



35TH TEXAS TECH UNIVERSITY
HEALTH SCIENCES CENTER
GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

STUDENT RESEARCH WEEK

THE LORD OF THE GENES

35TH ANNUAL STUDENT RESEARCH WEEK

February 28- March 3, 2023
Texas Tech University Health Sciences Center (TTUHSC)
Lubbock, Texas

The Graduate School of Biomedical Sciences 2023 Student Research Week Committee:

Director: Morgana Kellogg

Vice Director of Poster Competition: Melissa McHann

Vice Director of Operations & Judging: Tasmin Omy

Vice Director of Marketing: Brent Kisby

Website design and maintenance: Danny Boren, Graduate School of Biomedical Sciences

Communications and social media: Jordan Pape, Office of Communications & Marketing; Ashlee Rigsby, Graduate School of Biomedical Sciences

Speaker arrangements: Leslie Fowler, Graduate School of Biomedical Sciences

Abstract book design: Ashlee Rigsby, Graduate School of Biomedical Sciences

Student Research Week Banquet: Marilyn Mathew and Skylar Tran, Graduate School of Biomedical Sciences Graduate Student Association

The 2023 Student Research Week Committee would like to extend their warmest thanks to the following for their contributions and support in making Student Research Week a great success this year:

The Graduate School of Biomedical Sciences staff: Leslie Fowler, Ashlee Rigsby, Pam Johnson, Debbie Martinez, and Tres Boren

The Office of Communications and Marketing: Jordan Pape and Junior Jimenez

The Office of the President: Bryce Looney

The School of Medicine Office of the Dean: Charity Donaldson

The departments of immunology and molecular microbiology, cell biology and biochemistry, pharmacology and neuroscience, cell physiology and molecular biophysics, medical education and graduate medical education;

Graduate School of Biomedical Sciences at Lubbock, Abilene, and Amarillo, the School of Medicine, the School of Nursing, the School of Health Professions, the School of Pharmacy, the Office of Interprofessional Education, and Texas Tech University.

Dr. Beverly Chilton for establishing the Bette B. Chilton scholarship in honor of her mother.

Dr. Robert Weinberg for donating his keynote speaker honorarium as a student scholarship.

We also are very grateful to all the TTUHSC faculty and staff for their guidance and support.

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Information about TTUHSC, including information about the Graduate School of Biomedical Sciences, can be found at www.ttuhs.edu.

FRIDAY, MARCH 3, 2023

KEYNOTE LECTURERS

Dr. Robert Weinberg, MIT

10:15 am - 11:15 am

Dr. Peter Walter, Altos Labs Bay Area Institute of Science

1:15 pm - 2:15 pm

STUDENT SPEAKERS

8:30 am - 9:55 am

Balakrishna Koneru

Md. Sariful Islam

Ashok Siwal

Alejandra Gomez

Sejal Rajesh Jadhav

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Greetings:

It is my great pleasure to welcome everyone to the 2023 Student Research Week on February 28th-March 3rd. The theme for this year's event is "Lord of the Genes," and we are very pleased to host two highly distinguished keynote speakers: Dr. Robert A. Weinberg, PhD, the Daniel K. Ludwig Professor for Cancer Research in the Whitehead Institute at MIT; and Dr. Peter Walter, Director of the Bay Area Institute of Science at Altos Labs and Professor at the University of California, San Francisco.

I am extremely indebted to the 2023 Student Research Week Organizing Committee: Morgana Kellogg (Director), Brent Kisby (Vice-Director of Marketing), Tasmin Omy (Vice-Director of Operations), Melissa McHann (Vice-Director of Poster Coordination), Marilyn Mathew (GSA President), Nghi Tran (GSA Vice-President), and Elisa Biondo (Medical School Liaison). They have all done a tremendous job! I am particularly grateful for the hard work and assistance from Pam Johnson, Kari Dickson, Leslie Fowler, Ashlee Rigsby, Tres Boren, and the faculty and staff of the Department of Cell Biology and Biochemistry. Also special thanks to the host department chairs, Drs. Ganapathy and DuFour, and Dr. Jones for coordinating activities with the School of Medicine. The GSBS faculty, staff, and students make Student Research Week a success year after year. Finally, I would like to thank Chancellor Mitchell, President Rice-Spearman, Provost D'Agostino, Senior Vice-President for Research McMahon, Dean Berk, Dean Evans, Dean Sechrist, Dean Kuo, Dean Carrino and Drs. Prien, Guan, Neugebauer, Ganapathy, Abbruscato, Srivastava, Shurmur, and Chilton for their support that has made this event possible.

To help celebrate the 35th Student Research Week, the GSBS, the GSA, and the Department of Cell Biology and Biochemistry are very excited to host a dinner and evening at the American Windmill Museum. Funds raised from donations and a silent auction that evening will be used to support student scholarships. Thanks to all donors for their help in making this special event possible.

This year we have a special IPE session entitled "Collaboration and Where to Find It: an ALS Case Study" featuring an excellent IPE panel: Susan Sneed, Dr. Gail Cornwall, Dr. Andre Newcombe, Dr. John Norbury, and Dr. Bryan Sutton. Please join me in thanking them for sharing their time and expertise. Every year, the GSBS Student Research Week is a wonderful opportunity to meet our students, learn about their work, and discuss research in general. Thanks to the students, faculty and staff for participating.

Let's greet all of our speakers with a warm West Texas welcome! Thanks much and all the best!

Brandt L Schneider

Dean of the Graduate School of Biomedical Sciences



On behalf of the Student Research Week (SRW) committee, we want to welcome you to the 35th annual Student Research Week 2023: "Lord of the Genes". SRW is an annual event organized by student volunteers in the Texas Tech University Health Sciences (TTUHSC) Graduate School of Biomedical Science (GSBS), Lubbock Campus. SRW is an incredible event that brings together students from different TTU and TTUHSC schools and campuses, which gives them the opportunity to present their research, meet with distinguished keynote speakers, network with other students, and win awards throughout the week. During SRW, students will share their research in a hybrid format, with an in-person poster session at the Academic Event Center and a virtual judging presentation via Zoom. Throughout the week, students also have the opportunity to learn about scientific discoveries from distinguished keynote speakers, student speakers, and by engaging with other students at their posters.

Each year, SRW features a new theme highlighting advances in various areas of biomedical research. This year's theme is Lord of the Genes: Cell Biology and Biochemistry. Besides being a huge LOTR fan, in CBB, many of us focus on different aspects of cell homeostasis. For some, p53 is the "lord of the genes" since it is involved in tumorigenesis and is the "guardian of the genome". For others, SRP, which targets 30% of the proteome, is one of the Lord of the Genes. I wanted to include every facet of biochemistry and cell biology, and leave it vague enough that everyone can feel included, especially other departments.

Robert Weinberg, PhD will be giving his talk titled, "Mechanisms of Malignant Progression" at 10:15am on Friday by Zoom and broadcasted in the Academic Event Center. Dr. Weinberg received both his undergraduate- and graduate-level education in the Department of Biology of the Massachusetts Institute of Technology (MIT) in the years 1960 to 1969. After post-doctoral stays at The Weizmann Institute in Israel and the Salk Institute in California, he was asked to return to MIT where he assumed a faculty-level position in 1974. He has continued as a member of the MIT Department of Biology since that time with the additional association with the affiliated Whitehead Institute for Biomedical Research since 1982. His research has been focused over the past four decades on the molecular and biochemical determinants of neoplastic cell transformation and led to the discovery of the first functionally validated human oncogene (Ras) in 1979-81 and the isolation of the first validated tumor suppressor gene, RB, in 1986. This work led in subsequent years to the first experimental transformation of normal human cells into neoplastic cells in 1999. Since 2004, his group has been increasingly focused on the mechanisms by which the cell-biological program termed the epithelial-mesenchymal transition (EMT) confers on carcinoma cells many of the traits that are required for invasion and metastasis formation. Among other discoveries, they demonstrated in 2008 that the EMT program could create de novo carcinoma cells with the properties of cancer stem cells.

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Peter Walter, Ph.D. will be giving his talk titled, “Targeting the Cell’s Stress Pathways” at 1:15pm on Friday in the Academic Event center. Peter Walter is the Institute Director at the Altos Labs Bay Area Institute of Science. Peter recently retired from UCSF and HHMI and is a Distinguished Professor Emeritus at the Department of Biochemistry and Biophysics at UCSF and an HHMI Investigator Emeritus. He graduated from the Free University of Berlin in 1976 and received his Master of Science in Organic Chemistry from Vanderbilt University in 1977. In 1981 he obtained his PhD in Biochemistry at The Rockefeller University. In 1983, Peter joined the faculty of the Department of Biochemistry and Biophysics at the University of California at San Francisco and served as Department Chair from 2001 until 2008. His laboratory has produced groundbreaking research related to the identification and characterization of key proteostasis networks including the Unfolded Protein and Integrated Stress Responses. His contributions to science have been recognized with many distinguished awards, including the Eli Lilly Award, Passano Award, Wiley Prize, Stein & Moore Award, Gairdner Award, E.B. Wilson Medal, Otto Warburg Medal, Jung Prize, 2012 Ehrlich and Darmstaedter Prize, 2014 Shaw Prize, 2014 Lasker Award, 2015 Vilcek Prize, 2018 Breakthrough Prize and 2020 UCSF Lifetime Achievement in Mentoring Award.

These scientists are impressive and outstanding scientists that fully represent this year’s theme with their discoveries, their research, and their achievements. The SRW committee encourages everyone to attend their presentations on Friday, which will include student-speaker meet and greets and will be followed by a poster awards ceremony.

The SRW poster competition, starting the afternoon of Tuesday, February 28th and ending the afternoon of Thursday, March 3rd, gives students the opportunity to present their research and view the research of other students in a conference-like atmosphere. There will be students from all TTU and TTUHSC campuses, with around 260 students presenting their research this year both virtually and in-person. We welcome everyone to attend the virtual poster competitions on Zoom throughout the week. We would also like to invite everyone to visit the posters in-person at our open poster sessions to learn about ongoing student research projects on Tuesday February 28th through Thursday March 2nd in the Academic Event Center from 12pm to 1pm and 4pm to 5pm.

SRW would not be possible without the tireless and dedicated efforts of numerous people working to make it the success it is. We would like to thank the faculty and staff of the GSBS, the Department of Cell Biology and Biochemistry, Offices of Student Services and Marketing and Communications, and the School of Medicine. We would also like to thank President Rice-Spearman, Chancellor Mitchell, Dr. McMahon, Dr. D’Agostino, Dr. Schneider, Dr. Grisham, Dr. Jones, Dr. Prien, Dr. Berk, Dr. Norbury, and Dr. Newcome. Lastly, we want to thank all the participants in the 35th annual Student Research Week, as their ideas, research, and collaborative efforts make this such a successful event each year.

Sincerely,

The 35th Annual Student Research Week Committee
Morgana Kellogg, Melissa McHann, Brent Kisby, and Tasmin Omy

MONDAY, FEBRUARY 27

12:00 pm - 2:00 pm *NIKON Workshop*

TUESDAY, FEBRUARY 28

9:00 am - 12:00 pm *Vendor Fair*

12:00 pm - 1:00 pm *Poster Session I*

4:00 pm - 5:00 pm *Poster Session II*

WEDNESDAY, MARCH 1

12:00 pm - 1:00 pm *Poster Session III*

4:00 pm - 5:00 pm *Poster Session IV*

THURSDAY, MARCH 2

12:00 pm - 1:00 pm *Poster Session V*

4:00 pm - 5:00 pm *Poster Session VI*

6:00 pm - 9:00 pm *GSBS Student Banquet*

FRIDAY, MARCH 3

8:30 am - 9:55 am *Student Speakers*

10:15 am - 11:15 am *Dr. Robert Weinberg*

12:00 pm - 1:00 pm *Lunch, IPE Panel*

1:15 pm - 2:15 pm *Dr. Peter Walter*

3:15 pm - 3:30 pm *Remarks from TTUHSC Leadership*

3:30 pm - 4:00 pm *Awards Ceremony*



Dr. Robert Weinberg received both his undergraduate- and graduate-level education in the Department of Biology of the Massachusetts Institute of Technology (MIT) in the years 1960 to 1969. After post-doctoral stays at The Weizmann Institute in Israel and the Salk Institute in California, he was asked to return to MIT where he assumed a faculty-level position in 1974. He has continued as a member of the MIT Department of Biology since that time with the additional association with the affiliated

Whitehead Institute for Biomedical Research since 1982. His research has been focused over the past four decades on the molecular and biochemical determinants of neoplastic cell transformation and led to the discovery of the first functionally validated human oncogene (Ras) in 1979-81 and the isolation of the first validated tumor suppressor gene, RB, in 1986. This work led in subsequent years to the first experimental transformation of normal human cells into neoplastic cells in 1999. Since 2004, his group has been increasingly focused on the mechanisms by which the cell-biological program termed the epithelial-mesenchymal transition (EMT) confers on carcinoma cells many of the traits that are required for invasion and metastasis formation. Among other discoveries, they demonstrated in 2008 that the EMT program could create de novo carcinoma cells with the properties of cancer stem cells.



Dr. Peter Walter is the Institute Director, Altos Labs Bay Area Institute of Science. Peter recently retired from UCSF and HHMI and is a Distinguished Professor Emeritus, Department of Biochemistry and Biophysics at UCSF and an HHMI Investigator Emeritus. He graduated from the Free University of Berlin in 1976 and received his Master of Science in Organic Chemistry from Vanderbilt University in 1977. In 1981 he obtained his PhD in Biochemistry at The Rockefeller University. In 1983, Peter joined

the faculty of the Department of Biochemistry and Biophysics at the University of California at San Francisco and served as Department Chair from 2001 until 2008. His laboratory has produced groundbreaking research related to the identification and characterization of key proteostasis networks including the Unfolded Protein and Integrated Stress Responses. His contributions to science have been recognized with many distinguished awards, including the Eli Lilly Award, Passano Award, Wiley Prize, Stein & Moore Award, Gairdner Award, E.B. Wilson Medal, Otto Warburg Medal, Jung Prize, 2012 Ehrlich and Darmstaedter Prize, 2014 Shaw Prize, 2014 Lasker Award, 2015 Vilcek Prize, 2018 Breakthrough Prize and 2020 UCSF Lifetime Achievement in Mentoring Award.

JUDGES

Tom Abbruscato
Khondker Ayesha Akter
Abraham Alahmad
Nimat Alam
Sharilyn Almodovar
Jeremy Bailoo
Ganga Baskar
Susan Bergeson
Yangzom Doma Bhutia
Keith Bishop
Michael Blanton
Alex Bobulescu
Theresa Byrd
Rama Chemitiganti
Gail Cornwall
John Culberson
Hemalata Deshmukh
Quynh Hoa Do
Jannette Dufour
Hebatollah Ewida
Nadia German
John Griswold
Petar Grozdanov
Josee Guindon
Abdul Hamood
Ebtesam Islam
William Jones
Subash Kairamkonda
Min Kang
Fnu Kapil
Andrey Karamyshev
Michelle Keyel
Cassie Kruczek
Sudhir Kshirsagar
Sudhir Kumar
Irene La-Beck
J Josh Lawrence
Clinton MacDonald
Chinnadurai Mani
Raul Martinez Zaguilan
Barry Maurer
Mariacristina Mazzitelli

Michael Melkus
Srinivas Nandana
Volker Neugebauer
Kumar Palle
Lindsay Penrose
Lisa Pomeroy
Igor Ponomarev
Kevin Pruitt
Barath Rangaswamy
P. Hemachandra Reddy
Fernanda Rosa
Kendra Rumbaugh
Karunakar Saamarthy
Ujala Sehar
Sambantham Shanmugam
Cameron Smith
Jennifer Souter
Sanjay Srivastava
Julie St. John
Katherine Stapes
Dan Stuart
Tom Tenner
Lukman Tijani
Scott Trasti
Manisha Tripathi
Todd Triplett
Alice Villalobos
Laurence Wood
Victoria Young

CRITERIA FOR SCIENTIFIC RESEARCH

SIGNIFICANCE/INTRODUCTION:

1. Does the student address the significance of the work and why it is important to conduct this research?
2. Is the background information clearly presented?
3. Are the goals or aims clearly stated?

ORGANIZATION:

1. Were the methods mentioned/explained?
2. Is the presentation well organized?
3. Does the student show knowledge of the subject?

RESULTS:

1. Are tables or graphs used to enhance the presentation?
2. Does the presenter explain the figures and results?
3. Are the figures appropriately formatted and clearly understood?

DISCUSSION/CONCLUSIONS:

1. Does the presenter summarize the findings?
2. Can the presenter discuss what the findings mean and their significance?
3. Does presenter identify future direction for project?

PRESENTATION /RESPONSE TO QUESTIONS:

1. Was the presentation effective (eye contact, delivery)?
2. Does the presenter use time effectively?
3. Does the presenter answer questions in an organized, concise fashion?

CRITERIA FOR CASE STUDY

SIGNIFICANCE/INTRODUCTION:

1. Is the case history clearly defined?
2. Does the student provide sufficient patient background and literature for understanding the medical problem?
3. Is the rationale for reporting the case and the uniqueness of the case clearly explained?

METHODS:

1. Are clinical tests clearly explained, and are normal values of laboratory tests reported?
2. Is the process of determining the appropriate diagnosis, including any differential diagnoses, clearly explained?

RESULTS:

1. Are patient clinical results pertinent and clearly presented?
2. Is the presented diagnosis sufficiently addressed by results/future clinical work?

DISCUSSION/CONCLUSIONS:

1. Are conclusions clearly described and supported by observations or literature?
2. Is the recommended treatment or outcome of treatment discussed?
3. Are directions for future investigation or management of similar cases indicated?

PRESENTATION /RESPONSE TO QUESTIONS:

1. Was the presentation effective (eye contact, delivery)?
2. Does the presenter use time effectively?
3. Does the presenter answer questions in an organized, concise fashion?

CRITERIA FOR LITERATURE REVIEW

SIGNIFICANCE/INTRODUCTION:

1. Is a gap in knowledge identified and is the rationale for the review clear and novel?
2. Are objectives/aims clearly defined?

METHODS:

1. Are complex search strategies used (multiple keywords, etc.)?
2. Are multiple databases used?
3. Are the methods for searching literature clearly defined?

RESULTS:

1. Is a thorough review of the existing literature performed and are results well organized?
2. Are results synthesized into something new and relevant?
3. Is a summary table/graph present, easy to understand, and visually appealing?
4. Are references appropriately cited?

DISCUSSION/CONCLUSIONS:

1. Are review findings clearly summarized?
2. Is the importance of findings addressed?
3. Are future directions/areas of exploration clearly listed?

PRESENTATION /RESPONSE TO QUESTIONS:

1. Was the presentation effective (eye contact, delivery)?
2. Does the presenter use time effectively?
3. Does the presenter answer questions in an organized, concise fashion?

PARTICIPANTS

alphabetical by first name

UNDERGRADUATE

Abraham Le
Andrew Ibrahim
Ava Oliver
Daniel Latour
Jocelyn Medina
Lars Northcut
Lauren Conger
Mark Gao
Melanie Johnson

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Sana Erabti
Sara Al Dogom
Sarah Neal Secrest Horne
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Seena Firouzbakht
Shayan Sarrami

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 Vishal Bandaru
 Wooyoung Jang
 Yaw Adu
 Yezan Hadidi
 Zarif Gani
 Zheyar Seyan
 Zoe Davis

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 Akhila Reddy
 Akshay Raghuram
 Amber Nanni
 Anthony Pham
 Ardalan Naghian
 Bayli Davis
 Beth Green
 Caezaan Keshvani
 Caitlyn Matejka
 Caleb Hawkes
 Carter Chapman
 Elliott Norman
 Elwin Rutayomba
 Emily Brumfield
 Ferris Zeitouni
 Genesy Aickareth
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 Hazael Hernandez
 Jaclyn Cole

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 Malvika Ramesh
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 Neil Jain
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 Sachi Khemka
 Shakira Meltan
 Shruti Patel
 Taha Hassan
 Veena Agusala
 Vishaal Kondoor
 Vivie Tran
 Wooyoung Jang
 Zeid Nawas

BASIC SCIENCE YEARS 1-2

Akshay Raghuram
 Amanda Garcia
 Anna Farooqi
 Anthony Rudd
 Benjamin Lin
 Blaze Yeater
 Brent Kisby

Brianna Mendoza
 Brinkley Cover
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 Charles Zhu
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 Erika Orlov
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 Habib Abla
 Hamed Khedmatgozar
 Hannaneh Ghavanloughajar
 Harrison Benson
 Harry May
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 Jean Dai
 Joshua Theriot
 Kerri Spontarelli
 Kseniia Orobets
 Lauretta Anne Pierre
 Leanne Thomas
 Manas Yogendra Agrawal
 Marilyn Mathew
 Matthew Bender
 Md Sariful Islam Howlader
 Megan Ashton
 Megan Skains
 Mosharaf Mahmud Syed
 Naresh Sah
 Neha Sewant
 Nghi Tran
 Nhi Nguyen
 Pamela Luna
 Philip
 Prachi Patel
 Rebecca Schneider
 Richard Zhu
 Robert C Barnes
 Roberto Mendóza

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alphabetical by first name

SEJAL RAJESH JADHAV

Tanisha Basu

Tasmin Rahman Omy

Wyatt Paulishak

BASIC SCIENCE YEARS 3+

Alejandra Gomez

Ashok Silwal

Bayley Richardson

Canice Dancel

Dalia Martinez-Marin

Emily Vanderpool

Emily Wright

Johanna Villarreal

Joshua Willms

Kevin Bass

Melissa McHann

Morgana Kellogg

Peyton Presto

Praneetha Panthagani

Rebecca Gabrilkska

Sadisna Shahi

Sarah Miller

Sayanika Dutta

Sejal Sharma

Trevor Burrow

TYLER SNIEGOWSKI

Valeria Jaramillo-Martinez

Xiaobo Liu

POSTDOCTORAL

BALAKRISHNA KONERU

Nico Antenucci

Rachel Babcock

Ujala Sehar

Victoria Young

SCHOOL OF NURSING

Andrew Adams and Mandi Machen BSN, RN

Anne Feeler BSN, RN, CCRN, TCRN, NE-BC and
Angela Peterson BSN, RN, CEN, TCRN

Brooke Travers and Katy Baker

Caroline Overman BSN, RN and Crystal Johns BSN,
RN

Chelsea Potts BSN, RN and Shahn Laymance BSN,
RN

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RN

Emily Ochoa BSN, RN, CCRN and Erin Hayward
BSN, RN, CCRN

Jessica Aguilar BSN, RN and Amy Valenta BSN, RN

Kari Fennell and Amanda Gray

Kelly Finney BSN, RN and Staci Ramos BSN, RN

McKenzie Nees (she/her) BSN, RN and Margaret
Salazar (she/her) BSN, RN

Samantha Loreda BSN, RN, CCRN and Ena
Osmanovic BSN, RN, CEN

Tayler Havard BSN, RN and Marissa V. Herrera BSN,
RN

Valerye Beckham BSN, RN and Brianda Patino
BSN, RN

JUDGING GROUPS: ACADEMIC EVENT CENTER

TUESDAY, FEB. 28, 1 - 4 PM

Adithi Govindan
 Angelica Nibo
 Benjamin Olivo
 Caitlin Lowry
 Cesar Sanchez-Villalobos
 Destiny Ugwa
 Emily Bernstein
 Erika Orlov
 Hassan Saleh
 Jake Wilemon
 Lauren Danielle Dixon
 Neeti Swami
 Nico Antenucci
 Robert Hayden Meeks
 Sarah Neal Secrest Horne
 Tristin Chaudhury

WEDNESDAY, MAR. 1, 9 AM - 12 PM

Aaron Woodard
 Akhila Reddy
 Alexandria Arnett
 Amanda Garcia
 Asha E Worsham
 Ava Oliver
 Charles Zhu
 Easton Brewer
 Elise Bolin
 Flavia Sardela de Miranda
 Foster Ogu
 Hannaneh Ghavanloughajar
 Jaclyn Cole
 Jenna Hefele
 Joseph Oti-Nimoh
 Joshua Theriot
 Kailey Shannon
 Ketan Jolly
 Kyle Armstrong
 Malvika Ramesh
 Maria Batchinsky

Maribel Castro
 Mark Gao
 Michelle Onuoha
 Mitchell DeVolder
 Morgana Kellogg
 Muhammed Aaqil Shariff
 Neil Jain
 Ricardo Isaiah Garcia
 Sachi Khemka
 Sara Ahmed
 Scott R Burns
 Taylor Fuquay
 Zheyar Seyan

WEDNESDAY, MAR. 1, 1 - 4 PM

Aaron Woodard
 Abraham Le
 Akash Maheshwari
 Anna Farooqi
 Anthony Bruccolieri
 Anthony Bruccolierree
 Anthony Rudd
 Ardalan Naghian
 Caitlyn Matejka
 Carina Watson
 Coltyn Wagnon
 Cristian J Hernandez
 Davin Devara
 Dung Thi My Le
 Elliott Norman
 Emily Vanderpool
 Ferris Zeitouni
 Genesy Aickareth
 Geoff Thomas
 Hannah Jackson
 Harrison Woods
 Isha Shura
 Jad F Zeitouni
 Jennifer Krabacher
 Jessica Ramirez

Jocelyn Medina
 John Wolpert
 Julia Lange
 Junior Clark
 Kaylen Meers
 Khaja Siddiqui
 Kimberly Brown
 Kyle Mangum
 Liam Ung
 Lori Thompson
 Madeline Yuan
 Matt Buxton
 Muneeza Sheikh
 Neha Sewant
 Praneetha Panthagani
 Riley Fortner
 Roald Credo
 Robert Bustamante
 Roberto Mendóza
 Rorie Brister
 Sana Erabti
 Seena Firouzbakht
 Tenley Lehman
 TYLER SNIÉGOWSKI
 Vishaal Kondoor
 Vivie Tran
 Xiaobo Liu
 Yezan Hadidi
 Zeid Nawas

THURSDAY, MAR. 2 9 AM - 12 PM

Akshay Raghuram
 Alex Sutter
 Andrew Ibrahim
 Anthony Pham
 Benjamin Lin
 Beth Green
 Brandon Youssi
 Brent Kisby
 Chandler W. Nolte

JUDGING GROUPS: ACADEMIC EVENT CENTER

THURSDAY, MAR. 2 9 AM - 12 PM

Devi Nair
 Elaine Nava
 Elwin Rutayomba
 Erin Adams
 Geetha Priya Boligala
 Grayson Braziel
 Hailey Kreusel
 Hamed Khedmatgozar
 Javaria Baig
 Jean Dai
 Joshua Willms
 Kerri Spontarelli
 Kevin Nguyen
 Lauren Conger
 Lewis Kelly
 Luis Fernandez-Nava
 March 2 1-4pm
 Marilyn Mathew
 Matthew Bender
 Megan Ashton
 Melissa McHann
 Michael Shalaby
 Mikka Lankford
 Natalie Jameson
 Nhi Nguyen
 Nicole Remmert
 Prachi Patel
 Rebecca Gabrielska
 Rebecca Schneider
 Rebecca Schneider
 Richard Zhu
 Robert C Barnes
 Sarah Miller
 Shyam Sheladia
 Sunday Lawal
 Tasmin Rahman Omy
 Yesenia Barrios
 Zarif Gani

THURSDAY, MAR. 2, 1 - 4 PM

Anish Reddy
 Ashok Silwal
 Brandon Couch
 Brigid Cruser
 Carter Chapman
 Clarissa Palacios
 Dan Hayward
 Emily Brumfield
 Harrison Benson
 Hazael Hernandez
 Jaxon T Baum
 Jocelin Loewen
 Joseph Silvaggio
 Kevin Bass
 Kofi Agyare
 Loretta Anne Pierre
 Md Sariful Islam Howlader
 Megan Skains
 Mosharaf Mahmud Syed
 Nghi Tran
 Nicholas Wagner
 Olumakinwa Olayemi
 Peyton Presto
 Philip Adjei
 Sadisna Shahi
 Sara Al Dogom
 Sejal Sharma
 Simmone Spielmann
 Stephanie Moreno
 Stephanie Moreno
 Tanisha Basu
 Trevor Burrow
 Wyatt Paulishak
 Yaw Adu

JUDGING GROUPS: 2D101

TUESDAY, FEB. 28, 1 - 4 PM

Alejandra Gomez
 Daniel Latour
 Hannah Curtis
 Johanna Villarreal
 Lars Northcut
 Luis Fernando Castro
 Merry Mathew
 Muhammad Hasham Sarwar
 Peyton Presto
 Rachel Babcock
 Rebecka Nisbet
 Rohan Pendse
 Ujala Sehar
 Valeria Jaramillo-Martinez
 Victoria Young

WEDNESDAY, MAR. 1, 9 AM - 12 PM

Addie Pederson
 Alex Sutter
 Alexander Park
 Bayley Richardson
 Bayli Davis
 Caezaan Keshvani
 Caleb Hawkes
 Canice Dancel
 Flavia Sardela de Miranda
 Harry May
 Jodi Goldman
 Jonathan Kopel
 Melanie Johnson
 Nandini Ray
 Shakira Meltan
 Shayan Sarrami

WEDNESDAY, MAR. 1, 1 - 4 PM

Alex Zapata
 Amber Nanni
 Blake Harp
 Blaze Yeater

Cole Pollina
 Dalia Martinez-Marin
 Easton Brewer
 Emily Baysden
 Emily Wright
 Ganesh Acharya
 John Free
 Kiran Ali
 Kirie Psaromatis
 Kseniia Orobets
 Manas Yogendra Agrawal
 Naresh Sah
 Nicholas Householder
 Pamela Luna
 Rahul Atodaria
 Rebecca Joseph
 Ricardo H Franco, MD
 Ryan D Morgan
 Sai Pranathi Bingi
 Sayanika Dutta
 Shruti Patel
 Suyash Jain
 Taylor Prosser
 Vishal Bandaru
 Zheyar Seyan
 Zoe Davis

THURSDAY, MAR. 2 9 AM - 12 PM

Ashley Selman
 Christina Matl
 Kelsey Sprinkles
 Matt Li
 Nedha Kinnare
 Taha Hassan
 Wooyoung Jang
 Zheyar Seyan

THURSDAY, MAR. 2, 1 - 4 PM

Brianna Mendoza
 Brinkley Cover
 Habib Abla
 Irina Kim Cavdar
 Jiyeon Kim
 Kaitlyn Santineau
 Keegan Dunn
 Leanne Thomas
 Lucas Tobar
 Nicholas Vojtkofsky
 Radha Patel
 Shreya Mallena

UNDERGRADUATE

LAUREN CONGER, KERRI SPONTARELLI, PABLO ARTIGAS

Searching for the mechanism by which the Na/K pump mutations G99R and I327S cause Primary Aldosteronism

Primary Aldosteronism (PA) is a condition characterized by abnormal production of aldosterone resulting in hypertension and hypokalemia. Several mutations in the Na/K pump (NKA) gene *ATP1A1* have been identified in adrenal adenoma cells of patients, resulting in PA. The *ATP1A1* gene encodes the $\alpha 1$ subunit, which is the catalytic subunit of the NKA $\alpha\beta$ heterodimer. The NKA uses ATP hydrolysis to build electrochemical gradients by transporting $2K^+$ ions into and $3Na^+$ ions out of the cell. These gradients are essential for establishing resting membrane potential and secondary active transport. Most NKA-driven PA mutations result in a "gain-of-function" inward current that increases depolarization of the adrenal cells, leading to uncontrolled aldosterone production. However, reports so far indicate that the two mutants we study here, G99R and I327S, lack inward currents. To further investigate the mechanism by which these mutants may cause disease, we used two-electrode voltage clamp (TEVC) to evaluate the function of heterologously expressed NKA mutants in *Xenopus* oocytes and expressed their fluorescently tagged counterparts in human embryonic kidney cells (HEK 293 cells) to evaluate their trafficking to the plasma membrane. With TEVC we tested if there was a gain of function chloride leak that could have been missing from previous studies. Thus far, we identified that only the affinity for ions is affected, as previously reported. On the other hand, our preliminary results in cell culture indicate that both mutants appear to have the same plasma membrane localization as wild type pumps. These outcomes point to simply a loss of function by these mutations, as their PA-causing mechanism. In the future, we will evaluate this pharmacologically, with a mouse model recently acquired by our laboratory.

MARK R. GAO, REBECCA SCHNEIDER, & KENDRA P. RUMBAUGH, PH.D.

Determining the Virulence of Dispersed Cells from Pseudomonas Aeruginosa Biofilms In Vitro

Chronic wounds are frequently associated with the formation of a biofilm. Biofilms are communities of microorganisms surrounded by an extracellular polymeric substance (EPS), which can impede antibiotic potency and wound closure. Glycoside hydrolases (GHs) are enzymes that target the glycosidic linkages in the EPS and can induce bacterial dispersal from the protective biofilm matrix. Previous studies have suggested that dispersed cells are phenotypically distinct from their biofilm and planktonic counterparts. One important component of a bacterial phenotype is virulence, which allows a microbe to establish an infection and determines its ability to damage the host. In this study we hypothesized that enzymatically dispersed *Pseudomonas aeruginosa* (PA) cells are more virulent than planktonic cells. PA biofilms were established in vitro, and a GH solution was added to disperse the cells. Virulence was then measured by injecting *Galleria Mellonella* larva with 10 μ L of 10² CFU/mL dispersed or planktonic bacterial cells. From these experiments, we observed that PA dispersed from biofilms killed more *G. mellonella* larva than planktonic PA, suggesting increased virulence. We also observed that the presence of GHs did not necessarily cause PA to become any more/less virulent when in planktonic culture. This was also demonstrated by altering the concentrations of GHs, which made little to no difference in *G. mellonella* deaths. This revealed that PA cells dispersed from a biofilm are more likely to have increased virulence than cells grown in planktonic culture. Future studies will focus on determining the virulence of PA dispersed in vivo and its impact on infection.

ANDREW IBRAHIM; ZEID NAWAS, MS; MARINA ISKANDIR, MD; AND MOHAMMAD (MAC) ANSARI, MD

A case of Impella-assisted high-risk percutaneous coronary intervention in a patient with severe multivessel obstructive coronary artery disease

Introduction: Left ventricular assist devices are often required to achieve stable hemodynamic status in high-risk percutaneous coronary intervention (PCI). The Impella device provides temporary support to achieve stenting, particularly in patients with multivessel coronary artery disease and depressed left ventricular ejection fraction. We report a case in which hemodynamic support with the Impella device helped achieve multivessel PCI in an otherwise high surgical risk candidate. Such procedures are done nationwide, yet in the West Texas region, their use is still debated due to lack of awareness in community physicians. **Case Presentation:** We describe a 58-year-old male with past medical history of end-stage renal disease, type 2 diabetes, and hypertension presented to the emergency department for exertional dyspnea. Echocardiography displayed severely depressed ejection fraction. Coronary angiography revealed severe diffuse disease and multivessel stenosis: (1) two chronic total occlusions of the left circumflex coronary artery and proximal right coronary artery; (2) three distal-segment 90% stenotic lesions of the left anterior descending artery (LAD); and (3) 60% ostial stenosis of the left main coronary artery. Despite the patient's hemodynamic compromise, PCI was successfully performed without complication through support provided by Impella. After Impella insertion, PCI was performed to treat left circumflex and right coronary artery total occlusion and LAD stenosis with excellent results. Recovery in LV function was also observed post-PCI. **Conclusion:** In this complex high-risk case, hemodynamic stabilization provided by Impella was critical to achieving successful PCI. The patient remained conscious and hemodynamically stable during revascularization, likely due to left ventricular unloading by Impella. This case presents a glaring example of the usability of Impella as a treatment for otherwise high surgical risk candidates who lack treatment options. We intend to utilize this example in our patient-physician outreach education/exposure program, encouraging increased adoption of Impella use and personnel training in rural areas such as West Texas.

MELANIE JOHNSON, HAMED KHEDMATGOZAR, SAYANIKA DUTTA, DANIEL LATOUR, SRINIVAS NANDANA, MANISHA TRIPATHI

A Novel Therapeutic Compound to Inhibit Budding and Branching Phenotype in Benign Prostatic Hyperplasia

Introduction: Benign Prostatic Hyperplasia (BPH) is a widely prevalent urologic disease in men aged >50 years. It is hypothesized that embryonic re-awakening and branching morphogenesis drives hyperplasia in BPH. However, the molecular mechanisms that orchestrate the branching phenotype in BPH remain elusive. Current therapy with 5 α -reductase inhibitors (5ARI) that inhibit the conversion of testosterone to more potent dihydrotestosterone (DHT) and alpha-adrenergic receptor blockers (α -blockers), which inhibit smooth muscle contraction still leaves nearly a third of BPH patients with progressive disease, which underscores the need for new pathway discoveries and novel molecular-based mechanisms that drive therapy resistance. By overlapping gene expression profiles, i.e., common differentially expressed genes in three independent BPH patient cohorts, we have discovered that a key developmental pathway is active in BPH patients and could be targeted by a small molecule pathway inhibitor. Further, a recent study showed that glucocorticoids, a corticosteroid, is increased in BPH patients that develop 5ARI resistance; and glucocorticoids can induce budding and branching phenotype in BPH. So, we hypothesized that the small molecule pathway inhibitor would inhibit the budding and branching phenotype induced by glucocorticoids. **Methods:** We grew human BPH cells as organoids in 3D culture.

**DANIEL LATOUR BS, HAMED KHEDMATGOZAR MS, SAYANIKA DUTTA MS, SRINIVAS NANDANA PHD,
MANISHA TRIPATHI PHD***Generation and Application of a 3D-Organoid Culture Model for Benign Prostatic Hyperplasia*

Introduction: Benign prostatic hyperplasia (BPH) is the most prevalent urologic disease in men older than 50 years of age. Traditional cell culture methods used to study BPH biology include using BPH cell lines in a two-dimensional (2D) monolayer culture. However, these models often fail to reflect the physiology of the disease due to lack of the three-dimensional (3D) tissue architecture. Further, there is a paucity of animal models for BPH that mimic human disease progression. In lieu of these limitations, we developed a 3D human BPH organoid culture that simulates the tissue microenvironment of BPH. The goals are two-fold: a) to study the progression of BPH through utilizing the 3D culture of epithelia alone and a co-culture with stroma, and b) to screen for novel drugs for BPH. Methods: For the 3D-organoid culture, human prostate epithelial cells were mixed with media containing Matrigel. For the 3D co-culture, stromal cells were mixed with epithelial cells in varying ratios. The cultures were quantified for growth and the emerging buds and branches. Depending on the conditions and treatments, the organoids were harvested between 15-21 days. Results: We have developed a 3D organoid culture model of BPH utilizing four human BPH cell lines. BPH-1 epithelial cells form spheroids but do not form organoids. BHPe1, NHPe1 and RWPe1 epithelial cells form organoids with buds that develop into branches. Co-culturing epithelial cells with stromal cells significantly increased the branched organoids compared with epithelia alone. Further, the organoid numbers, buds and branches are significantly decreased upon addition of investigational drugs for BPH, suggesting the utility of this model system for the screening of therapeutic compounds. Conclusions: We have developed a 3D human BPH organoid model that mimics tissue architecture and human disease progression, and has great potential for translational research.

ABRAHAM LE, RAQEEB MOHAMMED*Gene expression analysis of Th1 and Th2 cytokines response from enriched T cells stimulated with Sm-p80 based vaccine*

Schistosomiasis, an infectious disease caused by blood flukes of *Schistosoma* spp., is still a major public health concern in endemic areas. A suitable vaccine is required for effective schistosomiasis control. TTUHSC's Center for Tropical Medicine and Infectious Diseases (CTMID) has created a vaccine candidate that targets Sm-p80, a functionally important subunit of the *Schistosoma mansoni* calpain protease, and is formulated in Glucopyranosyl Lipid Adjuvant-Stable Emulsion (GLA-SE), which is currently in phase I clinical trials. A preliminary study to better understand the immunological responses of vaccine candidate Sm-p80 may also be required. As a result, quantitative RT-PCR will be used to compare the gene expression of Th1 and Th2 cytokines in Sm-p80 stimulated and unstimulated T cells. Total RNA will be extracted for cDNA synthesis for use in qPCR. The gene expression of stimulated versus non-stimulated T cells will be characterized and compared using qRT-PCR. The findings of this study can be used to investigate T cell activity following schistosomiasis vaccination. For the analysis, more than one housekeeping gene will be used.

JOCELYN MEDINA

A correlation between ATRA deficiency and Alzheimer's Disease in mice through observation of lacZ expression as a quantification

Approximately 5.8 million Americans are living with Alzheimer's disease (AD). As the aging US population grows, 13.8 million Americans could have AD by 2050 without effective treatments. In this study, we propose that all-trans retinoic acid (ATRA), the bioactive metabolite of Vitamin A in brain, is deficient in Alzheimer's Disease (AD). It is widely accepted that the accumulation of amyloid beta ($A\beta$) leads to progressive cognitive decline. However, little is known of the mechanisms that disrupt the balance between amyloidogenic and non-amyloidogenic pathways. We propose that antioxidant depletion is a necessary precursor to AD onset and that ATRA levels is a major antioxidant that is modified through diet. Increased knowledge of mechanisms linking oxidative stress and antioxidant depletion to $A\beta$ generation and AD pathogenesis would assist in the development of prevention-based treatment strategies. Towards this goal, we have obtained RARE-lacZ mice, which drives lacZ expression in neurons that have sufficient ATRA levels. In preliminary experiments that employ X-Gal to reveal lacZ expression, we have validated the use of these mice. The expression of lacZ was found to be highest in the dentate gyrus. Additional quantification will allow us to determine exact which types of neurons in the dentate gyrus depend on ATRA levels. In our next experiments, we will employ immunohistochemistry in an attempt to improve the detection of lacZ protein. In addition, we will also test the influence of background strain by crossing RARE-lacZ mice to a mixed background. Finally, we will test the hypothesis that learning alters lacZ expression in a water T-maze. Brains will then be examined to determine the extent to which lacZ expression is altered.

LARS NORTHCUT, REBECCA GABRILSKA, KENDRA RUMBAUGH, PHD

Improving the Efficacy of Antifungals Using Dispersal Agents on Mixed-Kingdom Biofilms

Skin and soft tissue infections represent a wide variety of skin pathologies from acute acne to chronic, non-healing wounds. Microbes such as bacteria and fungi take advantage of damaged tissue to invade, colonize, and often cause infection of cutaneous tissues. Many microbes can protect themselves from host immune responses by forming biofilms. Biofilms are a phenotypic state different from free-floating, planktonic populations, where cells form an adhered, protected environment to thrive. In turn, disease-associated biofilms are significantly more difficult to rid from the body, both by host immunity and standard clinical intervention. Recalcitrant biofilms are common causes for the persistence of infections, as reflected in chronic wounds. Infections within a non-healing wound are often caused by skin pathogens such as the bacteria *Staphylococcus aureus* and fungus *Candida albicans* and are known to work synergistically to establish mixed kingdom biofilm infections in wounds. In hopes of improving conventional antimicrobial treatments, targeting biofilm components has become of significant importance. Glycoside hydrolases (GH), which attack glycosidic bonds within polysaccharides, have shown some promise for dispersing biofilms through the degradation of the protective exopolysaccharide layer of the biofilm. Once disrupted, antimicrobial treatments can reach vulnerable cells and clear the infection. In this study, we are assessing these enzymes for their potential use against *S. aureus*-*C. albicans* biofilms. We hypothesize that hydrolases effectively target mixed-kingdom wound biofilms, improving the efficacy of antimicrobial drugs. Our results suggest that within in vitro biofilms, administration of GHs to mature biofilms improves antifungal treatments. Future studies will include translation and efficacy testing in a wound-like environment. With the ever-rising risk of antibiotic resistance and host toxicity of antifungal drugs, GHs could have promise as a combination-therapeutic in clinical settings.

AVA OLIVER, ALINA SCHNEIDER, AMANDA GARCIA, ISABEL CASTRO-PIEDRAS, PHD, SHARILYN ALMODOVAR, PHD

Impact of HIV and SARS-CoV-2 Co-Infection and Immune Responses in the Human Airway

The COVID-19 pandemic provides an opportunity for the collision of SARS-CoV-2 with chronic infections such as Human Immunodeficiency Virus (HIV). We previously studied the impact of HIV on COVID and showed prior HIV+ status did not increase inflammatory cytokines associated with COVID-19. However, SARS-CoV-2-mediated airway immune responses in the presence of HIV strains is unknown. HIV interacts with CCR5 (HIV-R5 strain) or CXCR4 (HIV-X4 strain) coreceptors and triggers different degrees of inflammation that may damage the lungs. Our previous studies demonstrated different biological effects of R5 or X4 viruses on pulmonary vascular cells. Herein, we investigated the impact of HIV on airway (epithelial) cells, the portal of entry for SARS-CoV-2. We hypothesized that the R5 and X4 virus will trigger different immune responses in epithelial cells exposed to SARS-CoV-2 spike protein. We cultured human bronchial epithelial cells (HBECs) on air-liquid interface (ALI). We challenged HBECs with recombinant HIV R5 or X4 at the basolateral side for 48 hours. We added recombinant SARS-CoV-2 spike protein (S1) at 50ng/mL on the apical side for 4 hours followed by analyses of innate/adaptive immune response gene expression. Combinations of HIV-R5 and S1 upregulated IRAK1 and downregulated MPO, CXCR3, CSF2, CCR4, LYZ, CD8A, and ITGAM gene expression. Cell signaling analysis in Reactome suggested that HIV-R5+S1 affected pathways associated with neutrophil degranulation, toll-like receptor cascades, differentiation of myeloid cells, and NF-kB signaling. However, combinations of HIV-X4 and S1 upregulated CXCL10 and downregulated CD14, CD4, and FOXP3 gene expression. Reactome analysis suggested that HIV-X4+S1 affected pathways associated with HIV binding/entry, HIV-Nef mediated CD4 down-regulation, and development of regulatory T cells. Our preliminary observations let us conclude that pulmonary epithelial cells exposed to HIV-R5 or X4 combined with S1 triggered different immune signaling pathways. Further studies are needed to determine the impact of HIV/coronavirus co-infections in the vasculature.

GRADUATE MEDICAL EDUCATION SCIENCES

KYLE ARMSTRONG, BENJAMIN OLIVO, CASSANDRA KRUCZEK PHD, GURVINDER KAUR PHD

Anki and Formative Assessments in Tandem: The Medical Educator's Crystal Ball for Predicting Student Success and Academic Performance

At TTUHSC, the medical school curriculum begins with fast-paced basic science courses. During the first semester of the pre-clerkship curriculum, medical students take the General Principles (GPX) block. Historically GPX study resources similar to those presented in this project have been sparse and consequently, students have struggled assimilating the presented content. The purpose of this study was to determine if implementation of formative assessments (comprehensive Anki deck and mini-quizzes) provided throughout GPX would improve student exam performance, increase student satisfaction, and alleviate student stress. 3,000 flashcards were created on the spaced repetition software, Anki, covering high yield course material and released at the beginning of GPX. Six mini-quizzes (10-15 questions each), covering high yield material were created and released every week of the block. Answer rationales were provided to the students, providing immediate feedback to help identify areas of strength and weakness.

**KYLE ARMSTRONG, BENJAMIN OLIVO, CASSANDRA KRUCZEK PHD, GURVINDER KAUR PHD
(CONTINUED)**

Correlation between mini-quiz performance and Unit Exam performance was analyzed to determine the effectiveness of formative assessments. Additionally, students were surveyed to assess student satisfaction and stress after using the Anki deck. Analysis of formative assessment data revealed a strong correlation with graded exam performance ($r^2 = 0.2-0.46$, $p < 0.0001$) for students who completed 2 or more mini-quizzes ($n=78$). Students who completed >2 mini-quizzes scored significantly higher compared to students ($n=57$) who completed <2 mini-quizzes (86% vs 81%, $p < 0.01$). Additionally, 97.7% ($n=86$) of students reported the Anki deck helped alleviate exam stress and anxiety. Overall, formative assessments significantly correlate with increased academic performance and reduced student stress. Given the positive correlation between formative assessment and exam performance, medical educators can use the two in tandem as a predictive model for student success early in the block.

EMILY BERNSTEIN B.S., BEVERLY S. CHILTON PH.D., JANNETTE DUFOUR PH.D., GURVINDER KAUR PH.D., DEPARTMENT OF MEDICAL EDUCATION, DEPARTMENT OF CELL BIOLOGY AND BIOCHEMISTRY, TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER, LUBBOCK, TX

Connecting the Layers: Enhancing Medical Students Knowledge of Male and Female Perineum Anatomy

Background: At TTUHSC, first year medical students (MS1s) begin their medical training by learning human anatomy through lectures and cadaveric dissections in the Anatomy, Histology and Embryology (AHE) block. Historically, pelvis and perineum (P&P) anatomy is considered one of the most difficult topics. A needs-analysis was performed by surveying MS1s ($n=47$) who had completed anatomy with 63% indicating P&P anatomy as the most difficult with limited resources, time, and old models hindering their ability to master content. We hypothesized that additional educational resources on P&P anatomy would enhance student learning. Methods: A step-wise male and female perineum dissection manual to facilitate P&P dissection in conjunction with a review session focused on P&P was provided. Students were given a pre-test (15 minutes prior to review) and post-test (immediately after the review) to determine the efficacy of the dissector manual and the review to assess students' understanding and readiness of P&P. Results: Prior to the review • 77% ($n=125$) mentioned P&P anatomy as the most intimidating topic in Unit 3 • 27% felt prepared and 73% felt overwhelmed with P&P anatomy After the review • 65% ($n=118$) mentioned P&P anatomy as the most intimidating topic in Unit 3 • 65% felt prepared and 35% felt overwhelmed with P&P anatomy • Student performance showed improvement (pre-test = 67%, $n=127$ and post-test=74%, $n=120$; $p=0.3$) Additionally, TTUHSC MS1 performance on the P&P section of the National Board of Medical Examiners was better as compared to other medical schools (TTUHSC-75%; National average-69%). Conclusions: A newly created step-wise perineum dissection manual alongside an in-depth review directly impacted students' knowledge over the male and female perineum, which translated into improved student performance. Future studies should incorporate additional P&P resources for student learning.

GRAYSON BRAZIEL, GURVINDER KAUR PH. D.*Hitting the spacebar: Spaced repetition and resource usage among first year medical students*

Medical students feel overwhelmed as they have to master large amounts of knowledge at a very fast-pace. Various techniques to improve retention of this vast amount of factual knowledge have been previously tested. Spaced repetition serves as an effective learning tool to help students retain an abundant amount of knowledge over time. One such learning software for spaced repetition is Anki, but students who are not familiar with Anki cannot reap its benefits to the fullest. We hypothesize that providing an in-depth tutorial on Anki to first year medical students (MS1's) will enhance Anki usage. An online, in-depth tutorial video along with an in-person session on how to successfully use Anki was created and presented to MS1's at the beginning of medical school. Data to gauge Anki usage, learning style, and the amount of different resources used by MS1's (bimodal vs. trimodal) were collected prior to the start of the first three blocks (Anatomy, Histology & Embryology (AHE), General Principles (GPX) & Organ System 1 (OS1)) of the medical school curriculum. The majority (98%, n= 70 for AHE, 149 for GPX, 161 for OS1) of students indicated that the original tutorial video was helpful to use Anki effectively. Anki usage progressively increased from 60% (AHE) to 66% (GPX) to 81% (OS1), with 95% of these students mentioning it being a beneficial resource. Bimodal learning decreased from 58% to 47% while trimodal learning increased from 12% to 18%. The percentage of students learning from the big picture with details later incorporated increased from 58% (AHE) to 75% (OS1). Lastly, 45% of the students preferred visual learning style as compared to others. Overall, the data suggest that the usage and commitment to spaced repetition learning significantly increased. Medical students shifted their learning style and approach as demonstrated by a positive transition towards strategic learning.

ROBERT BUSTAMANTE*Dirty Gloves: A Hands-on Approach to More Efficient Anatomical Study*

Upon entering medical school, navigating the pathway to content mastery can be daunting and time consuming. In anatomical study, students face a large volume of material presented and an overwhelming number of resources necessary to master this material. Aim: Dirty Gloves are printable pdfs designed to help students find and learn anatomical structures more efficiently in lab, condensing multiple resources into one, easily accessible glossary of images and tables. Dirty Gloves helps students spend less time searching and more time actively learning with their hands exactly where they should be: on the cadaver. Question: Was Dirty Gloves a useful teaching tool for learning anatomical structures in the Anatomy Lab? Method: Dirty Gloves were created for the first two units of Anatomy. Quizzes were released on a weekly basis, along with the Dirty Gloves pdfs to assess the effectiveness of this learning tool and to provide performance feedback for students. For the first two weeks, quizzes were administered in a pre-/post-quiz format, with questions of similar topic and difficulty. Additionally, qualitative surveys were administered throughout the project. Results: • In an end-of-project survey, 97.3% (n=109) of responding students reported that Dirty Gloves made their learning more efficient. • Students scored significantly higher on post-quizzes after reviewing with Dirty Gloves when compared to their pre-quiz scores. o Week 1: Quiz Average - 53% à 84% (p-value < 0.0001) o Week 2: Quiz Average - 43% à 74% (p-value < 0.0001) • 99.1% (n=109) of responding medical students recommended the next incoming class of medical students use Dirty Gloves. Conclusion + Future Direction: Dirty Gloves significantly improves student satisfaction and performance in anatomical study. Data suggests that this tool should be implemented into the medical school curriculum. Our team plans to create the final Unit of Dirty Gloves for the next generation of Anatomy students.

HANNAH CURTIS, REBECCA NISBET, DAN WEBSTER

Student-Designed Lab Guides Increased Medical Student Confidence but not Exam Performance on Cell Biology and Histology Concepts in a Restructured Foundational Pre-Clerkship Block.

PURPOSE With the USMLE Step1 exam changing to Pass/Fail, the TTUHSC-SOM changed its curriculum to add Cell Biology and Histology (CB/Histo; ~25 extra hours) to an Anatomy and Embryology block (~150 hours). The institution also transitioned to a Pass/Fail grading system for its pre-clerkship curriculum. The first iteration of the new block showed decreased performance in CB/Histo, so we hypothesized that students would benefit from the development of additional resources to encourage success in this content-heavy block. A needs-analysis survey indicated that 52.5% of students did not utilize the initial laboratory manuals to study for examinations. Therefore, an integrated CB/Histo lab study guide was constructed for the second iteration. **METHODS** The CB/Histo portion of the block was contained within the first Unit (3 weeks). Interactive laboratory manuals were designed to provide students with a more integrated view of didactic and lab materials. Students were able to add their own annotatable images to aid retention and questions were interspersed within the guides to check understanding as students progressed through the labs. **RESULTS** At least 95% of students reported utilizing the resource that the guides were helpful in preparing for examinations. Approximately 70% of students reported feeling confident going into the Unit 1 course examination. Narrative comments were largely positive. However, student performance in the Histology portions of the three Unit exams did not change between two iterations in the new block and were substantially lower than in the legacy curriculum. **CONCLUSION** Student feedback suggested that the new resource was thoroughly enjoyed by the students and enhanced student learning and confidence. The increased academic load, concurrent with the change to Pass/Fail, may have shifted student priorities and led to decreased student performance. Future iterations will attempt to further integrate CB/Histo concepts with Anatomy and Embryology material.

LAUREN DIXON, JENNA HEFELE, CASSIE KRUCZEK

The effects of introductory information on medical students' performance and understanding of cardiovascular physiology material.

As medical students prepare for the USMLE Step 1 exam, resources made available to them in the short time they have to study can be most beneficial. Educational projects are used to aid them in their studies. This educational project is a tool that students who have taken cardiovascular physiology have stated they needed. The aim of this educational project is to give students the opportunity to preview the information prior to lecture to aid in comprehension of lecture material. : The cardiovascular physiology notes are compilations of the information obtained from past lectures and other high-yield reputable resources that explain the content needed for students to understand basic principles of cardiovascular physiology. A preliminary survey from the 2022 cohort was conducted to evaluate which resources students would have liked to be made available as a resource for learning cardiac physiology. The two most common responses were for the provision of additional multiple choice practice questions and high yield fact sheets. Based on the preliminary data, the educational project was split into two parts: multiple choice practice questions and informative notes containing high yield facts. Both resources were created and made available to the students. The preliminary survey from the 2022 cohort recorded that out of the 59 respondents in a cohort of 200 students, they preferred practice questions (65%) and a high yield fact sheet (29%). The project will evaluate how these notes used by students in conjunction with lecture and practice questions can further their understanding and improve learning outcomes. Results of this study can aid in determining if lecture notes or preliminary notes should be provided with every lecture.

R. HAYDEN MEEKS MBA., DAN WEBSTER, PH.D.*Strategic Studying: The Role of Impactful Resources and Personality Type in Student Exam Performance*

Research Question We wished to determine if the use of faculty-vetted fact sheets and question sets would improve student exam performance and resource satisfaction, and to what extent Myers-Briggs personality types contributed to student success. **Background** The second block of the medical school pre-clinical curriculum, General Principles (GPX), consists of three units emphasizing topics in biochemistry, cell biology, and microbiology. Historically, student exam performance in the first two units has been low. To increase performance, I designed supplemental resources consisting of High-Yield Fact Sheets (HYFS) and Conceptual-Question Guides (CQG). The Myers-Briggs Type Indicator is a dimensional personality assessment that details personal preferences in the learning process. The most important predictor for success on multiple-choice examinations is the Sensing vs Intuitive dimension. Sensing students prefer detail-oriented learning while Intuitive types prefer conceptual and relationship-based learning. **Methods** A needs analysis pre-survey was conducted, and HYFS and CQG resources were created for each unit of GPX. After every exam, an anonymous survey was conducted in which students self-reported their learning types, resource satisfaction, exam scores, and likelihood of future resource use. **Results** The needs analysis revealed that former GPX students believed that both resources would be helpful. Use of the HYFS and CQG resources improved student exam performance as compared to class averages. Students also reported high degrees of resource satisfaction. Intuitive types averaged higher scores than their Sensing counterparts across all three GPX exams. **Conclusion** Feedback was extremely positive regarding the created resources, and students expressed that similar resources should be created for future blocks. Student success is not exclusively dictated by learning type, but results suggest learning type should be considered when evaluating student study strategies and methods of exam preparation in the pre-clinical curriculum.

JENNA HEFELE, LAUREN DIXON, DR. CASSIE KRUCZEK*Enhancement of Student Learning Through Utilization of Practice Questions in Cardiovascular Physiology Education***Background:**

As part of the first-year medical school curriculum at TTUHSC, students begin taking organ-systems based blocks following two foundational blocks. The first organ-systems based block (OS1) covers the physiology and the pathophysiology of the immune, hematopoietic, and cardiovascular systems. Following completion of OS1 in 2022, a survey was conducted to assess which resources students used to learn cardiac physiology and which additional resources students would find helpful. A total of 59 students out of 200 (29.5%) of the class responded. The majority (65%) reported that additional practice questions would be beneficial for their learning. Multiple-choice cardiovascular questions were constructed in response.

Aim/Hypothesis

The goal of this project is to assess whether multiple-choice questions can enhance student learning in the cardiovascular physiology unit. Additionally, we want to evaluate whether the questions will increase student confidence and decrease anxiety surrounding the material. We hypothesize that the utilization of these questions will improve knowledge retention, exam scores, and content mastery.

Methodologies

- Forty-four multiple-choice cardiovascular physiology questions were designed to cover a wide range of essential topics and provide in-depth rationales for both the correct and incorrect answer choices.

JENNA HEFELE, LAUREN DIXON, DR. CASSIE KRUCZEK (CONTINUED)

- Data will be collected prior to the start of the cardiovascular unit in 2023 and after the completion of the unit to assess how students feel practice questions contribute to their learning and education.
- Exam averages will be compared to students who utilized the practice questions and those who did not.

Results

Based on the needs-based analysis, students value practice questions as an important educational resource to master their demanding course load. We anticipate that the practice questions will enhance student learning and satisfaction.

Conclusion/Future Directions

Increasing the number of practice questions made available to students will positively contribute to their medical education.

NATALIE JAMESON, JESSICA MORTENSON, TAYLOR GOODFELLOW, GURVINDER KAUR

Effect of Pass/Fail medical school curriculum at TTUHSC on student wellness and engagement in extracurriculars

Introduction/Background: United States Medical Licensing Examination (USMLE) Step1 scores have played a critical role in residency selection decisions. In 2020, Step1 became pass-fail to improve student wellness and develop well-rounded physicians, which will enhance student engagement in extracurriculars such as leadership and research to volunteering. According to AAMC, increasing number of medical schools are also shifting to pass-fail pre-clerkship curricula. In 2020, TTUHSC changed its pre-clerkship curriculum to pass-fail. Effect of pass-fail curriculum on student wellness and engagement in extracurriculars at TTUHSC has not been analyzed.

Hypothesis: We hypothesize that pass-fail curriculum changes at TTUHSC has improved student wellness, and increased engagement in extracurriculars. **Methods:** A survey was administered to first-year medical students (Class of 2026) and consisted of questions that gauged impact on student wellness and participation in extracurricular activities. **Summary/Results** Forty-one percent (n=68) of students indicated they experienced burnout most of time, 54% experienced it some of the time while 4.4% never experienced it. All the students were involved in specialty interest group organizations (average= 3; maximum=10) and were participating in electives (average=3; maximum=12). 25% of students have authored a research paper while 24% presented their research at a local/national meeting. Students ranked Step 2 performance, academic performance, and research as top 3 criteria to enhance residency application. 47% of students indicated that they would have been less involved in extracurriculars if the TTUHSC curriculum was graded while 51.4% said it would have no impact on their involvement. **Conclusions** Overall, students seem less stressed and more involved in extracurriculars. Ranking of academic performance and research as top 3 criteria to enhance residency applications indicate students value these equally to become a well-rounded physician. Exam score comparison between pass/fail and graded curriculum classes will help us evaluate the impact of these changes on academic performance.

ELAINE M. NAVA AND ALICE R. VILLALOBOS, DEPARTMENT OF MEDICAL EDUCATION, TEXAS TECH UNIVERSITY HEALTH SCIENCES-SCHOOL OF MEDICINE, LUBBOCK, TX 79430

Practice questions and rationales: Do they really improve morale regarding the testing experience and learning of cardiovascular physiology and pathophysiology?

Background: Exam scores can be inversely correlated with test anxiety. One pressing question is whether anxiety can be lessened, while also improving understanding. Many students perceive working through multiple-choice questions (MCQ) as a solution. Falcao et al. (2022) suggest demand for MCQ in medical formative assessment is greater than supply. Our aim was to develop MCQ to facilitate mastery of cardiovascular (CV) concepts for first-year medical students in Organ Systems 1 (OS1).

Hypothesis: Providing additional practice MCQ with in-depth rationale will decrease stress, while improving confidence and understanding of CV physiology and pathophysiology.

Methods: Two sets of faculty-approved MCQ and in-depth rationales have been developed for the CV physiology and pathophysiology units of OS1 for the Class of 2026. Student confidence and test anxiety will be assessed with a survey using a Likert scale (1-5; 5: most stressed or confident) at the beginning of each unit. Before receiving the MCQ-rationale set students will complete the survey again and a pretest comprised of 5 unique MCQ to assess understanding of CV concepts.

After completing the MCQ-rationale set, students will once again complete the anxiety/confidence survey and a post-test with 5 different MCQ covering the same concepts. Comparison of mean performance scores on the pre- and post-tests will be utilized to evaluate improvement in student comprehension of CV physiology and pathophysiology; likewise, mean Likert values will be compared to evaluate changes in confidence and test anxiety.

Anticipated results: MCQs with in-depth rationales will improve morale regarding learning CV physiology and pathophysiology, and student performance on the post quizzes when compared to the pre-quizzes.

Conclusions: We predict this study will support use of MCQ-rationale sets as a tool to promote learning and deepen understanding of CV concepts in formative assessments. Future studies will analyze whether using MCQ-rationale sets improves performance on summative assessments.

REBECKA NISBET, HANNAH CURTIS, DAN WEBSTER

Student-Designed Question Set increased medical student satisfaction but not exam performance on Cell Biology and Histology concepts in a restructured foundational preclerkship block

PURPOSE

With the USMLE Step1 exam changing to Pass/Fail, the TTUHSC-SOM changed its curriculum to add Cell Biology and Histology (CB/Histo; ~25 extra hours) to an Anatomy and Embryology block (~150 hours). The institution also transitioned to a Pass/Fail grading system for its pre-clerkship curriculum. The first iteration of the new block showed decreased performance in CB/Histo, so we hypothesized that students would benefit from the development of additional resources to encourage success in this content-heavy block. A needs analysis survey revealed 100% of students felt more practice questions would be beneficial. Therefore, a substantial CB/Histo question set was constructed for the second iteration.

REBECCA NISBET, HANNAH CURTIS, DAN WEBSTER (CONTINUED)

METHODS

The CB/Histo portion of the block was contained within the first unit (3 weeks). Weekly quizzes of 6 questions were administered to assess student retention throughout the entire ten weeks of the block. Quizzes were organized to evaluate student understanding of each tissue type discussed in the course. By the end of the course, students had access to 72 faculty approved CB/Histo practice questions.

RESULTS

The question set was rated highly by the students. Approximately 97% (n=40) of students reported that the question set was helpful in preparing for examinations. Narrative comments were largely positive. However, student performance in the Histology portions of the three unit exams did not change between two iterations in the new block, and were substantially lower than in the legacy curriculum.

CONCLUSION

Student feedback suggested that the additional practice questions were well-received by the students and enhanced student learning. Students also reported an improvement in their confidence level. The increased academic load, concurrent with the change to Pass/Fail, may have shifted student priorities and led to decreased student performance. Future iterations will attempt to further integrate CB/Histo concepts with Anatomy and Embryology material.

BENJAMIN OLIVO, KYLE ARMSTRONG, GURVINDER KAUR, CASSANDRA KRUCZEK

Effectiveness of Spaced Repetition Learning with Applied Practice in the General Principles Block

Medical students often feel overwhelmed by the amount of material they are required to learn leading to higher test anxiety. Spaced repetition learning through use of flashcards in conjunction with practice multiple choice questions (MCQs) improves long-term retention and exam performance. Furthermore, use of higher-order MCQs can expand learning beyond simple fact recognition as they require deeper understanding of topics and help prepare students for board-style exams. A survey of 52 first-year medical students (MS1) that completed the General Principles (GPX) block in 2022 indicated 76.95% would have found block-specific flashcards with MCQ quizzes a helpful resource, and 88.5% stated MCQs would have alleviated test-related anxiety.

The purpose of this study was to assess the impact of block-specific flashcard and MCQ usage on comprehension of key topics in GPX and overall test anxiety.

Higher-order MCQs were administered through weekly online quizzes with rationales provided upon quiz completion. In addition, electronic flashcards were developed and distributed as study aids. At the end of the block, statistics regarding MCQ usage and exam scores were collected.

Of the 190 MS1 end of block survey participants, 77.4% found the flashcards a useful resource. A follow-up survey revealed use of these resources was linked to a reduction of overall test anxiety in the GPX block (97.7%, n=90) and 81.1% (n=90) found the MCQs helpful. Additionally, when comparing MCQ users versus non-users, MCQ usage appeared to correlate with improved comprehension of key topics.

Overall, the flashcard and MCQ study aids were found helpful by MS1s as a resource for GPX exam preparation. The results indicate formal implementation of electronic flashcards and MCQ quizzes reduces students' overall test anxiety and improve understanding of key topics.

MICHAEL SHALABY, CASSANDRA KRUCZEK PHD, LISA POPP PHD

CICRs: A Powerful Tool & Interactive Approach to Learning & Reasoning in Preclinical Medical Blocks

PURPOSE Recent changes in the curriculum prompted the addition of interactive learning modules into the Biochemistry and Cell Biology units in General Principles. Consequently, interactive sessions termed Cognitive Integration and Development of Clinical Reasoning Skills (CICR) were incorporated to enhance student performance on these historically challenging topics by exposing students to higher-order questions on high-yield topics. **METHODS** Two separate interactive CICR sessions were created, each containing approximately 20 questions. In addition to reviewing important concepts, these sessions exposed students to advanced order types of questions and problem-solving strategies. Students could choose to attend the sessions in person or over Zoom (interactive learning group). Additionally, students could access the questions via a testing software known as Exemplify independently (non-interactive learning group). Student attendance and participation were recorded with students being divided into three groups: Interactive, non-interactive, and the control that did not participate at all. Exam performance both overall and on specific questions was evaluated. In addition, anonymous student comments regarding these sessions' utility have been collected. **RESULTS** The interactive learning group exam average was 88.73% \pm 10.86, n=100, for the first exam. The non-interactive learning group averaged 85.91% \pm 13.02, n=38. Additionally, the control group that did not participate had an average of an 83.50% \pm 11.09, n=63, respectively. **CONCLUSIONS** Preliminary data suggest that interactive CICR sessions may correlate with increased exam performance. Moreover, student comments suggest that many students found the CICR sessions to be a useful tool that was well received. Finally, interactive learning sessions exposing students to advanced order questions over high-yield topics are valuable tools in the medical educator toolbox that could empower tomorrow's physicians. The non-interactive learning group averaged 85.91% \pm 13.02, n=38. Additionally, the control group that did not participate had an average of an 83.50% \pm 11.09, n=63, respectively. **CONCLUSIONS** Preliminary data suggest that interactive CICR sessions may correlate with increased exam performance. Moreover, student comments suggest that many students found the CICR sessions to be a useful tool that was well received. Finally, interactive learning sessions exposing students to advanced order questions over high-yield topics are valuable tools in the medical educator toolbox that could empower tomorrow's physicians.

CLINICAL FELLOWS & RESIDENTS

SARA AL DOGOM, M.D. PRINCIPAL INVESTIGATOR: LARA JOHNSON, M.D., M.H.S.

Screening for Celiac Disease in Pediatric Patients with New Onset Type 1 Diabetes: A Retrospective Study

Celiac disease (CD) is a common comorbidity in patients with type 1 diabetes mellitus (T1DM) compared with the general population. Classic intestinal symptoms of CD may not be present in patients with T1DM; therefore, screening is essential and can be done with sensitive and specific serologies including tissue transglutaminase (tTG) IgA and deaminated gliadin peptide (DPG) IgA and IgG. Positive serologies are further confirmed via histopathologic evaluation of duodenal

SARA AL DOGOM, M.D. PRINCIPAL INVESTIGATOR: LARA JOHNSON, M.D., M.H.S. (CONTINUED)

biopsy specimens showing evidence of small intestinal villous atrophy and increased intraepithelial lymphocytes. Nonetheless, studies have shown that autoimmunity in the presence of T1DM may illicit CD autoimmunity in the initial phase of T1DM diagnosis rendering positive CD screens false upon further evaluation on duodenal biopsies. The aim of this study is to determine the incidence of false positive screening for CD in pediatric patients with new onset T1DM through conducting a retrospective study in hospitalized pediatric patients ages 2-18 years old between years 2012 and 2022.

RICARDO H FRANCO, MD AND VICTOR J TEST, MD

Peek a Boo! PE, I see you!

Our case is of a 59-year-old male transferred from an outside facility due to bilateral pulmonary emboli (PE) and apical thrombus. CT angiography of the chest performed at our facility revealed bilateral pulmonary emboli with bilateral hilar masses. ECHO revealed an apical thrombus with a reduced LVEF of 20%. The Pulmonology service was consulted to assist in performing biopsies of noted hilar masses and work up the patient for malignancy. Bronchoscopy and Endobronchial Ultrasound (EBUS) with biopsy were performed. While performing EBUS, we were able to visualize the thrombus in the right pulmonary artery at the level of the right bronchus intermedius. The imaging demonstrated the direct visualization of a pulmonary embolus in the pulmonary arteries via EBUS. In the future, EBUS can be implemented to assist in the evaluation of PE's in patients who cannot undergo CTA, due to contraindications. This could aid in decision-making on whether particular patients require anticoagulation or not.

MUHAMMAD HASHAM SARWAR MD, TUSHI SINGH MD, KENNETH NUGENT MD, EBTESAM ISLAM MD, ANDRES YEPES MD

Outcomes of tracheostomy in critically ill COVID 19 patients in North West Texas

RATIONALE Tracheostomy is performed in patients who need prolonged intubation. COVID -19 brought unforeseen challenges, thus altering previously established norms. In this study, we want to determine the outcomes of patients undergoing tracheostomy for respiratory failure due to COVID -19. **METHODS** This is a single center retrospective observational cohort study of patients who underwent percutaneous tracheostomy between March 1, 2020 and September 30, 2021 due to respiratory failure secondary to COVID-19. Inclusion criteria included performance of percutaneous tracheostomy on patients with confirmed diagnosis of COVID-19. Exclusion criteria included patients undergoing surgical tracheostomy, extubation prior to the performance of a tracheotomy, and death prior to the performance of the tracheotomy. **RESULTS** We included a total of 49 patients in this study after reviewing the records of 101 patients who underwent tracheostomy during the study period. The average age of the population was 59 years with 67% of the patients being male. The median Sequential Organ Failure Assessment (SOFA) score on admission was 2. The median duration of mechanical ventilation, prior to tracheostomy was 15 days with a median positive end expiratory pressure (PEEP) and fraction of inspired oxygen (FiO2) of 10 cm of water and 45% respectively. One patient had a cardiac arrest during the procedure leading to death. Eighteen (38%) patients died after the procedure with the median length of stay of 32.5 days. Eight (18%) patients were decannulated in the hospital. Twenty (40%) of the patients were discharged to rehabilitation. Four (8%) were discharged home. Eight (18%) patients were alive and well at the end of 90 days.

MUHAMMAD HASHAM SARWAR MD, TUSHI SINGH MD, KENNETH NUGENT MD, EBTESAM ISLAM MD, ANDRES YEPES MD (CONTINUED)

About twelve (26%) patients were lost to follow up after discharge from the hospital. At the time of the tracheostomy, 32% had moderate ARDS as per the Berlin definition and 24% had severe ARDS. CONCLUSION: Tracheostomy is an important therapeutic intervention in the critically ill. To date studies in ARDS show that it does not reduce 60 days or 90 days mortality (1). However, COVID-19 has changed our approach in many ways. Tracheostomy has been shown to be safe to perform from the clinician point of view (2) and there are no differences in outcomes between surgical tracheostomy and percutaneous tracheostomy (3). Our outcomes with tracheostomy are similar to the previously reported studies (1). Optimal timing is unclear yet and is best tailored to each patient based on clinical status and prognosis.

BIOTECHNOLOGY

MEGAN N. ASHTON, ASHA E. WORSHAM, TONY CHEUNG, DANIEL M. HARDY

Heterogeneous splicing and permissive surveillance in human male germ cells drive individual variation in ZAN transcript diversity

Functional divergence of gamete recognition molecules confers species-specificity to fertilization and promotes speciation. In mammals, the speciation gene *Zan* encodes zonadhesin, a rapidly evolving sperm protein that mediates species-specific egg recognition. To explore taxonomic diversity underlying zonadhesin's contribution to species divergence, we characterized individual variation in human *ZAN* and mouse *Zan* mRNA expression. Six distinct human *ZAN* mRNA transcripts originated by heterogeneous splicing of two exons encoding the C-terminal sequence of VWD4, the last of four tandem von Willebrand D domains comprising a majority of the human zonadhesin precursor. The corresponding region of mouse *Zan* VWD4 showed no splicing heterogeneity among outbred (CD-1 strain) and inbred (C57Bl6 strain) males. The profiles of the variant *ZAN* transcripts differed in testes from different men (N=5). None of the six deduced, human zonadhesin polypeptides coincided with zonadhesin encoded by cDNAs from other species. Two of the six variants terminated at the canonical stop codon in the last exon defined by *Zan* mRNAs from other species, though both encoded VWD4 deletions. The other four variants' conceptual translation products truncated in VWD4 owing to shifts into reading frames with premature stop codons, which in somatic cells would target them for destruction by nonsense-mediated decay. Contrary to expectation, however, the mRNAs with premature stop codons showed no apparent decrease in abundance compared to the two that terminated at the canonical stop codon. Thus, individual heterogeneity in human *ZAN* mRNA splicing generates multiple transcripts that evade nonsense-mediated decay in human male germ cells, adding another mode of diversification in support of zonadhesin's species-specific function. The findings represent the first demonstration of intra-species variation in a sperm protein with implications for the evolution of gamete recognition in mammals, and in turn the process of speciation in hominids.

JAVARIA BAIG AND P. HEMACHANDRA REDDY*Increased Lifespan in Transgenic MicroRNA-455-3p Mice: Protective Role of Mitophagy*

Background: MicroRNA (miRs) are small, single-stranded, non-coding RNA molecules reported to involve in RNA silencing and post-transcriptional regulation of gene expression in cells. Multiple miRs have been studied in our lab, but overexpressed miR-455-3p in mice (miR-455-3p Tg mice) was observed to increase cognitive and memory functions and increase lifespan five months longer than the wild-type (WT) mice, whereas miR-455-3p knockout (KO) mice lived four months shorter than WT mice, but the exact mechanism of increased lifespan in miR-455-3p Tg mice is unknown. In Alzheimer's disease (AD), defective mitophagy is observed in AD cells, AD mice and AD brains. Mitophagy is a cellular process that selectively removes dead/damaged mitochondria through formation of mitophagosome, a double membrane. Purpose: Our purpose of our study is to understand the possible mechanisms of lifespan extension, in this case mitophagy, that may be contributing to increased lifespan of miR-455-3p Tg mice. Hypothesis: We hypothesize that mitophagy may play a key role in enhanced lifespan of miR-455-3p Tg mice compared to its WT counterparts. Methods: Gene expression levels of 17 genes associated with mitophagy were studied using the hippocampal/cortical brain tissues of miR-455-3p Tg, miR-455-3p KO, and WT mice at two timepoints: 2 months and 12 months. Results/ Discussion: The overall, early, preliminary data revealed mitophagy genes were had an increase in expression in MiR-455-3p Tg mice and decrease in expression in MiR-455-3p KO mice compared to their WT counterparts, indicating an increase in removal of damaged/ dead mitochondria in the cells in MiR-455-3p Tg mice compared to WT mice. Conclusion: These results indicate enhancement of mitophagy in MiR-455-3p Tg mice compared to their WT counterparts, may be contributing to the increased lifespan in mice, may have protective role in AD.

TANISHA BASU, HALLIE MORTON, JOHN CULBERSON, KEYA MALHOTRA, ERIKA ORLOV, CHHANDA BOSE, LISA GITTNER, HAFIZ KHAN AND P. HEMACHANDRA REDDY*Lifestyle and Biological Factors in Cognitively Healthy Superior Agers in Rural West Texas*

Background and Purpose: Alzheimer's disease (AD) is a global pandemic among the elderly with devastating consequences with no cure. The conditions that lead to dementia are varied with regard to lifestyle, genetic profile, and socio-economic conditions. Within the rural West Texas community, it is seen that some of the elderly population in their 60-90s age without any cognitive impairments, while others begin to experience cognitive decline and chronic conditions. The purpose of our current study is to understand the factors associated with cognitively healthy brain in superior agers in rural West Texas. Methods: We designed a longitudinal prospective cohort study with a purpose of understanding the factors that affect cognitive status in individuals at the age of 60–90. Our ongoing study hopes to recruit 4000 cognitively healthy and 500 AD/ADRD patients to determine the factors that delay aging in some individuals by investigating various aspects including genetics, epigenetics, ethnicity, biology, culture and lifestyle. This is done by gathering information about participants' cognitive assessments (Montreal Cognitive Assessment), anthropometric measurements, blood profiles, brain scans, and health and wellness questionnaires. Results and Discussion: Currently our study is in year one and has recruited 20 healthy and 4 AD patients. Our preliminary data strongly indicates that poor scores on the MOCA test are directly associated with the incidence of brain atrophy as seen through MRIs. Physical and mental wellbeing assessed using bloodwork and questionnaires is greater among the cognitively healthy population. We observed that healthy lifestyle such as diet and exercise was associated with the healthy aging population.

TANISHA BASU, HALLIE MORTON, JOHN CULBERSON, KEYA MALHOTRA, ERIKA ORLOV, CHHANDA BOSE, LISA GITTNER, HAFIZ KHAN AND P. HEMACHANDRA REDDY (CONTINUED)

Conclusion: Based on our current data, it is evident that there is an association among psychosocial parameters and the scores on the MOCA test, brain atrophy, and biomarkers. The outcomes of our study will provide novel insights into healthy aging in rural West Texas.

PAMELA LUNA, GANESH ACHARYA, DAMIEANUS OCHOLA, SWETHA PEDDIBHOTLA, CHINNADURAI MANI, MARK B. REEDY AND KOMARAIHAH PALLE

Glutaminase inhibition induces replication stress in ovarian cancer cells and inhibition of replication checkpoint causes synthetic lethality.

Ovarian cancer (OC) is a highly aggressive disease and the deadliest gynecological tumor in women. Although most patients with OC respond to chemotherapy drugs, more than 70% of patients relapse and die as a result of chemoresistance. Therefore, new therapeutic agents are needed to prevent chemoresistance and treat disease relapse to improve prognosis. Many cancer cells depend on glutamine as their primary carbon source, and these cells have high expression of glutaminase (GLS), an enzyme that converts glutamine to glutamate. Chemo-resistant OC cells have elevated levels of GLS, which confirms their increased dependency on glutamine metabolism. Based on these observations, we postulated that GLS inhibition may attenuate the aggressive growth of GLS high OC cells and may sensitize to the agents that may further enhance these effects. Interestingly, GLS inhibition using a clinical-stage drug CB839 caused replication stress and activated DNA damage checkpoint protein 1 (CHK1) mediated cell cycle arrest. These novel findings suggested a role for CHK1 in protecting GLS inhibition-induced DNA damage by facilitating the timely repair of DNA breaks. Based on these observations, we hypothesized that GLS inhibition in combination with CHK1 inhibition may cause synergistic lethality in chemo-resistant and GLS high OC cells. We evaluated the combination of the GLS inhibitor CB839 and the CHK1 inhibitor Prexasertib. Our results show that CHK1 phosphorylation induced by GLS inhibition is significantly attenuated by prexasertib treatment. Similarly, combined treatment of CB839 and Prexasertib showed significantly elevated levels of DNA damage as measured by COMET assays, replication stress-mediated DNA damage responses, and synergistic OC cell lethality compared to individual drug treatments. Furthermore, CB839 and Prexasertib combination was more synergistic in cells that expressed high GLS compared to low GLS-expressing OC cells indicating the specificity of the combination of these drugs. Together, our studies identified a novel connection between metabolic and DNA damage checkpoint pathways in OC and propose a novel synergistic lethality-based combination therapy to treat chemo-resistant and aggressive OC.

LAURETTA ANNE PIERRE, HOA QUINH DO PHD, MICHAELA JANSEN PHD

Effects of RIC-3 on the expression profile of serotonin type 3A receptors

Serotonin type 3A (5-HT_{3A}) receptors belong to the Cys-loop ligand-gated ion channel receptor superfamily. 5-HT_{3A} receptors are found in high densities in certain brain regions, have an involvement with brain-gut signaling circuitry and other non-serotonergic synaptic activities, which make them effective and potential therapeutic targets for treatments of many conditions such as irritable bowel syndrome, chemotherapy-induced vomiting, inflammation, and psychiatric disorders. RIC-3, a transmembrane protein and endoplasmic reticulum resident chaperone, acts as a molecular chaperone of cation-conducting Cys-loop receptors, both

LAURETTA ANNE PIERRE, HOA QUINH DO PHD, MICHAELA JANSEN PHD (CONTINUED)

serotonin type 3A (5-HT3A) and nicotinic acetylcholine receptors. RIC-3 is needed for efficient receptor folding, assembly and trafficking / functional surface expression. RIC-3 interacts directly with the intracellular domain of serotonin type 3A subunits (ICD). RIC-3 has two binding sites with a shared duplicated motif in 5HT3A subunits, one in the MX-helix and one in the MAM4-helix. Toward drug discovery based on protein-protein interactions, we here aimed to determine the effect of RIC-3 on the expression profile of serotonin type 3A receptors. For this study, 5-HT3A constructs were genetically engineered, and the functional surface expression was examined using two-electrode voltage clamp and immunoblot analysis / western blot. We found that when 5-HT3A channels were co-injected with RIC-3, RIC-3 inhibits 5-HT3A current amplitudes elicited by serotonin in *Xenopus* oocytes; Ala replacements at residues W347, R349, and L353 (MX) or residues W447, R449, and L454 (MAM4) on the ICD weakened the inhibitory effect of RIC-3 on the functional surface expression of the channels. We infer that in *Xenopus* oocytes, RIC-3 reduction of functional surface expression of 5HT3A receptors is mediated by binding to the two identified binding sites.

MEGAN SKAINS, D. MARIEN CORTES AND LUIS G. CUELLO

A novel mechanosensitive gating mechanism and crystallization conditions determine the Rb⁺ binding properties to KcsA's selectivity filter.

KcsA has four K⁺ binding sites in its selectivity filter (SF). However, only three Rb⁺ were observed at sites 1, 3, and 4. We identified a novel mutant (T75V) that causes the loss of the K⁺ at site 4 although when crystallized in Rb⁺, it was predicted to contain Rb⁺ at sites 1 and 3 but surprisingly an ion was found at site 2. Also, we have discovered a novel KcsA's mechanosensitive gating that allows us to hypothesize that the Rb⁺ bound configuration could be a structural artifact. Since this KcsA structure was obtained in Decyl Maltoside (a small micelle detergent that favors KcsA opening by hydrophobic mismatch) and pH 5.4 (KcsA is a proton gated channel), hence a logical extrapolation is that KcsA was sampling the open conformation, resulting in the loss of the Rb⁺ at the site 2 due to an allosteric mechanism between the channel activation gate (AG) and its SF. Using Site Directed Spin Labeling, Continuous Wave Electron Paramagnetic Resonance Spectroscopy (SDSL and CW-EPRs), and Isothermal Titration Calorimetry (ITC), our laboratory looked to determine if the conditions of crystallization biased KcsA to the open conformation. Our data demonstrate that the crystallization conditions indeed stabilized KcsA's open state and decreased the affinity of the SF for Rb⁺. Our laboratory is also in the process of crystallizing WT-KcsA at pH 7.5 and Dodecyl Maltoside (a detergent with a larger micelle size) that should show an increased Rb⁺ occupancy at the 2nd binding site.

JOSHUA THERIOT, SATOSHI KATSUBE, HARIHARAN PARAMESWARAN, LAN GUAN

The role of Asn58 in the cation binding site of Salmonella Typhimurium MelB

Salmonella enterica serovar Typhimurium melibiose permease (MelBSt) catalyzes the co-transport of galactosides with cations (H⁺, Li⁺, or Na⁺). MelB is a prototype for Na⁺-coupled major facilitator superfamily (MFS) transporters presenting from bacteria to mammals, including the brain lipid transporters. 3D crystal structures of MelBSt have shown the overall fold of the protein and the sugar-binding mechanism, but have yet to show the cation binding and detailed coupling mechanisms. Asn58 has been proposed to play an important role in cation binding and coupled transport. In this study, Asn58 was mutated to 10 different side chains, and those mutants were subjected to various functional analyses including sugar fermentation on MacConkey agar, [³H]melibiose transport assay with intact cells, and cation-binding assay using Trp⁺dansyl galactoside fluorescence resonance energy transfer of a fluorescent ligand.

JOSHUA THERIOT, SATOSHI KATSUBE, HARIHARAN PARAMESWARAN, LAN GUAN (CONTINUED)

All of the 10 single-site Asn58 mutants showed decreased protein expressions and reduced transport activities. The polar mutants (Thr and Ser) still bind Na⁺ or Li⁺ and retain the cation-coupled melibiose transport to certain extents. The hydrophobic (Leu) and positively charged (Arg) mutants completely inhibited the active and downhill transport activities. Interestingly, the Cys mutant and the conserved Gln mutant with only one carbon longer lost Na⁺ binding and coupled melibiose transport; both mutants still bind Li⁺, and the N58C mutant even retained the Li⁺-coupled transport activity similar to the WT. All data suggest that Asn58 plays an important role in the cation binding and coupling mechanisms in MelBSt, which is consistent with the current model from the molecular dynamics simulations.

GSBS 1-2 YEARS

GANESH ACHARYA, CHINNADURAI MANI, MARK B REEDY AND KOMARAI AH PALLE

PARG inhibition augments CHK1 inhibitor-induced replication stress and synergistically kills ovarian cancer cells

Ovarian cancer (OC) is one of the leading causes of cancer-related deaths in women in the United States. PARP inhibitors showed promising clinical responses; however, most of the patients eventually relapse and succumb to the resistant disease. Currently, it lacks effective therapies to prevent and treat OC, which warrants novel drugs and combination therapies to improve patients' prognoses. Epithelial OC are heavily dependent on ATR-Chk1-mediated DNA damage checkpoint signaling for survival, which is also regulated by hedgehog/Gli1 (Hh) signaling in cancer cells. However, both Hh/Gli1 and Chk1 inhibitors failed to show promising results in clinical trials as single agents. Poly(ADP-ribose) glycohydrolase (PARG) is the critical enzyme that removes Poly-ADP-ribosylated (PARylated) proteins upon replication stress. We hypothesized that inhibition of PARG could amplify Chk1 inhibitor-induced replication stress by trapping PARylated proteins on the chromatin and compromising DNA repair and causing a metabolic and mitotic catastrophe. We evaluated Chk1 inhibitor prexasertib in combination with PARG inhibitor (PARGi) to target metabolic and DNA repair crosstalk to effectively kill OC cells and to overcome resistance. Our studies demonstrate that prexasertib treatment induces PARylation by inducing replication stress. Similarly, PARG inhibition by (PDD00017273) fails to remove PARylation and activates checkpoint kinase 1 (Chk1) by phosphorylating at S296, S317, and S345 in OC cells. Based on these observations, we hypothesized that a combination of Chk1 and PARG inhibition would augment oncogenic replication stress in OC cells and cause increased DNA damage and cell death. Interestingly, our evaluation of prexasertib and PARGi combination treatment by clonogenic survival and MTT assays showed synergistic killing in a panel of OC cells, including in isogenic chemoresistant models as well as 3D organoid models of primary OC cells compared to individual drugs. As predicted, combined treatment increased DNA double-strand breaks as demonstrated by COMET assays, and increased γ H2AX foci, pRPA32 foci, perturbed S/G2 phase arrest, and nuclear disintegration relative to individual-drug treatment. Furthermore, significant depletion of NAD⁺ levels was seen in PARGi-treated OC cells compared to untreated cells. Together, these results indicate that this combination treatment cause persistence of heavy PARylation at DNA damage sites abrogates cell cycle checkpoint mechanisms, exhausts cellular NAD⁺ levels, and inhibits DNA repair leading to the metabolic and mitotic collapse of cancer cells and synergistic lethality in OC cells. Currently, prexasertib is under clinical trials and our studies will provide novel mechanistic insight into the therapeutic potential of this combination and provides preclinical evidence to further develop this combination therapy in treating OC.

MANAS YOGENDRA AGRAWAL, SHARAVAN RAMACHANDRAN, CARSON ZABEL, AND SANJAY K. SRIVASTAVA

Elucidation of anticancer mechanism of Pimavanserin for the treatment of Glioblastoma

Glioblastoma multiforme (GBM), an aggressive grade IV brain tumor, has a 5-year survival rate of 5% with an average survival time of 15 months. Its treatment has several challenges, such as impermeability through the blood-brain barrier (BBB) and extreme drug toxicity. Thus, we aim to decipher the anticancer potential of an FDA-approved antipsychotic drug, Pimavanserin tartrate (PVT). We performed cytotoxicity assay on different human (SF188, SF295, SF268, U251) and murine (CT2A-Luc) GBM cell lines. An IC₅₀ of 5 to 8 μM after 48 hours of treatment was observed. Standard therapy temozolomide (TMZ) exhibited the IC₅₀ at around 1000 μM, thus making PVT 200 times more potent. PVT-TMZ combination enhanced the effect of TMZ. The annexin assay confirmed the apoptotic mode of cell death. The apoptotic cell population increased by 70% at 10 μM PVT concentration compared to the control. This was further corroborated by western blotting wherein the pro-apoptotic proteins such as caspase-3 and Bax were upregulated. To further elucidate the mechanism of PVT, immunoblotting was performed. We found that PVT suppressed the phosphorylation of PI3K and Akt and upregulated the FOXO proteins, which are the negative regulators of Akt. These FOXO proteins translocate to the nucleus and increase the transcription of pro-apoptotic Bim. We induced the GBM tumor intracranially in the immunocompetent C57BL/6 mice by injecting the luciferin-transfected CT2A cells. 10 mg/kg of PVT was administered through oral gavage daily. Significant inhibition of tumor growth was observed in the PVT group. There was no significant difference in body weights and organs of mice in PVT and control groups, thus confirming that PVT does not cause any toxicity. Thus, our study demonstrates that PVT is a safe, non-toxic, and more potent substitute for treating GBM. Further ex-vivo and LCMS analyses are in progress.

ALEXANDRIA ARNETT

Feline Osteoclastic Resorptive Lesions: The Most Common, Poorly Understood Dental Disease

Feline osteoclastic resorptive lesions (ORL's) are the most common dental disease and yet, the etiology and pathophysiology remain unknown after over a century since its discovery. Veterinarians around the world have performed various clinical studies attempting to find more information other than the basic dental facts. ORL's are teeth that are completely reabsorbed and then replaced with bony tissue and there have been no definitive links to vitamin D levels, an osteoporosis diagnosis, or inflammatory conditions. Complete tooth resorption in humans and canines is unheard of so making relevant connections are difficult. As the incidence increases and many clinical aspects still undiscovered, the importance of knowing which pharmacological and non-pharmacological therapies are important in attempting to reduce the risk of ORL's and preventing complete tooth extractions. After conducting several reviews on clinical and case studies regarding the risk factors and pathophysiology of ORLs, researchers have found diet, previous history of dental disease, and outdoor time can play a role in its development. In addition, resorptive lesions have been classified as non-inflammatory and inflammatory and felines infected with feline leukemia virus or feline immunodeficiency virus have a higher risk of developing inflammatory ORL's. Pharmacological therapies are limited and extend to chlorhexidine rinses. Non-pharmacological therapies include proper oral care, professional and at-home, a dry food only diet, and prevention of hairball regurgitation, as the gastric acid can damage teeth. Preventative clinical measures include regular dental cleanings, annual radiographic exams, and administration of the Feline Leukemia Virus (FEV) vaccine.

ROBERT BARNES, MELISSA MCHANN, JOSEE GUINDON, ISABEL CASTRO-PEIDRAS

Sex and dose-dependent antinociceptive effects of Cannabidiol in the formalin model of inflammatory pain

Cannabis has been valued for its analgesic properties for thousands of years. Recent changes in both legislation and public perception have led to an increased interest in its utility for pain management. The principle active ingredients of cannabis are known as the phytocannabinoids, with both Δ^9 -tetrahydrocannabinol (Δ^9 -THC) and cannabidiol (CBD) being members of this class. CBD exerts its effects through inverse agonism of the CB1 receptor and through partial agonism of the CB2 receptor. In this study, we analyzed the sex and dose-dependent antinociceptive effects of CBD (0.3 to 100 mg/kg) in the formalin pain model. This pain model has two distinct phases, with the first being the acute phase and the second being the inflammatory phase. In wild-type C57BL6J mice, CBD produced significant antinociceptive effects in the formalin pain model. These antinociceptive effects were potent at a lower dose in males (significant at 2.5 mg/kg) than in females (significant at 10mg/kg) in the inflammatory phase of the formalin test. Additionally, only males experienced antinociception in the acute phase of the formalin test and at the 30mg/kg dose. The efficacy of CBD at 10 mg/kg and 30 mg/kg was equivalent in both male and female mice. The differences found in this study between males and females support sex as a key factor in the antinociceptive response mediated by cannabinoids.

HARRISON BENSON, JENNY WILKERSON, MAHMOUD SALAMA AHMED

Identification of Novel EphB1 Tyrosine Kinase Inhibitors for Treatment of Neuropathic Pain

Background: Chronic pain is a common debilitating condition resulting in prescription of opioids at escalating doses. In the US, over 100 million patients, resulting in significant morbidity, and costs over \$600 billion in combined lost wages and medical expenses affected by chronic pain. The large family of Eph (erythropoietin-producing hepatocellular carcinoma) receptor tyrosine kinases have been implicated Alzheimer's disease, anxiety, neuropathic pain, malignancies, fibrotic diseases, and viral infections. Recently, our research group revealed the synergism of three tetracycline (Minocycline, Chlortetracycline, and Demeclocycline) family members showing the competitive inhibitory profile along with ATP-binding catalytic domain to reverse thermal hyperalgesia and mechanical allodynia in various pain models. However, the IC₅₀ for this approach is in the low micromolar range, requiring near maximal dose of all three antibiotics in combination. Hypothesis: There is an urgent need for developing novel non-opioid, and non-addicting therapies that are effective in management of chronic pain. We hypothesize that our newly developed EphB1 kinase inhibitors will effectively block neuropathic pain in mice. Data and Results: We successfully refined the first-generation of newly synthesized analogs to markedly improve the IC₅₀ for inhibition of EphB1 kinase activity (from an IC₅₀ of 322 μ M for the first generation to an IC₅₀ of \sim 7.60 μ M for the second generation) via receptor-based drug design. Future work: The upcoming experimental validation will involve optimization of the analogs' activities in the nanomolar range coupled with in vivo pharmacological evaluation to block neuropathic pain.

**GEETHA PRIYA BOLIGALA, KATHRYN L. FURR, RACHEL L BABCOCK, THOMAS MICHAEL
HINTELMANN, KEVIN PRUITT**

Dishevelled 2 - a novel substrate for lysine demethylase and lysine methyl transferase in triple negative breast cancer cells

Dishevelled proteins (DVL1-3) are key mediators of the Wnt signaling pathway and aid in maintaining constitutive oncogenic signaling. DVL paralogs undergo multiple post translational modifications (PTMs), and our lab was the first to demonstrate that key DVL1 lysine PTMs act as a “molecular switch” and govern DVL1 nuclear translocation. However, the functional significance of DVL2 PTMs remains unknown. We recently discovered DVL2 methylation is a novel PTM. In this study we aim to identify the functional significance of DVL2 methylation and identify the enzymes that are responsible for its methylation and demethylation. Results: To identify the novel endogenous DVL2 PTMs in triple negative breast cancer (TNBC) models, we performed immunoprecipitation with DVL2 specific antibody followed by liquid chromatography mass spectrometry (LC-MS/MS). Interestingly, we found novel methylation sites on endogenous DVL2, a PTM not previously identified. We also wanted to determine if DVL2 is a substrate for lysine demethylase (KDMs) and lysine methyltransferases (KMTs), hence we performed coimmunoprecipitation and the results revealed that DVL2 interacts with a KDM (LSD1) and KMT (EZH2). Given the DVL2 interaction with LSD1 and EZH2 we wanted to determine whether inhibition of either enzyme could influence the methylation of DVL2. Therefore, we treated TNBC cells with FDA approved LSD1 and EZH2 inhibitors and immunoprecipitated methyl-lysine followed by western blot for DVL2. We found that LSD1 and EZH2 inhibitor treatment modulated the methylation levels of DVL2 confirming that DVL2 methylation is regulated by LSD1 and EZH2 activity. Conclusions: Our study is poised to be the first to report that DVL2 is a novel substrate for lysine demethylases and lysine methyltransferases in TNBC cells. Further, studying the significance of the methylation sites will help us understand the functional significance of DVL2 methylation and the associated proteins in the Wnt signaling pathway.

AMANDA KRISTENE GARCIA, AVA GRACE OLIVER, SHARILYN ALMODOVAR-CAMACHO, PHD

Pulmonary Smooth Muscle Cells as Cellular Sources of HIV in the Vasculature: Implications for HIV Reservoirs

Human Immunodeficiency Virus (HIV) is a retrovirus that infects CD4⁺ cells. People living with HIV can now live longer due to AntiRetroviral Therapy (ART); however, ART does not cure HIV infection. The existence of HIV reservoirs challenges current efforts to eradicate HIV. HIV reservoirs are cells or anatomical sites that contain replication-competent virus. Over the years, the study of immune cells like lymphocytes and macrophages have dominated the field, as important sources of HIV under ART. However, theoretically, any CD4⁺ cell may act as an HIV reservoir. The expression of CD4 receptors has been confirmed in non-immune cells such as vascular Smooth Muscle Cells (vSMC). Previous studies by others have demonstrated that vSMC express the CD4 receptor as well as CCR5 and CXCR4, which allow HIV entry. Moreover, vSMC are associated with vascular pathologies associated with chronic HIV infection. Our hypothesis is that pulmonary vSMC may serve as an HIV reservoir under ART. To prove our hypothesis, pulmonary arterial SMC were purchased from Lonza and cultured in the presence of cell-free or cell-associated HIV reporter virus tagged to DsRed (pNL43-AD8). This allowed us to use red fluorescence as a marker of active viral replication. vSMC were exposed to HIV and treated with/without Tenofovir (~0.4 ug/mL) at different timepoints and analyzed by fluorescent microscopy. Treatments of vSMC with HIV and Tenofovir simultaneously showed no red fluorescence even after 72 hours. vSMC treated with HIV for 48 hours prior to treatment with Tenofovir showed red fluorescence at 48 hours and 72 hours.

AMANDA KRISTENE GARCIA, AVA GRACE OLIVER, SHARILYN ALMODOVAR-CAMACHO, PHD**(CONTINUED)**

A potential implication of these findings is that vSMC could be acting as an HIV reservoir in the pulmonary vasculature under ART that may challenge the eradication of HIV infection. Future directions will confirm vSMC as a reservoir by additional methods and in the presence of ART.

HANNANEH GHAVANLOUGHAJAR, AMANDA M.V. BROWN, ABDUL N. HAMOOD

Transcriptome analysis reveals adaptive response of Acinetobacter baumannii A118 to blood from healthy volunteers

Acinetobacter baumannii is an opportunistic human pathogen which has been responsible for a growing number of community and nosocomial infections including bacteremia, urinary tract infections, wound infections, meningitis, and pneumonia. The emergence of multidrug resistant (MDR) A.baumannii isolates such as A118 strain and their quick dissemination within the host which leads to septic shock has been a concern. Depending on the route of infection, mortality rates in patients with AB bacteremia vary from 30 to 75%. A.baumannii A118 is a strain isolated from the blood of an infected patient and at this time, little is known regarding the pathogenesis of A.baumannii A118 during septicemia. Thus, we hypothesized that during blood infection there will be changes in the expression of multiple genes within A.baumannii A118 genome. To address this hypothesis, we grew A.baumannii A118 in the whole blood from healthy volunteers (HVs) and Luria broth (LB) in triplicates and examined the global gene expression using RNA-seq technology. The Kallisto and DESeq2 programs were used for RNA-seq analysis (quantifying abundance of transcripts and differential expression analysis respectively). Functional gene ontology enrichment was assessed using topGO. Pathway analysis was carried out using STRING network analysis. Our results show that A.baumannii A118 has changed the expression of 1288 genes (p adjusted value < 0.05) when it was grown in HV's blood compared to LB. Out of these genes, 693 genes were upregulated (\log_2 fold change >1) which many genes associated with different virulence factors were among them such as acinetobactin biosynthesis and transport (siderophore excreted by A.baumannii). Pathway analysis of upregulated genes reveal that many ribosome proteins (51 genes) were significantly upregulated. Also, Oxidative phosphorylation (31 genes), biosynthesis of secondary metabolites (137 genes) and metabolic pathways such as carbon metabolism (40 genes) were significantly upregulated. Gene ontology analysis shows that translation is the most significantly biological process enriched. Ribosome and structural constituent of ribosome are the most significantly enriched GO categories within cellular component and molecular functions respectively. Our results show that A.baumannii is capable of changing the expression of numerous important genes in response to the change of its environment. The next step in our research would be finding the possible correlation between some of these gene expression changes and different time points of A.baumannii growth in the serum of healthy individuals.

MD SARIFUL ISLAM HOWLADER, HIRANMOY DAS

Role of KLF2 in the treatment of COVID prognosis

The coronavirus disease 2019 (COVID-19) is one of the dreadful diseases throughout the world due to the high mortality rate and quick spread-ability to let people more affected. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is associated with a diminished immune system and uncontrolled inflammatory response of the whole body against viruses that have steered to the abnormal production of cytokines, in other words, cytokine storms, headed to the hyperreactivity of macrophage.

MD SARIFUL ISLAM HOWLADER, HIRANMOY DAS (CONTINUED)

Cytokine storms start with showing several symptoms like fever, dizziness, headache, and anemia that gradually turn into a sudden malfunctioning of the multi-organ or even death. In this study, both Nuclear (N) and Spike (S) plasmids of SARS-CoV-2 were transfected into K562 cells to induce an in-vitro disease model. The master controller of vascular homeostasis, kruppel-like factor 2 (KLF2), has been selected to cure the abnormality of the COVID transfected K562 cell. Thus, in the present study, growth factors, various inflammatory and anti-inflammatory mediators were tested using qRT-PCR method. The relative genomic expression has been compared among the control, disease, and KLF2-induced therapy in disease model to assess the role of KLF2 in lessening the SARS-CoV-2 mediated disease condition. Similarly, the relative protein expression of various signaling molecules has been tested by immunocytochemistry (ICC) and western blot (WB) to establish a particular molecular pathway. Based on our results of qRT-PCR on various cytokines and inflammatory regulators, we have found the cytokine and inflammatory markers have increased tremendously in the SARS-Cov-2 infected cells that are well regulated by KLF2. The WB and ICC results on signaling molecules also hypothesize that SARS-Cov-2 activates the PI3K-cJun pathway to stimulate matrix metalloproteinase-9 (MMP-9) which is the principal pathway for the expression of cytokine storms. KLF2 acts as a promising role in controlling this pathway following the regulation of cytokine storms. Our findings of PI3K inhibitors would be an enormous groundbreaking tool for the discovery of antibiotics for pharmaceutical companies.

SEJAL RAJESH JADHAV, ASHRAFUR RAHMAN, YONG ZHANG AND THOMAS J. ABBRUSCATO

Developing a Central Post-Stroke Pain model and analysis of sensory abnormalities in mice.

Background: Central post-stroke pain (CPSP) is a common consequences of stroke injury. CPSP is a central neuropathic pain condition that may develop generally in the same part affected by the stroke. The estimated occurrence of CPSP in patients with stroke is 12% and up to 18% in patients with sensory deficits. The major symptoms of CPSP are increased temperature and pain sensitivity both mediated by the damage of spinothalamic tracts. Specific injury of the thalamic ventral posterolateral nucleus (VPL) alone has been reported to be associated with CPSP and focused injury could serve as a model for neuropathic pain associated with stroke injury. Method: In the study we developed a mouse CPSP model by stereotactic injection of collagenase IV in the thalamic VPL and determine thermal and mechanical pain sensitivity using the thermal plate preference test (TPPT) and electronic Von Frey test for 12 days. Hypothesis: Thalamic VPL lesion will significantly increase temperature and pain sensitivity in collagenase-injected mice. Result: Collagenase-injected mice had reduced thermal ($10.45 \pm 3.31\%$ time on cold plate) sensitivity compared to the sham ($29.3 \pm 2.43\%$) and control (26.73%) mice, starting at the fourth days post-injection, which was maintained for the entire observation period over 12 days. Collagenase-injected mice also had a reduced mechanical paw withdrawal threshold (2.7 ± 0.04 g) compared to the sham and control mice, starting at four days post-injection, which was maintained for the entire observation period over 12 days. Conclusion: Together the results from TPPT and Von-Frey test suggest that a unilateral collagenase-induced lesion generates robust and long-lasting thermal and mechanical hypersensitivity in mice, a typical symptom of CPSP, indicating this model could serve as an acceptable model for studying the CPSP. Future studies: We plan to test the anti-epileptic drug, gabapentin in the CPSP model to determine if it reduces thermal and mechanical hypersensitivity. Once validated, this CPSP model of thalamic injury will be utilized to test novel antinociceptive agents developed to treat CPSP.

**HAMED KHEDMATGOZAR MS, LUIS BRANDI MD, SAYANIKA DUTTA MS, GIRIJESH PATEL PHD,
JONATHAN WELSH BS, MOHAMED FOKAR PHD, WERNER DE RIESE MD PHD, ROBERT MATUSIK PHD,
SRINIVAS NANDANA PHD, MANISHA TRIPATHI PHD**

Identification of a Candidate Gene that plays key roles in the Pathogenesis and Therapy Resistance in Benign Prostatic Hyperplasia

Introduction: Benign Prostatic hyperplasia (BPH), a disease characterized by hyperproliferation of epithelial and stromal compartments, is the most common pathological condition affecting older men that severely impacts quality of life due to lower urinary tract symptoms (LUTS). Currently, therapy is limited to 5ARI and/or Alpha-blockers, both of which fail in about a third of patients. Therefore, there is an urgent need for identifying novel molecular-based therapeutic strategies for effective management of BPH. Through integrating three RNA-Seq datasets from BPH patients, our goal was to identify common differentially expressed genes (cDEGs) that play key roles in BPH pathogenesis and 5ARI resistance. Method: Datasets and expression profiles were downloaded from Gene Expression Omnibus (GEO) and Genotypes and Phenotypes (dbGap) database. DEGs were identified by DNASTAR and Array star and analyzed/represented using RStudio, GSEA, DAVID, STRING, Cytoscape, Immunohistochemistry (IHC), cell proliferation assays and organoid (3D) culture. Results: We identified a signature BPH transcriptome consisting of cDEGs between three independent patient cohort datasets. By comparing the common genes with the 5ARI treatment groups, we found SLIT3 as one of the common candidate genes that is dysregulated in BPH. We subsequently validated SLIT3 over-expression at the protein level through immunohistochemistry. We next investigated the molecular functions of SLIT3 through genetic manipulation of SLIT3 in human BPH cell lines. Our studies revealed that when compared with the respective controls, reduced SLIT3 expression resulted in decreased proliferation of both epithelial and stromal BPH cells in culture. In agreement with these results, SLIT3 knockdown in benign prostatic cells resulted in smaller and fewer organoids in 3D culture. Conclusion: Our results suggest that SLIT3 plays a key role in BPH pathogenesis.

BRENT R. KISBY, MICHELLE MCMANUS, SAMBANTHAM SHANMUGANUM, IGOR PONOMAREV

Heterogeneity of gene expression responses in vascular cell types in the neuroimmune mouse model of escalated ethanol consumption

Escalation of alcohol (ethanol) consumption is one of eleven criteria for alcohol use disorder (AUD). Previous work has shown that innate immune activation by repeated injections of the Tlr3 agonist, Poly(I:C) (PIC), increases alcohol consumption in C57BL/6J (B6J) male mice. We lack understanding of how different cell types are affected by immune activation and of their role in promoting escalated ethanol drinking. Previous research highlighted a potential role of vascular cells in this process. The goal of this study was to use single nucleus RNA-Seq (snRNA-Seq) to identify cell types, which are responsive to innate immune activation, with the focus on vascular cells. We used the Every-Other-Day (EOD) ethanol drinking procedure and repeated PIC injections to study the effects of immune activation on gene expression in specific cell types. B6J male mice were given a total of 9 injections of either saline or 10 mg/kg of PIC every 4 days and were given access to EOD ethanol, resulting in 2 groups: saline/ethanol (SE), and PIC/ethanol (PE). Brains were harvested twenty-four hours after the final alcohol session, flash frozen and later subjected to snRNA-seq analysis. Our initial snRNA-Seq analysis of 49,763 nuclei showed 40 discrete graph-based clusters corresponding to specific cell types, identified using cell type-specific molecular markers. We observed four distinct graph-based clusters associated with vascular cells; Smooth Muscle cells (SMCs), Endothelial cells (ECs), Pericytes, and perivascular fibroblasts (PVF) and used DESeq2 to identify genes differentially expressed (DEGs) between SE and PE groups in each cell type.

BRENT R. KISBY, MICHELLE MCMANUS, SAMBANTHAM SHANMUGANUM, IGOR PONOMAREV**(CONTINUED)**

We identified 966 DEGs within ECs, 660 DEGs within Pericytes, 709 DEGs within SMCs, and 557 DEGs within PVF, suggesting that vascular cell types are responsive to innate immune activation by PIC. We hypothesize that some cell type-specific DEGs (e.g., *Cldn5* for ECs, *Slc7a5* for SMCs, and *Slc38a2* for PVF) may play an important role in regulation of PIC-induced escalation of ethanol drinking. Taken together, the data suggests that vascular cell types are sensitive to neuroimmune activation and may contribute to the transition from low to elevated levels of ethanol consumption in mice.

MARILYN MATHEW, GUNADHARINI NANDAGOPAL DHARMALINGAM, SATHISH SIVAPRAKASAM, SABARISH RAMACHANDRAN, SOUAD R. SENNOUNE, AND VADIVEL GANAPATHY

Functional coupling between the amino acid transporters SLC38A5 and SLC7A11 in TNBC via selenomethionine

Breast cancer is the most common cancer in women, affecting 1 in every 8 women, with a combination of radiation, surgery, and chemotherapy as treatment. SLC38A5 is a glutamine/serine/glycine/methionine transporter, which mediates the influx of Na⁺/amino acid into cells coupled to the efflux of H⁺. SLC7A11 mediates the cellular uptake of cystine in exchange for glutamate. Both transporters are upregulated in triple-negative breast cancer (TNBC). SLC38A5 supports “glutamine addiction” and the increased need for one-carbon metabolism in cancer cells. SLC7A11 supports cellular synthesis of glutathione by providing cysteine, and thus protects the cancer cells against oxidative stress and iron-induced cell death (ferroptosis). To date, no functional crosstalk has been identified between the two transporters. We hypothesized that (i) SLC38A5 might mediate the cellular uptake of the micronutrient selenium in the form of selenomethionine (Se-Met) like it does Methionine (Met) and (ii) since Se-Met is known to induce the anti-oxidative transcription factor Nrf2 that promotes SLC7A11 expression, there might be a crosstalk between the two transporters via Se-Met. We tested these hypotheses using two TNBC cell lines, MB231 and MB453. The activity of SLC38A5 was monitored by measuring the uptake of serine in the presence of an uptake buffer (pH 8.5) containing LiCl in place of NaCl. Li⁺ tolerance and higher uptake at alkaline pH are unique features of SLC38A5. The interaction of Met and Se-Met with SLC38A5 was investigated by studying the dose-response effects for the two amino acids in inhibiting serine uptake. Met and Se-Met competed with serine for SLC38A5-mediated uptake in both cell lines with comparable IC₅₀ values (~500 μM). We then investigated the effect of Se-Met on the expression and activity of SLC7A11. Pretreatment of cell lines with 1 mM Se-Met for 16 h increased SLC7A11 mRNA levels and increased the transport activity of SLC7A11. In these studies, monomethylfumarate was used as a positive inducer of Nrf2. Previously work showed shRNA-mediated downregulation of SLC38A5 in TNBC cell lines suppress growth and proliferation of cancer in cell culture and in mouse xenografts. RNAseq analysis of the control tumors and shRNA-tumors show transcriptomic variance in the profile of the tumors in response to SLC38A5 deficiency. We found upregulation of genes involved in oxidative phosphorylation, TGF-β signaling, and hypoxia signaling and downregulation of KRAS and epithelial-mesenchymal transition pathways in SLC38A5-deficient tumors. We conclude that though both SLC38A5 and SLC7A11 promote TNBC via independent mechanisms, the two transporters are functionally coupled by Se-Met. This study provides valuable insight into how these two amino acid transporters work together to support TNBC growth, thus setting the stage for pharmacologic targeting of these transporters as a novel therapeutic strategy.

HARRY MAY, NIGHAT NOUREEN, KRISTYN MCCOY, JONAS NANCE, DIANA IXLAMATI-NAVA, C. PATRICK REYNOLDS, MIN H. KANG

Identification of differentially expressed genes in Neuroblastoma PDX in response to topotecan and cyclophosphamide

Neuroblastoma (NBL) is the most common extra-cranial solid tumor that arises in the sympathetic nervous system among children. NBL accounts for about 6% of childhood cancers and approximately 15% of all pediatric cancer deaths. While the survival rate for patients with low- and intermediate risk disease approaches 100%, the 5 years survival rate for high-risk NB patients less than 60%. Approximately 15% of high-risk neuroblastoma patients develop progressive disease (PD) during induction chemotherapy. Laboratory models are needed to understand mechanisms of early neuroblastoma PD. We evaluated 31 subcutaneous patient-derived neuroblastoma xenografts (PDX) established at diagnosis (Dx, n=15) and PD (n=16) from the Children's Oncology Group/ALSF repository (www.CCcells.org). Response over 175 days was assessed to 3 cycles of cyclophosphamide (cyclo, 30 mg/kg) + topotecan (topo, 0.6 mg/kg) daily x 5 days every 21 days. RNA sequencing of PDXs prior to therapy in three batches was corrected for batch effect using Combat. Differentially expressed genes were identified using DESeq2 and limma. Of the 31 PDXs, Six PDXs were non-responders (NR), two stable disease (SD), eleven partial responders (PR), four complete responders (CR), and eight maintained CRs (MCR). SD models were classed in the NR group along with six NRs, and 23 PR/CR/MCR were classed in the response group (R) to identify differentially expressed genes between the NR group and the R group. DESeq2 identified over 20 genes that are differentially expressed. Gene Set Enrichment Analysis found pathways that are statistically significant, including Hallmark E2F targets, Hallmark G2M checkpoints, and Hallmark MYC targets V1 and V2. To confirm the genes that are differentially expressed, we are currently conducting real-time RT-PCR in PDX samples as well as matching cell lines, and in vitro cytotoxicity assays with various expression of the selected gene candidates. The utilization of PDX models is crucial in understanding the role of differentially expressed genes in the NR group since biopsies are not routinely done in clinical settings. Our data will provide guidance in identifying specific genes that are associated with poor response to chemotherapy in neuroblastoma patients.

NHI T NGUYEN, SATHISH SIVAPRAKASM, AND VADIVEL GANAPATHY

Expression, activity, and regulation of the amino acid transporter SLC38A5 in colon cancer cells

Cancer-associated upregulation has been demonstrated for selective glucose transporters and amino acid transporters. The amino acid transporter SN2 (SLC38A5) represents the latest addition to this list. Transcriptomic analysis of tumor tissues has shown SLC38A5 is upregulated in breast and colon cancer. SLC38A5 is an amino acid-dependent Na⁺/H⁺ exchanger, induced in cancer, which not only supplies amino acids to cancer cells but also maintains an alkaline intracellular pH. The substrates for SLC38A5 include glutamine, asparagine, histidine, methionine, glycine, and serine, highlighting the role of SLC38A5 in glutamine addiction and one-carbon metabolism, both pathways being essential for cancer cells. In addition, SLC38A5 activates macropinocytosis, a process involved in cellular uptake of proteins in the extracellular fluid to meet amino acid demands in cancer cells. Since the transporter is upregulated in colon cancer, we hypothesized that the multiple functions of SLC38A5 fuel the growth, proliferation, and survival in colon cancer cells and that its induction is driven by oncogenic mutations in p53 and KRAS. To test this hypothesis, we performed qRT-PCR and western blot to analyze SLC38A5 expression colon cancer cells. Using serine uptake assays, we confirmed the functional characteristics of SLC38A5 in KM12L4 (a human colon cancer cell line) and NCM460D (a normal human colon epithelial cell line) and examined the regulation of its expression by KRAS and p53 using two different isogenic

NHI T NGUYEN, SATHISH SIVAPRAKASM, AND VADIVEL GANAPATHY (CONTINUED)

cell line pairs: SW48 with and without the oncogenic mutation (G12D) in KRAS and HCT116 with and without the tumor suppressor p53. The oncogenic mutation G12D in KRAS increased SLC38A5 activity in SW48 cells, whereas the loss of p53 decreased SLC38A5 activity in HCT116 cells. These data demonstrate that SLC38A5 is induced in colon cancer cells and that its expression/activity is regulated differentially by KRAS mutation (G12D) and p53, thus providing valuable insight into the molecular mechanisms for the upregulation of the transporter in colon cancer.

TASMIN R. OMY, CHINNADURAI MANI, MARK REEDY AND KOMARAIH PALLE

miRNA221_5p regulates RAD18-mediated DNA damage tolerance and repair signaling and ovarian cancer therapeutic responses.

The deadliest gynecological malignancy, ovarian cancer (OC), typically manifests asymptotically and is diagnosed at an advanced stage (stage III–IV) with local or distant metastases. Surgically removing the entire visible tumor is the conventional course of treatment for OC, which is then followed by chemotherapy. More than 70% of OC patients develop recurring disease despite initial responses. People frequently develop resistance to these treatment. This tragic situation emphasizes the urgent requirement to pinpoint the molecular pathways driving the disease's aggressiveness upon recurrence and the emergence of treatment resistance. By regulating the pattern of transcriptional and post-transcriptional gene expression, a few genetic and epigenetic variables have been connected to the reprogramming of tumor cells. Particularly, tumor development and therapy outcomes are significantly influenced by miRNA-mediated regulatory circuits. Our study of the miRNA expression pattern in a panel of human ovarian cancer cell lines revealed minimal to no miR221_5p expression and a concomitant rise in DNA damage response and repair gene RAD18. RAD18 plays critical role in cellular DNA damage tolerance and repair activity against chemotherapeutics, including platinum drugs. Similarly, loss of miRNA221_5p is associated with aggressive tumor cell growth, stemness, chemoresistance to platinum drugs, and poor prognosis in several cancers. Based on these information, we have hypothesized that miR221_5p regulates RAD18 mediated DNA damage tolerance and repair, and may offer novel therapeutic intervention to overcome OC chemoresistance. Our experimental data confers miR221_5p post-transcriptionally regulates RAD18 by binding to its 3'-UTR region and restores OC cell sensitivity to platinum drugs. Mechanistically, our results demonstrate that miRNA221_5p epigenetically regulates RAD18-mediated DNA damage tolerance and homologous recombination repair and could be a novel therapeutic to overcome OC chemoresistance. Collectively, our studies identify a novel chemotherapy-induced epigenetic modulator in OC therapeutic resistance and offer novel miRNA 221-5p-mediated therapeutic intervention for the treatment of chemoresistant OC and to prevent disease recurrence.

KSENIIA S. OROBETS, SNEIDER ALEXANDER GUTIERREZ GUARNIZO, ELENA B. TIKHONOVA, ANDREY L. KARAMYSHEV

Pathological RAPP Activation by Mutations in Granulin as a Mechanism for Frontotemporal Lobar Degeneration

Frontotemporal Lobar Degeneration (FTLD) is a neurodegenerative disease characterized by severe dementia. Granulin is one of the major proteins which is implicated in FTLD pathology. Granulin is a secretory protein, it is synthesized as progranulin which contains N-terminal hydrophobic signal sequence.

KSENIIA S. OROBETS, SNEIDER ALEXANDER GUTIERREZ GUARNIZO, ELENA B. TIKHONOVA, ANDREY L. KARAMYSHEV (CONTINUED)

The signal sequences are recognized by Signal Recognition Particle (SRP) for co-translational targeting to the endoplasmic reticulum (ER) for proper biogenesis. Mutations in the signal sequence may change hydrophobicity of this region and interfere with SRP binding. The loss of SRP interaction activates an mRNA degradation in Regulation of Aberrant Protein Production (RAPP) pathway and leads to the protein loss. We hypothesize that mutations in progranulin signal sequence activate RAPP and affect granulin mRNA and protein level. Using bioinformatic analysis on the whole human genome level we identified novel granulin mutations which can play a role in FTLN pathogenesis. We constructed recombinant mutated granulins and expressed them in the cultured human cells. Utilizing RT-qPCR and Western blotting, we evaluated granulin mRNA and protein levels for described clinical mutants. We found that hydrophobicity reduction of the h-domain of the signal sequence due to mutations S6R, A9T, G13R, G13E leads to decrease of progranulin mRNA and protein level due to the loss of interaction with SRP. Mutations in other domains of the signal sequence either do not affect the expression level (A16T, T18A) or trigger mRNA decrease by unknown mechanism (T3S). These findings demonstrate the role of the signal peptide alterations in the onset of FTLN.

WYATT PAULISHAK AND LAURENCE WOOD*Listeria monocytogenes as a Chemotherapeutic Delivery Vehicle*

Listeria monocytogenes (LM) is an intracellular Gram-positive bacterium at the core of an expanding oncology toolbox. LM invades and proliferates within tumors, facilitated by the action of surface invasion proteins and their ability to spread from cell-to-cell through a unique intracellular life cycle. This preferential colonization of tumors by LM is aided by the immunologically suppressed and hypoxic tumor microenvironment. While targeted delivery of drugs and immunotherapies is a multibillion-dollar industry, many approaches are reliant on tumor-associated antigens (TAAs) that have low expression and poor internalization which forces a reliance on extremely cytotoxic payloads. Here, we investigate the cytotoxicity and infectivity of various LM strains in vitro to identify one viable to act as a drug delivery vehicle. We also demonstrate proof of concept of LM as a chemotherapeutic delivery vehicle utilizing attachment of an antibody drug conjugate, SN38-ADC, to LM as a novel targeted cancer therapeutic. LM-mediated delivery of SN38 enabled cytotoxicity upwards of 60% in the J774 sarcoma cell line in vitro. The J774 macrophage-like sarcoma cell line represents an idealized target for LM drug delivery, and our results demonstrate an ADC concentration-dependent cell killing effect. Our results demonstrate the viability of LM as a drug delivery vehicle and support current research efforts towards refining and expanding the technology. We anticipate that use of different cytotoxic payloads, refining LM labeling methods, and expanding into other cancers will allow the move from ideal cell lines into in vivo applications.

MOHAMMED POURGHAED, FELIPE RAMIREZ VELANDIA, ASHISH SARANGI, JOHN CULBERSON, GABRIELA ASHWORTH, HAFIZ KHAN, ANNETTE BOLES, ANTWI-ADJEI PHILIP, VOLKER NEUGEBAUER, AND J. JOSH LAWRENCE

Associations between Vitamin D levels and diabetes in Elderly Hispanics of Rural Western Texas.

BACKGROUND: Bioactive vitamin D (calcitriol) is a hormone essential for many metabolic processes in the body. Vitamin D (VD) deficiency and insufficiency have been associated with a risk of metabolic disorders like including diabetes. The prevalence of diabetes is known to be high amongst the Hispanics population in West Texas. Understanding the connection between levels of Vitamin DVD and the prevalence of diabetes in Hispanics may be a useful clinical tool in combating the disease in Western Texas. **HYPOTHESIS :** Does low levels of there an association between Vitamin D predispose and diabetes among Hispanics in Western Texas to diabetes? **METHODS:** Data was obtained from a cohort of 299 rural West Texans (mean age 62.6 ± 11.7 , 70.9% female, and 40.5% Hispanic/Latino ethnicity (HLE) recruited into Project FRONTIER (Facing Rural Obstacles to Health Care Now Through Intervention, Education, and Research). Relationships between self-reported measures of general health, history of disease, vitamin supplementation and diabetes-related blood-based biomarkers were investigated. Descriptive statistics and regression analyses were used to determine correlations between serum VD levels and diabetic biomarkers and other parameters. **RESULTS:** A significant negative correlation was seen observed forbetween VD level and diabetes ($p=0.0018$), and the risk factors for diabetes i.e. obesity ($p=0.020$), body-mass index ($p=0.0001$) and abdominal circumference ($p<0.0001$). Simple linear regression found significant negative associations between VD level and fasting blood glucose level ($p=0.0004$) and HbA1c level ($p = 0.0005$). Also VD level was negatively associated with the probability of having diabetes ($p=0.0003$) and pre-diabetes/diabetes status (>110 mg/dL;) ($p<0.0001$). Hispanic ethnicityHLE was associated with significantly higher HbA1c levels ($p = 0.0006$) and higher fasting glucose levels than non-Hispanic HLE populations ($p = 0.0034$). **CONCLUSION:** Low VD levels is associated with an increased risk probability of diabetes in Hispanics of in Western Texas. **KEYWORDS:** Vitamin D, Deficiency, Hispanic, Diabetes.

CESAR SANCHEZ-VILLALOBOS, J.JOSH LAWRENCE, RANADIP PAL

Ranking gene expressions on hippocampal transcriptomes elucidate differentiating genes in Alzheimer's Disease.

Alzheimer's Disease (AD) is the most common type of dementia, leading to cognitive impairment and memory loss. It is also one of the leading causes of death in the United States. Although neuroscientists have spent considerable effort trying to understand and treat this disease, the molecular mechanisms underlying this disorder remain unclear, which is an obstacle in developing effective treatment strategies. In this work, we apply Relief Based Algorithms (RBA) to the dataset from van Rooij et al. (2018). The data consists of the RNAseq expression of 14564 genes from the hippocampus of 28 brains (18 AD and 10 age-matched controls). After applying RBA and computing the feature importance aided with a Random Forest (RF) classifier, we reduced the number of predictors to only 14 genes. Most genes in the selections have not been reported in the AD-related literature. One of the genes is KCNIP1, a potassium voltage-gated channel interacting with channels linked to epilepsies and heart disorders but not yet to AD. From our exploratory analysis, we concluded that the multivariate interaction of these genes gives us a high accuracy when we try to discriminate between the two groups. Therefore we are validating our results by using other datasets of post-mortem Hippocampus transcriptomes.

FLAVIA SARDELA DE MIRANDA, RACHEL BABCOCK, MARIBEL CASTRO, SONIA Y. KHAN, CARSEN ROACH, THOMAS HINTELMANN, KATHRYN FURR, CHANG HYUN LEE, GEETHA PRYIA BOLIGALA, FAHMIDA RASHA, LUIS BRANDI, HARVINDER SINGH GILL, KEVIN PRUITT, MICHAEL W. MELKUS, RAKHSHANDA LAYEEQUR RAHMAN

Breast cancer cryoablation combined with anti-CTLA4 inhibition induced a systemic abscopal effect resulting in increased activated T cells in distant tumors

Introduction: Cryoablation, a technique that kills tumor cells through rapid freeze/thaw cycles, preserving tumor antigens, is approved to treat small low-risk breast cancer (BC) but has not been as successful for high-risk BC. A promising area of cryoablation research is its combinational use with immune checkpoint inhibitors (ICIs) to enhance the anti-tumor immune response and generate distant tumor cell targeting – the abscopal effect. Using a murine model of high-risk metastatic BC, we investigated cryoablation in conjunction with ICIs. Methods: BALB/c mice were bilaterally transplanted in the mammary fat pad with 4T1-12b-luciferase BC cells. Two weeks after, all mice had their left tumors cryoablated; 24 hours pre- and post-cryoablation, mice received an intraperitoneal injection containing PBS (control) or 100 µg of anti-CTLA4 or anti-PD-L1. The right tumors represented distant metastatic tumors to examine the immune abscopal effect. Mice were sacrificed one-week post-cryoablation; cryoablated (left) and abscopal (right) tumors, peripheral blood and spleen cells were used for flow cytometry analysis of immune populations. Results: Anti-CTLA4 treated mice had increased T cell activity with higher percent of effector/effector memory CD4+ T cells in the abscopal tumors compared to the control, where similar trends were observed for CD8+ T cells. Additionally, higher activation of CD4+ and CD8+ T cells was found in the blood of mice treated with anti-CTLA4, compared to the control. We did not observe broad T cell activation with anti-PD-L1 treatment but found increased levels of naïve CD8+ T cells in abscopal tumors compared to the other groups. Conclusions: Cryoablation in combination with anti-CTLA4 increased T cell activation in abscopal tumors and blood after treatment, while the combination with anti-PD-L1 increased naïve CD8+ T cells. Further studies will investigate each strategy in long-term survival experiments. The goal is to identify predictive biomarkers for efficacy to translated it to the clinic.

NEHA SAWANT, SUDHIR KSHIRSAGAR, LLOYD BUNQUIN, HALLIE MORTON, P. HEMACHANDRA REDDY AND ARUBALA P. REDDY

Protective effects of Citalopram against phosphorylated Tau induced neurotoxicities in the dorsal raphe nucleus

Background: Depression is among the most common neuropsychiatric comorbidities in many Tauopathies including Alzheimer's disease (AD). Apart from its anti-depressive and anxiolytic effects, selective serotonin reuptake inhibitor (SSRI) treatment also offers intracellular modifications that may help to improve neurogenesis, amyloid burden, Tau pathology, and neuroinflammation. Despite its multifaceted impact in the brain, the exact physiological and molecular mechanism by which SSRIs such as Citalopram improve neurogenesis and synaptogenesis in dementia is poorly understood. Purpose: In the present study we explored phosphorylated Tau (pTau) related cellular changes as well as protective effects of Citalopram on the dorsal raphe nucleus (DRN), which is the largest serotonergic nucleus in the brain.

NEHA SAWANT, SUDHIR KSHIRSAGAR, LLOYD BUNQUIN, HALLIE MORTON, P. HEMACHANDRA REDDY AND ARUBALA P. REDDY (CONTINUED)

Methods: We investigated pTau, TPH2, SERT, 5HTR1a, Synaptophysin and PSD95, mRNA and protein levels by RT-qPCR, immunoblotting and immunofluorescence staining in Citalopram treated and untreated Tau mouse models as well as in serotonergic RN46A-B14 neurons, transfected with wild-type and mutant Tau cDNA. Additionally, we also conducted cell survival analysis and Seahorse analysis on the RN46A-B14 neurons, behavioral studies on mice and Golgi-cox staining on postmortem mouse brains. **Results:** Citalopram treatment reduced pTau, SERT, and 5HTR1a levels, while up-regulating synaptophysin and PSD95 levels in both mouse and cell models of mutant Tau. These findings were endorsed by the increased dendritic spine density and improved cognitive behavior of the treated mice compared to that of the untreated ones. Further, Citalopram also increased survival and maximal OCR of pTau transfected RN46A-B14 neurons. Statistical significance was determined, using one-way ANOVA. **Conclusions:** Taken together these findings suggest Citalopram could not only be a promising therapeutic drug for treating depression in AD, but also for delaying the progression of AD.

REBECCA SCHNEIDER AND KENDRA RUMBAUGH, PH.D.*Effects of debridement on antibiotic treatment for chronic wound biofilm infections*

Background: Chronic wounds have become staggering burdens to healthcare systems, with 6 to 7 million diabetics in the US alone expected to have foot ulcers. Biofilm infections are challenging to eradicate from chronic wounds, even with the current gold standard of care – repeated sharp debridement and antibiotics. Biofilms are a survival strategy for microbes, whereby they surround themselves with an antibiotic-tolerant extracellular polymeric substance (EPS) composed of proteins, extracellular DNA (eDNA), and carbohydrates. We investigated whether EPS-carbohydrate-targeting glycoside hydrolase enzymes (GH) could improve wound care. We hypothesized that GH enzymatic debridement would more effectively disperse bacteria from a biofilm infection than non-enzymatic debridement methods. **Methods:** We evaluated the efficacy of debridement treatments in our chronic wound murine model by (1) assessing systemic dispersal of *Pseudomonas aeruginosa* (PA) without antibiotic treatment and (2) evaluating bacterial load reduction with antibiotic treatment. 48h infections were treated with one or a combination of the following: sharp debridement with a curette; enzymatic debridement with GH solutions; and PBS vehicle controls, with and without Neosporin antibiotic treatment. Up to 24h following treatment, wound tissue and internal organs were collected for bacterial colony forming units (CFU) quantification. **Results:** In the absence of antibiotic intervention, our results suggest that GH enzymatic debridement increases the likelihood of systemic bacterial dispersal compared to non-enzymatic debridement ($p < 0.001$). Furthermore, antibiotic treatment can successfully lower the risk of bacteremia in enzymatically debrided mice ($p < 0.05$) and reduce bacterial load in the wound compared to enzymatic debridement without antibiotic treatment ($p < 0.001$). **Conclusions:** This study provides valuable insight into the behavior of bacteria dispersed from biofilm-infected chronic wounds. Paired with antibiotic intervention, enzymatic debridement can release bacteria from the protective biofilm EPS and into a potentially more susceptible dispersed state. Future studies will focus on infection clearance and wound healing with concurrent antibiotic treatment over time.

KERRI SPONTARELLI, VICTORIA YOUNG, RYAN SWEAZEY, ALEXANDRIA PADRO, JEANNIE LEE, TULIO BUESO, ROBERTO HERNANDEZ, JONGYEOL KIM, NHGRI REVERSE PHENOTYPING CORE, MIGUEL HOLMGREN, JEREMY BAILOO, SHO YANO, PABLO ARTIGAS

ATP1A1-driven neuropathy is absent in heterozygous $\alpha 1$ knockout

The peripheral neuropathy Charcot-Marie-Tooth disease (CMT) has been linked to heterozygous germline mutations in ATP1A1 (the gene encoding the $\alpha 1$ subunit of the Na⁺/K⁺-ATPase (NKA)) which are reported to cause loss-of-function. NKA uses the energy of ATP hydrolysis to transport Na⁺ and K⁺, establishing electrochemical gradients essential for proper action potential propagation. The $\alpha 1$ isoform (one of 4 isoforms) is expressed in all tissues and is the predominant ortholog in peripheral axons. We hypothesized that haploinsufficiency of ATP1A1 drives CMT pathophysiology and we tested this by characterizing heterozygous ATP1A1 knockout mice (ATP1A1^{+/-}). ATP1A1^{+/-} and wildtype (WT) littermates were tasked with a battery of behavioral tests evaluating strength, coordination, and balance, at regular time intervals up to 18 months of age. No significant differences between WT and ATP1A1^{+/-} mice were observed throughout their lifespans. We also evaluated if increased demand on peripheral neurons via exercise would induce a CMT phenotype in ATP1A1^{+/-} mice. ATP1A1^{+/-} and WT littermates were exercised on a treadmill until 5 months of age. Behavioral tests performed up to 9 months old revealed no significant differences between ATP1A1^{+/-} or WT mice. Likewise, no significant differences in behavioral performance were observed at any time point between exercised and non-exercised mice. Using electromyography for the detection of subclinical disease, we found no difference in the compound neuromuscular action potentials of WT and ATP1A1^{+/-} mice. Consistent with the result in mice, we present a human participant identified with a loss-of-function variant of ATP1A1 (nonsense mutation at p.Y148) who lacks any clinical features of ATP1A1-driven disease phenotypes. The absence of a neuropathic phenotype in ATP1A1 mice and human suggests a complex pathophysiology of ATP1A1-driven CMT. 1R03-NS116433-01.

MOSHARAF MAHMUD SYED, DEVARAJA RAJASEKARAN, TYLER SNIEGOWSKI, AND YANGZOM D. BHUTIA

Studying the compensatory mechanism associated with SLC6A14 blockade in pancreatic cancer

Pancreatic ductal adenocarcinoma (PDAC) is highly lethal and is associated with the upregulation of SLC6A14. PDAC cells are dependent on SLC6A14 for their amino acid supply for their growth and proliferation. Interestingly, the absence of SLC6A14 seems to curtail their growth in both in vitro cell line models as well as in in vivo animal models. The fact that the PDAC cells are so much dependent on SLC6A14 for their growth and also because SLC6A14 blockade inhibits mTORC1 signaling pathway, we were curious to investigate whether SLC6A14 inhibition upregulates other alternate mechanism of amino acid acquisition. mTORC1 is a master regulator of protein synthesis and an upstream regulator of autophagy, which is a known nutrient scavenging mechanism. Because SLC6A14 blockade inhibits mTORC1 signaling pathway, we wanted to investigate if autophagy is induced in the PDAC cells in response to SLC6A14 blockade. If this is true, then the induced autophagy can undermine the anticancer efficacy of SLC6A14 blockade. Therefore, the aim here was to test if SLC6A14 blockade induces autophagy in PDAC cells and if true whether a combination therapy targeting SLC6A14 and autophagy will lead to a better therapeutic outcome in PDAC as opposed to targeting SLC6A14 alone. Interestingly, our results indicated that SLC6A14 blockade does induce autophagy in PDAC cells as demonstrated by the increase in LC3 protein, changes in the phosphorylation status of mTORC1, AMPK and Beclin-1.

MOSHARAF MAHMUD SYED, DEVARAJA RAJASEKARAN, TYLER SNIEGOWSKI, AND YANGZOM D. BHUTIA (CONTINUED)

Western blotting and confocal microscopy were performed in SLC6A14-positive CFPAC-1 cells post-treatment with Alpha-MLT (SLC6A14 blocker). Taken together, our results indicate that autophagy is induced as an alternate mechanism of amino acid acquisition in response to SLC6A14 inactivation and therefore, our future goal is to test whether a combination therapy targeting SLC6A14 and autophagy will lead to a better therapeutic outcome in PDAC as opposed to targeting SLC6A14 alone.

NGHI N.B. TRAN, ANTHONY BUI, VALERIA JARAMILLO-MARTINEZ, QINGHAI ZHANG AND INA L. URBATSCH

LIPID ENVIRONMENT DETERMINES THE DRUG-STIMULATED ATPASE ACTIVITY OF P-GLYCOPROTEIN

P-glycoprotein (Pgp), also known as ABCB1 or multidrug resistance protein 1 (MDR1), is expressed in the luminal membrane of the intestine, liver, and kidney where it regulates the absorption, distribution, metabolism, and excretion (ADME) of a wide range of xenobiotic compounds and metabolites, and at the blood-brain where it protects the sanctuary from uptake of toxic compounds and enhances excretion of β -amyloid and metabolites. Its expression in cancer cells has been linked to multidrug resistance against many chemotherapeutic agents leading to ineffective treatment and relapse. Besides chemotherapeutic drugs, lipids have been suggested to be transported by themselves or co-transported with drugs by Pgp. Here we tested the hypothesis that the plasma membrane lipid composition modulates how drugs interact with Pgp and may greatly affect both the affinity of the transport substrates and its maximum activity. Our general approach was to test varieties of synthetic lipid mixtures starting with the bilayer-forming phosphatidylcholine (PC) and supplementing with phospholipids carrying different head groups as well as cholesterol. We present first results of Pgp interactions with PC, phosphatidylethanolamine (PE), sphingomyelin (SM), and cardiolipin which we found to act as positive effectors and increase the apparent affinity for substrates and increase V_{max} , while others acted as negative effectors and decreased V_{max} . The impact on the substrate binding and translocation mechanisms of Pgp will be discussed. The long-term goal is to establish a stable source of synthetic phospholipid mixtures supplemented with cholesterol that mimic Pgp activity in its native environment in the human body.

GSBS 3+ YEARS

KEVIN BASS, SATHISH SIVAPRAKASAM, VADIVEL GANAPATHY

Colonic ketogenesis's essential role in intestinal homeostasis and normal physiology

For a nearly a hundred years, orthodoxy in classical physiology has held that the liver regulates systemic ketonemia and that ketogenesis in extrahepatic organs serves only a regulatory role and does not contribute to systemic ketonemia. Using a colon-specific HMGCS2 knockout mouse, we show that nearly 40% of systemic ketonemia is regulated by colonic ketogenesis, challenging this long-accepted doctrine. Knocking out the microbiota via antibiotics recapitulates the effect of

KEVIN BASS, SATHISH SIVAPRAKASAM, VADIVEL GANAPATHY (CONTINUED)

the colon-specific HMGCS2 knockout on systemic ketonemia, with concomitant downregulation of HMGCS2, linking the microbiome to colonic ketogenesis, putatively via the short-chain fatty acid butyrate. The colon-specific knockout mouse is much more vulnerable to DSS-induced colitis, demonstrating the importance of colonic ketogenesis to intestinal homeostasis. Intriguingly, the impact of colonic ketogenesis on both systemic ketogenesis and intestinal homeostasis appears to be gender-specific.

SAYANIKA DUTTA, GIRIJESH PATEL, HAMED KHEDMATGOZAR

TBX2 acts as a molecular switch to downregulate androgen receptor and upregulate glucocorticoid receptor signaling in castrate resistant prostate cancer

Background: A major obstacle in the treatment of metastatic castrate resistant prostate cancer (mCRPC) is acquired resistance to androgen deprivation therapy (ADT). It is now recognized that ADT, particularly the 2nd generation androgen receptor (AR) antagonists, such as enzalutamide, orchestrate plasticity changes/molecular alterations leading to therapy resistance. It is hypothesized in the field that the emergence of castrate resistance to 2nd generation ADT is driven by a switch/bypass from AR signaling to the glucocorticoid receptor (GR) signaling. Therefore, identifying the molecular mechanisms that concurrently drive the loss of AR and gain of GR signaling may be crucial in devising novel and effective therapeutic modalities against mCRPC. We have previously reported that TBX2, a T-box transcription factor (TF) with both repressor and activator functions, is over-expressed in CRPC and that TBX2 drives PCa bone metastatic progression. In agreement with our findings, a recent report showed that TBX2 is a key TF that drives plasticity associated with CRPC. In this study, we investigated the molecular mechanisms by which TBX2 drives plasticity associated with enzalutamide resistance. Methods: We genetically modulated TBX2 using the dominant negative (DN), sh-RNA, and overexpression (OE) approaches. RNA-seq was performed, and qRT-PCR, Western blot and immunohistochemical (IHC) analyses were used for validation. Further, we performed chromatin immunoprecipitation (ChIP) and site directed mutagenesis (SDM). Results: Using publicly available databases, we observed a negative correlation between TBX2 and AR; and a positive correlation between TBX2 and GR. Strikingly, blocking TBX2 expression in wildtype PC3 human PCa cells that do not express AR mRNA or protein led to a marked elevation of AR signature as assessed by RNA-seq analysis. These results were confirmed/validated at the protein level using additional human PCa cell lines. Further, these results were validated using all three approaches to genetically modulate TBX2, i.e. DN, shRNA, and OE. Further, ChIP and SDM analyses confirmed that TBX2 directly binds and transcriptionally represses AR. Conversely, genetic modulation of TBX2 was positively associated with GR expression, and TBX2 was found to directly bind to the GR promoter. Further, we found that knock-down of GR in LNCaP cells overexpressing TBX2 (LNCaPTBX2OE) reversed enzalutamide resistance that is associated with elevated TBX2 expression. Conclusions: Our studies suggest that TBX2 acts as the molecular switch that on one hand represses AR and on the other hand activates GR. Further our study paves the way for potential therapeutic strategies against the AR/GR switch/bypass in CRPC wherein AR and GR signaling could be co-inhibited through targeting TBX2.

REBECCA GABRILSKA AND KENDRA RUMBAUGH, PHD*Investigating the contribution of obligate anaerobes to wound healing*

Skin and soft tissue infections encompass a spectrum of clinical presentations and are often polymicrobial. Chronic, non-healing wounds are infamous for their association not only with biofilm-associated microbes but a dysbiotic microbiome that may also contribute to disease chronicity. Although there is strong evidence of delayed closure of wounds infected by dominant pathogens such as *Staphylococcus aureus*, less is known about the possible influence of less abundant, fastidious organisms such as obligate anaerobes. Evidence of correlations for obligate anaerobes as a biomarker of poor healing prognosis are well documented, thus anaerobes are hypothesized to contribute to worsened infection. However, there are also reports that targeted antibiotic treatment of anaerobes does not improve wound healing outcomes. In this study, we aimed to determine the potential functional contribution of obligate anaerobes in wounds using a polymicrobial *in vivo* wound model. We utilized a murine full-excision dermal model, infected with a pre-established wound microcosm community, to investigate if infection with anaerobes impacts wound severity. Clinical outcomes were measured, including wound area reduction monitored over the course of healing in addition to end-point microbial viability. Interestingly, we observed significant variations in longitudinal wound healing of different bacterial communities. Contrary to our hypothesis, the obligate anaerobe *Bacteroides fragilis* did not contribute to significant delays in wound closure, while *Finnegoldia magna* appeared to improve closure, suggesting a potential functional role for obligate anaerobes in wound healing. Future studies will include further investigations into the microbe-microbe and host-microbe mechanisms that govern these outcomes.

ALEJANDRA GOMEZ, AVELINE HEWETSON, PETAR GROZDANOV, JEREMY D. BAILOO, GAIL A. CORNWALL*The role of CRES amyloids in sex-specific learning and memory*

Amyloids are highly ordered cross β -sheet aggregates that are typically associated with disease states. However, growing evidence shows that some amyloids carry out biological roles including as structural scaffolds and signaling complexes. These are categorized as functional amyloids. We previously demonstrated an extracellular amyloid matrix surrounds sperm in the normal mouse epididymal lumen and has host defense functions. This matrix is composed of several members of the highly amyloidogenic reproductive CRES subgroup of cystatins (cysteine protease inhibitors). The mammalian brain extracellular matrix (ECM) contains three distinct populations; loosely attached, membrane bound and tightly bound ECM. These components are involved in cell homeostasis and communication and their composition changes during processes such as memory formation, plasticity, regeneration, and neurodegeneration. We hypothesize that CRES and CRES subgroup members are components of the brain ECM and are important participants in learning and memory processes. RT-PCR and Western Blot show CRES and other subgroup members are present in the mouse hippocampus and cerebellum. Further, PAD pull-down suggests CRES amyloid is present in the urea soluble/tightly bound ECM fraction.

Immunofluorescence studies show CRES is present in both neurons and astrocytes in the male mouse hippocampus suggesting its involvement in several brain processes. Indeed, cognitive-behavioral studies between adult wild-type (WT) mice and a global CRES knockout (KO) mouse model highlight that male, but not female, KO mice display impairments in learning in a 2-choice water-escape task as well as behavioral inflexibility during reversal (they perseverate on the previously learned escape location) when the location of the platform to escape is changed. These findings suggest CRES and CRES subgroup members, possibly as amyloids, are part of the mouse brain ECM and are necessary for normal brain processes.

VALERIA JARAMILLO-MARTINEZ, SOUAD R. SENNOUNE, ELENA B. TIKHONOVA, ANDREY L. KARAMYSHEV, VADIVEL GANAPATHY, INA L. URBATSCH

Biochemical and molecular characterization of the most-common SLC13A5-Epilepsy causing missense-mutations

The sodium-coupled citrate transporter (NaCT) is a plasma membrane transporter, which is energized by an inwardly directed electrochemical sodium gradient. It mediates the symport of sodium and the carboxylate citrate into cells. NaCT is expressed in the liver, testis, brain, bone, and teeth, where citrate plays key roles in the synthesis of neurotransmitters, cholesterol, and fatty acids, the generation of energy, and teeth/bone mineralization. In humans, loss-of-function mutations in SLC13A5, the NaCT gene, cause early infantile epileptic encephalopathy type-25 (EIEE25, SLC13A5-Epilepsy), which leads to epilepsy, impaired speech, limited motor skills, developmental delay, and tooth defects. Currently, there is no treatment for EIEE25. Recently, the cryo-electron microscopy structure of the human NaCT was solved in an inward-facing conformation. This was an important advancement in the NaCT field, paving the way for a better understanding of the structure-function relationships for this clinically important transporter. We classified 22 NaCT missense disease-causing mutations based on their localizations in the 3D structure. Class I mutations interfere with the transport function by blocking the elevator-type mechanism for substrate translocation. Class II cause defects in protein folding and protein trafficking to the cell surface, which may be corrected by small molecule therapeutics. As there are not NaCT-specific antibodies, we expressed WT and the mutants with specific epitopes to facilitate detection, which didn't interfere with the presentation of the mutant phenotypes. The Class I mutations C50R, T142M, and T227M displayed protein and surface expression levels similar to WT. Class II mutants G219R, S427L, and L488P showed significantly decreased protein expression and no plasma membrane expression. Both classes displayed diminished transport activity. These experiments have brought us one step closer to understanding the defects of disease-causing mutations at the molecular level, allowing us to begin dissecting NaCT trafficking pathway(s).

MORGANA K. KELLOGG, ELENA B. TIKHONOVA, KEVIN N. BASS, PAUL D'CUNHA, ANDREY L. KARAMYSHEV

Defective SRPs Affect Protein Expression and Sorting: Modelling Molecular Mechanisms of Human Diseases

Human signal recognition particle (SRP) co-translationally targets secretory and membrane proteins to the endoplasmic reticulum for their further trafficking. SRP is a complex of six proteins arranged on a long, noncoding 7SL RNA. The SRP54 subunit is directly involved in recognition of signal peptides of secretory and membrane proteins, while functions of the other subunits are less defined. Many human diseases are associated with defects in the SRP subunits. Among them are congenital neutropenia, bone marrow pathologies, neurological diseases, cancer, immune-mediated necrotizing myositis, male fertility, and others. We hypothesize that SRP subunits have distinct functions in protein targeting, quality control, mRNA protection, inter-subunit regulation, and interactions at the ribosome; and that dysregulation of these processes cause diseases. Using RNAi technology in cultured HeLa cells, we constructed cell culture models producing SRP with depleted subunits and studied how they affect each subunit expression, trigger RAPP protein quality control, and interfere with the interaction with ribosomes. We show that expression of the subunits forming dimers in the SRP complex (SRP68/72 and SRP9/14) depends on each other.

MORGANA K. KELLOGG, ELENA B. TIKHONOVA, KEVIN N. BASS, PAUL D’CUNHA, ANDREY L. KARAMYSHEV (CONTINUED)

We also demonstrate that SRP54 protein expression is affected by the absence of other SRP subunits. Our data show that SRP54 is essential for the SRP complex to bind to the ribosome, and that SRP54 has a primary role in mRNA protection acting as a negative regulator of RAPP, while other SRP subunits have a minor function in this process. Deciphering how defects in SRP interfere with its major functions in mRNA protection, protein quality control at the ribosome, protein targeting, and dysfunction is key to understand the molecular mechanism of its involvement in many different human diseases.

XB LIU, A GUTIERREZ, JO WILLMS, M AGUILERA, AA SHAIK, P PANTHAGANI, A VEGA, B BACKUS, J DRISKILL, J SANCHEZ, JD BAILOO AND SE BERGESON

A NOVEL DSM-V BASED MODEL OF ALCOHOL USE DISORDER IN MINI PIGS: AN UPDATE

Alcohol Use Disorder (AUD) is a chronic, relapsing condition characterized by lost control over alcohol intake despite adverse social, occupational, or health consequences. Preclinical AUD research has predominantly used rodent models. A gap in the field is there are no non-primate animal models that satisfy the Diagnostic and Statistical Manual of Mental Disorders V (DSM-V) criteria for diagnosis of AUD. Ideally, safety of therapeutics should be evaluated in multiple mammalian models before FDA approved clinical trials in humans. Given the significant biological and physiological similarities of pigs to humans, including drinking to intoxication, we developed DSM-V based diagnostic tools with good face validity and hypothesized that minipigs would reach criteria for AUD. Using a within-subject design, 11 custom-made DSM-V criteria-based tests of AUD were established. To date, 7 of 11 measures have been evaluated, and all 5 pigs already meet AUD criteria. Every animal drank to intoxication ($p=0.0001$) with a blood alcohol concentration higher than 0.8 mg/ml and showed greater than 80% preference at all concentrations ($p<0.002$). As predicted, as ethanol concentration increased, all pigs showed impaired motor coordination on the agility test ($p=0.0013$). However, only Pig 1 showed craving after deprivation (>130%). Pig 2 and Pig 5 had decreased home pen recreational activity by 66.7% and 68%, respectively. Pig 2 and Pig 4 showed physiological withdrawal symptoms. A full severity assessment will be completed when the remaining 4 criteria are tested. Our results highlight that the minipig may be a highly translationally relevant model species for pre-clinical evaluation of therapeutic strategies for AUD.

DALIA MARTINEZ-MARIN, MONICA SHARMA, JENNA C. VAN WUNNIK, FLÁVIA SARDELA DE MIRANDA, GEETHA PRIYA BOLIGALA, KEVIN PRUITT

Dishevelled-1 regulates global transcriptomic changes and partners with transcription factor ETS1

Dishevelled (DVL) is a crucial component of Wnt-signaling pathways and is vital for other physiological processes. Previously thought to have a primarily cytoplasmic role, the discovery of DVL translocation to the nucleus reframed how DVL is viewed functionally. DVL1 is the least understood of the three paralogs and its nuclear function remains enigmatic. This study utilizes data from our recent DVL ChIP-seq and RNA-seq analyses, publicly available data, genomic analyses, and other bioinformatics tools to investigate novel mechanisms of how DVL1 coordinates downstream signaling. Our study seeks to define the elusive function of nuclear DVL with respect to epigenetic and transcriptional regulation in models of triple-negative breast cancer.

DALIA MARTINEZ-MARIN, MONICA SHARMA, JENNA C. VAN WUNNIK, FLÁVIA SARDELA DE MIRANDA, GEETHA PRIYA BOLIGALA, KEVIN PRUITT (CONTINUED)

DVL ChIP-sequenced reads were aligned against GRCh38.p14, and peaks visualized using R and an integrative genomic viewer. RNA-seq FASTQ files were trimmed and aligned to GRCh38.p14; read counts were analyzed with edgeR and resulting differentially expressed genes with R and Cytoscape. To determine possible DVL binding partners, transcription factor computational analysis using JASPAR-LOLA and subsequent co-immunoprecipitation were performed. Our analysis shows DVL binds to core-promoter elements in hallmark genes such as APCS, MMP1, BMP2, CXCR4, and SIRPA. Data mining and co-immunoprecipitation analysis have led to the identification of several possible nuclear DVL binding partners, including candidate transcription factors that partner with DVL1. We have not only identified DVL binding to the promoter of genes involved in tumorigenesis and immune function but also identified possible DVL binding partners that aid in the regulation of these genes. These findings and future in silico and in vivo approaches will further define a novel DVL regulatory role of tumor and immune signaling in triple-negative breast cancer.

MELISSA MCHANN, ISABEL CASTRO-PIEDRAS, D.J. MORGAN, ROBERT BARNES AND JOSEE GUINDON

JNK Signaling Effects on Tolerance to CP55,940 is Sex and Dose Dependent in CB1 Desensitized Mutant Mice

Chemotherapy-induced peripheral neuropathy (CIPN) affects 18-85% of cancer patients and there are limited treatment options. This chronic painful experience can also persist for six months to a year after stopping chemotherapy treatments in a phenomenon known as “coasting”. In recent years cannabinoids have become increasingly popular for the treatment of CIPN associated pain, however tolerance to these cannabinoids is a problem as they lose their effectiveness in alleviating neuropathic pain. In this study, we investigated the effects of JNK inhibition using SU 3327, on antinociception and delaying tolerance to CP55,940 (CB1/CB2 agonist) using S426A/S430A knock in mice. These mice have a mutation at the CB1 receptor for GRK and β -arrestin, showing delay in tolerance to cannabinoids. The 426 and 430 serines are turned into alanines preventing GRK from phosphorylating CB1, therefore the CB1 receptor is not desensitized as quickly. We found that when these KI mice are given SU 3327 (a JNK1-3 inhibitor) at a dose of 3 mg/kg there is a partial reversal of neuropathy that was induced by cisplatin. However, there was no reversal of neuropathy at the 1 mg/kg dose. When SU 3327 at 1 mg/kg is combined with CP55,940 (0.3 mg/kg) it delays tolerance to CP55,940 only in the female KI mice. Likewise, when CP55,940 (0.3 mg/kg) is combined with SU 3327 at 3 mg/kg it delays tolerance to only the female KI mice. It does not however delay it longer than the 1 mg/kg dose. These data shows that the JNK pathway is involved in chronic pain as well as cannabinoid tolerance.

SARAH C. MILLER, ELENA B. TIKHONOVA, ANDREY L. KARAMYSHEV

Neonatal Diabetes mutation L13R in the INS gene leads to insulin depletion due to the activation of RAPP

Insulin is a protein hormone produced by pancreatic β -cells in response to rising levels of blood glucose. Via signal transduction pathways, insulin signals to peripheral tissues to uptake glucose from the bloodstream. The Signal Recognition Particle (SRP) is a cytosolic ribonucleoprotein which cotranslationally binds to the ribosome-nascent-chain complexes of secretory or membrane proteins and targets them to the endoplasmic reticulum (ER). The inability of SRP to recognize its targets leads to the activation of a cotranslational quality control pathway called the Regulation of Aberrant Protein Production (RAPP).

SARAH C. MILLER, ELENA B. TIKHONOVA, ANDREY L. KARAMYSHEV (CONTINUED)

RAPP activation results in the specific degradation of mRNAs associated with the defective protein. Our hypothesis is that mutations in the insulin signal sequence which interfere with SRP binding activate RAPP. To test our hypothesis, we introduced several clinical mutations in the insulin signal sequence by site-directed mutagenesis and studied each mutant insulin's interaction with SRP by photocrosslinking. We expressed these mutants in cultured human cells and analyzed insulin mRNA and protein expression by qPCR and ELISA. We found that the mutation L13R, which was discovered in a patient with neonatal diabetes, interrupts insulin's interaction with SRP and results in substantially reduced levels of insulin mRNA and protein. Our data demonstrate that RAPP plays a role in insulin biogenesis.

PRANEETHA PANTHAGANI, ABDUL A SHAIK, JOSHUA O WILLMS, XIAOBO LIU, SAMBATHAM SHANMUGAM, TED W REID, GEORGE I HENDERSON, AND SUSAN E BERGESON*IND-ENABLING STUDIES FOR FDA APPROVAL OF A MODIFIED MINOCYCLINE ANALOG AS AN ALCOHOL USE DISORDER MEDICATION*

Alcohol use disorder (AUD) has an annual U.S. economic burden of >\$250 billion and no high efficacy treatment. While minocycline (MINO) limited alcohol consumption in mice, its antibiotic activity can lead to side effects including dysbiosis and antibiotic resistance. Therefore, modified MINO analogs (MMAs) were synthesized to remove antimicrobial activity. The present studies focus on our lead MMA, butyl-ether MINO (BEM) and the completion of early IND-enabling experiments required for FDA approval: efficacy, safety, and pharmacokinetics: BEM dose dependently reduced alcohol consumption with no reduction in water intake or altered ethanol metabolism. In the MTT assay, BEM had an IC₅₀ of 125 μM compared to MINO at 50 μM. The Ames test confirmed lack of mutagenicity. In-vitro Caco-2 studies revealed high permeability with Papp of 27.9, which increased to Papp 42.6 upon Pgp inhibition. Intestinal and microsomal stability assays indicated BEM was stable with a half-life >1hr. Protein binding assays suggested that BEM had no off-target affinity for the hERG channel, but was positive for several neurotransmitter receptors that participate in addiction processes and various psychological conditions. BEM also exhibited inhibitory activity towards COX1 and COX2 indicating an anti-inflammatory potential. BEM showed preferred drug-like characteristics in terms of efficacy, solubility, permeability, stability, and half-life. High hydrophilicity and permeability of BEM make it a Class 1 drug (most desirable) according to the Biopharmaceutical Classification System. Present studies confirmed that BEM is an excellent lead candidate for AUD, which warrant full ADMET evaluation in order to submit an IND application to the FDA.

PEYTON PRESTO, GUANGCHEN JI, OLGA PONOMAREVA, IGOR PONOMAREV, VOLKER NEUGEBAUER*Transcriptomic profiling of the central and basolateral amygdala in a rat chronic neuropathic pain model*

Chronic pain is a pervasive healthcare issue comprised of interactions between sensory, cognitive, and emotional-affective dimensions. Together, this interplay presents a challenge to the identification of effective therapeutic strategies. One obstacle to the discovery of treatment options arises from a lack of full understanding of the mechanisms involved in the transition to a chronic pain state. Therefore, mechanistic insights into pain-related signaling processes are critical to identify new molecular targets for evidence-based medicine. Gene expression analysis provides a sensitive measure of cellular function, and abnormal changes in gene expression may ultimately impact behavior and disease states. Transcriptomic profiling in the periphery and spinal cord has revealed an upregulation of many transcription factors and cytokines in

PEYTON PRESTO, GUANGCHEN JI, OLGA PONOMAREVA, IGOR PONOMAREV, VOLKER NEUGEBAUER (CONTINUED)

neuropathic pain, though pain-related gene expression profiles within the brain are overwhelmingly understudied. A limbic brain region, the amygdala is a key player in the emotional-affective aspects of pain and pain modulation. Changes in amygdala activity have been observed in pain models and neuroplasticity within the amygdala has been linked to pain-related behaviors. However, the molecular signatures of pain-related amygdala plasticity that may drive these behaviors remain to be determined. Here we characterize the amygdala transcriptional profile of adult male rats at the chronic stage of neuropathic pain. Tissues containing either the basolateral (BLA) or central (CeA) nucleus of the amygdala were collected for RNA sequencing 4 weeks after spinal nerve ligation (SNL) or sham surgery. Within the BLA, pathway and biological function enrichment analysis revealed differential expression in genes coding for GABAergic receptor signaling, calcium regulation, and long-term potentiation. In the CeA, differentially expressed genes included those related to opioid prodynorphin pathways, corticotropin releasing factor receptor signaling, and vasopressin synthesis. Together these findings provide mechanistic insight into pain-related amygdala function that may guide the development of novel therapeutic strategies for neuropathic pain relief.

SADISNA SHAHI, RAYNA BANDY, NADEZHDA A. GERMAN

Urea-based compound UR-1-1-13 affects the mitochondrial health of triple negative breast cancer cells.

Purpose: Triple-negative breast cancer (TNBC) is an aggressive type of breast cancer that lacks the expression of three things: estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) genes. That is why, hormonal therapy and HER2-based treatment are not effective against it. Approximately 15% of breast cancers are TNBC, and 28% of TNBC patients suffer from brain metastases, leading to decreased survival rates compared to people suffering from other types of breast cancer. Due to the high heterogeneity of TNBC, six subtypes with distinct sensitivity to existing chemotherapeutic agents were identified. Our lab has synthesized a novel class of anticancer agent, UR-1-1-13, with cytotoxicity against TNBC cell lines, high ability to cross the BBB in vitro and in vivo, and the ability to reduce tumor growth in vivo by > 95%. In this study, we are investigating if our compound affects the mitochondrial health of the cancer cells. **Methods:** The chemicals we have used for this study are MitoView Green, JC-1, MitoSOX Red, a mitochondrial superoxide indicator, oxidizing agents like dimethoxy-naphthoquinone (DMNQ) and hydrogen peroxide (H₂O₂), and antioxidants like ascorbic acid (vitamin C), n-acetylcysteine (NAC), and glutathione (GSH). We measured mitochondrial ROS and membrane depolarization by our compound on TNBC cell line MDA-MB-231 by colorimetric assay, flow cytometry, and immunofluorescence with and without antioxidants. **Results:** Using MTT assay, we determined that UR-1-1-13 has comparable cytotoxicity in five TNBC cell lines. Tested cell lines belong to the MSL, BL1 and BL2 subtypes of TNBC. Our compound UR-1-1-13 showed good anti-cancer activity against all the cell lines. We have selected MDA-MB-231 cell line for further experiments as it is commonly used to model late-stage breast cancer. Colorimetric assay using DMNQ and H₂O₂ as positive control and GSH and vitamin C as negative control showed that the activity of our compound is mediated through increased ROS levels. These data were further confirmed by flow cytometry and immunofluorescence using MitoSOX Red dye. We also examined the effects of antioxidants on the cytotoxicity of our compound where vitamin C, but not NAC diminished the cytotoxicity of our compound. As vitamin C, but not NAC, can enter the mitochondria, we conclude that UR-1-1-13 induces ROS production in mitochondria.

SADISNA SHAHI, RAYNA BANDY, NADEZHDA A. GERMAN (CONTINUED)

Furthermore, our compound showed mitochondrial membrane depolarization in cancer cells but not in human breast epithelial cells (MCF10a). A structural analog of UR-1-1-13 that lacks any cytotoxicity in tested cell lines showed no effect on mitochondrial membrane polarization and on the ROS level. Therefore, our compound exhibits its anticancer activity by generating ROS inside the mitochondria and causing mitochondrial membrane depolarization. Conclusions: This study showed that UR-1-1-13 has comparable cytotoxic activity in several TNBC cell lines that belong to different subgroups, whereas MCF10a cells were the least affected. The observed anticancer activity correlates with the level of mitochondrial membrane depolarization and ROS production in the cancer cells.

SEJAL SHARMA, YONG ZHANG, ALI EHSAN SIFAT, SABRINA RAHMAN ARCHIE, THOMAS**ABBRUSCATO**

Evaluation of Influx and Efflux Transporters of Metformin in an In Vitro Blood-Brain Barrier Model During Normoxic and Ischemic Conditions

Repurposing metformin has been proposed as a viable treatment for stroke injury. Metformin's potential interaction with blood-brain barrier (BBB) transporters is unknown. Four types of uptake organic cationic transporters- OCT1, OCT2, OCT3, and PMAT and efflux transporter, p-GP, have been identified at the luminal membrane of BBB. A co-culture of bEnd3 cells and primary astrocytes were used for permeability determination. [¹⁴C] metformin treatment in presence of increasing amounts of unlabelled metformin was used. For influx transporter-specific inhibition, unlabelled metformin (10 μM) treatment was performed in the presence of transporter-specific inhibitors followed by quantitation using the LC-MS/MS method. For metformin's interaction with the efflux transporter, P-gp overexpressing cells were used. The permeability of metformin in apical-to-basolateral (A>B) and basolateral-to-apical (B>A) using p-gp inhibitor was calculated. It was shown that with inhibitory concentrations of 10 mM and 20 mM, there was a significant decrease in [¹⁴C] metformin transport (p<0.0001). For the transporter-specific inhibition study, with mitoxantrone, metformin showed a significant reduction in permeability (p<0.005). With corticosterone, there is a further reduction in permeability (p<0.05), which suggests that, in addition to OCT-1, OCT-2 and/or OCT-3 are involved in metformin's transport. However, there is no significant difference between corticosterone, desipramine, and MPP+, which rules out the possibility of other transporters like PMAT, SERT, or CHT involved in metformin's transport. Next, for the interaction of metformin with p-gp, the UFR and ER was found to be 1.24 and 0.64, respectively. Studies report that compounds with UFR and ER less than 2, are poor substrates for p-gp. OCT-1, 2, and 3 are involved in the influx of metformin into the brain, while it does not interact with efflux transporter such as p-gp. Our ongoing investigations are related to metformin transport during oxygen-glucose deprivation, which is utilized to specifically model metformin transport into the ischemic brain.

ASHOK SILWAL, BRITNEY REESE, NIRAJ LODHI, MAGDALENA KARBOWNICZEK AND MACIEJ**MARKIEWSKI**

TP53 codon 72 polymorphism modulates macrophage polarization through altered PI3K/Akt signaling pathways.

Purpose: The purpose of this study is to determine the role of the most common p53 single nucleotide polymorphism (SNP) at codon 72, which encodes proline (P72) or arginine (R72), in the regulation of macrophage polarization.

ASHOK SILWAL, BRITNEY REESE, NIRAJ LODHI, MAGDALENA KARBOWNICZEK AND MACIEJ MARKIEWSKI (CONTINUED)

Methods: Bone marrow derived macrophages (BMDMs) from human p53 knock-in (Hupki) mice, in which exons 4-9 of the endogenous mouse p53 allele were replaced with the homologous human p53 gene sequence, carrying P72 and R72 variant were treated with lipopolysaccharide (LPS) to activate macrophages and induce proinflammatory M1 phenotype. Signaling pathways involved in macrophage activation were analyzed by Real Time RT-PCR, Western blotting, and immunofluorescence. A highly selective Akt inhibitor MK-2206 (Selleckchem), at a concentration of 0.1 μ M, was used 60 min. prior to LPS to determine the effect of Akt blockade in R72 macrophage polarization and signaling. Volumes of tumors generated by subcutaneous injections of tumor cells (TC1), mixtures of tumor cells and LPS-stimulated P72 macrophages (TC1+P72LPS), or mixture of tumor cells and LPS-stimulated R72 macrophages (TC1+R72LPS) were measured every four day, with tumor volumes calculated as length \times Width \times Width/2. Results: LPS stimulation of BMDMs led to a greater upregulation of genes traditionally linked to M1 phenotype (Socs1 and Nos2) in P72 compared to R72 macrophages (Fig 1a). Further, we examined activation of PI3K/Akt as this pathway is essential for restricting proinflammatory (M1) and promoting anti-inflammatory (M2) responses in toll-like receptor (TLR4)-stimulated macrophages [1]. The phosphorylation of Ser 473 residue of Akt was increased to a greater extent in R72 vs. P72 macrophages upon LPS treatment (Fig 2a). FOXO3a is tumor suppressor and longevity factor (2) and downstream target of Akt. Consistent with increased Akt activity in R72 macrophages, the phosphorylation of FOXO3a at Ser 253 residue was greater in these cells than P72 macrophages upon LPS stimulation. This phosphorylation inhibits FOXO3a transcriptional activity via a nucleus to cytoplasm shuttle (Fig 2a). NF- κ B activation, nuclear translocation, and subsequent transcriptional regulation is a key for the induction of several proinflammatory genes in macrophages [3]. Cytoplasmic FOXO3a was demonstrated to inhibit NF- κ B via direct binding to NF- κ B in the cytoplasm and preventing its nuclear translocation [4]. Through confocal microscopy and immunofluorescence, we demonstrate increased cytoplasmic colocalization of FOXO3a and NF- κ B upon LPS stimulation (Fig 2b). Western blotting further corroborated these data showing impairment of NF- κ B nuclear translocation (Fig 3a). Following treatment with MK2206, we observed reduced FOXO3a Ser 253 phosphorylation and enhanced NF- κ B nuclear translocation (Fig 3b). Similarly, we observed increased expression of M1 genes (Socs1 & Nos2) in R72 cell treated with MK2206, to the level observed in P72 macrophage (Fig 1b). Addition of LPS-stimulated P72 macrophages (TC1+P72LPS) to tumor cells reduced tumor growth, in contrast to R72 macrophages (TC1+R72LPS) in a syngeneic model of HPV-induced cancer (Fig. 4a and b). Conclusion: The role of most common p53 SNP at codon 72, in the regulation of the immune system has not yet been thoroughly explored. Here, we report that macrophages carrying R72 variant are biased toward M2 phenotype through mechanism that involved the altered NF- κ B nuclear translocation. In R72-LPS stimulated macrophages NF- κ B is partially restrained in the cytoplasm by phosphorylated FOXO3a (S253). FOXO3a phosphorylation is enhanced by p-AKT (S473). Studies in a mouse model of cancer confirm impact of this polymorphism on macrophage function in vivo by demonstrating that R72-LPS stimulated macrophages lose ability to reduce tumor growth.

TYLER SNIEGOWSKI, VADIVEL GANAPATHY AND YANGZOM D. BHUTIA

Investigating the tumor promoting role of SLC38A5 in pancreatic ductal adenocarcinoma

Pancreatic ductal adenocarcinoma (PDAC) is lethal. Based on the Human Protein Atlas database, SLC38A5 is significantly upregulated in PDAC and correlates with poor patient survival. SLC38A5 is a Na⁺-coupled, electroneutral amino acid transporter that transports glutamine, serine, glycine, and methionine that are essential for glutaminolysis and one-carbon metabolism that the cancer cells are addicted to.

TYLER SNIEGOWSKI, VADIVEL GANAPATHY AND YANGZOM D. BHUTIA (CONTINUED)

Furthermore, SLC38A5 is a c-Myc target and induces macropinocytosis. Thus, it makes sense as to why cancer cells would love to upregulate SLC38A5 as a part of their tumor-promoting gene expression program. Using Real-time PCR and Western blotting, we validated the expression status of SLC38A5 in PDAC cell lines, PDXs, and organoids. Using radiolabeled serine uptake, we also confirmed that the PDAC cell lines not only expressed SLC38A5 but are also functional in these cell lines. Having established the expression and functionality of SLC38A5 in PDAC cells, our next aim was to investigate its tumor promoting role. To achieve that SLC38A5 was silenced in SLC38A5-positive BxPC-3 and HPAF-II cells. After validating the knockdown using Real-time PCR and radiolabeled serine uptake, in vitro assays like the colony formation and transwell invasion assay was performed using the knockdown cells and non-targeting control (NTC). It was interesting to observe that knockdown of SLC38A5 suppressed the colony formation ability as well as the invasion capacity in both the cell lines suggesting the tumor promoting role of SLC38A5. To extrapolate the in vitro data further, subcutaneous xenograft was performed in athymic nude mice. Interestingly, we found that the SLC38A5 knockdown cells grew slower as evidenced by the smaller tumor weight further validating our in vitro data. Our future work involves extrapolating these data in KPC spontaneous mouse model of PDAC and understanding its mechanism of upregulation.

EMILY J. VANDERPOOL, ALPER MUTLU, ASHLEIGH GRIFFIN, KENDRA P. RUMBAUGH

Trick-or-Cheating: in vivo dynamics following infection invasion by a social cheat

Chronic infection research has revealed the presence of heterogeneous bacterial populations, where some members of a species lose genes related to quorum sensing and virulence. This leads to two distinct subpopulations: producers and cheaters. In response to density-dependent quorum sensing signals, producers synthesize public goods. Cheaters do not contribute to synthesis but can still benefit from these products. Over time, cheaters proliferate more rapidly without this metabolic cost. Consequently, disproportionate expansion of a social cheat could offer the host a better opportunity to clear infection by reducing the total virulence of the population. Most research in the area of social evolution has been performed in vitro. Thus, we investigated the social dynamics of two isogenic strains of *Pseudomonas aeruginosa* in an in vivo chronic wound model. We used multi-drug resistant PA14 + pAMBL2 (producer) in heterogeneous infections with the quorum sensing signal blind mutant, PA14 Δ lasR (cheater). We hypothesized that the Δ lasR cheater would invade an existing producer population and as a result, alter the susceptibility of the population to antibiotic treatment. First, we allowed an infection with the pAMBL2 producer to establish for 72 hours, then added the Δ lasR cheater strain. After an additional 72 hours, the final proportion of the cheater in the invasion condition matched the proportion of the cheater in an initially mixed population. This suggests that the cheater successfully integrated into the established infection. Then we compared the antibiotic susceptibility of the invaded population to the initially mixed population. Our preliminary results suggest that after treatment, the invaded population had fewer total viable bacteria than the mixed population. This could indicate that invasion with a social cheat is a potential therapeutic strategy for resistant infections. In future experiments, we will test varying proportions of the cheater to determine the ratio for optimal population susceptibility.

JOHANNA VILLARREAL, MINAL ENGAVALE, JON J. MCCORD, ELLIOT RADOVAN, PETER KEYEL, ROGER B. SUTTON

Investigating Dnase1L3's role in inflammation and redesigning the enzyme to be used as a therapeutic

Systemic lupus erythematosus (SLE) affects 1.5 million Americans. Lupus is a debilitating autoimmune disorder in which patients form antibodies that react to self-antigens. Anti-dsDNA antibodies bind to DNA, forming immune complexes (ICs) and deposit on organs. Over time accumulation of the ICs can lead to lupus nephritis, which will ultimately require a kidney transplant. Removing and breaking down the immune complexes from circulation and deposits would be beneficial in preventing further damage to organs. Some patients with SLE have a deficiency in Dnase1L3 (Dnase1-Like 3) enzyme caused by a pathogenic mutation in the Dnase1L3 gene. Dnase1L3 digests extracellular DNA in the peripheral circulation. In contrast to Dnase1, Dnase1L3 possesses the unique activity of digesting DNA complexed with other biological molecules in the form of microparticles and immune complexes; this activity is essential in preventing the creation of antibodies against self-antigens. Dnase1L3 degrades antigenic DNA complexes and is a potential therapeutic for SLE. Dnase1L3 has also been implicated in having a role in releasing inflammatory cytokines, but specific inhibitors block this action; it is still unclear what Dnase1L3 function is inhibited by these inhibitors. We have developed a unique bacterial expression system for Dnase1L3 and solved the X-ray crystal structure of the core enzyme without the C-terminal domain. I plan to determine the structure of the full-length enzyme bound to DNA to better understand the mechanism of action of Dnase1L3. To minimize any potential off-target side effects from a Dnase1L3 therapeutic, I am also investigating the inhibitors to elucidate the Dnase1L3 role that is blocked in the inflammatory pathway. The long-term goal of this project is to produce the most effective therapeutic for lupus nephritis.

JOSHUA WILLMS, BEN MCCAULEY, LINDSAY KERR, PEYTON PRESTO, ANKITH ARUN, NAZEEN SHAH, KIERRA IRBY, MEGAN STRAWN AND JONATHAN KOPEL

Ketamine Therapy Reduces Suicidal Ideation, Treatment-Resistant Depression, PTSD, and Generalized Anxiety Disorder in a Medical Student

Suicide is the most common cause of death in male resident physicians and the second most common cause of death in resident physicians overall. Physicians also experience high rates of major depressive disorder (MDD), post-traumatic stress disorder (PTSD), and burnout. These conditions frequently develop during medical school, and threaten not only physicians but the patients they care for. A 30-year-old medical student presented to our clinic with a history of treatment-resistant depression (TRD), generalized anxiety, PTSD, and three years of daily suicidal ideation. The patient perseverated on, fixated on, and re-lived specific traumatic events that occurred during his training. The patient had been seen by multiple psychiatrists, psychologists, and counselors and was prescribed varying combinations of antidepressants (including sertraline, bupropion, and duloxetine). These interventions had little effect on the patient's mental health. The patient was treated at our clinic with an 8-month regimen of IV ketamine infusions and ketamine-assisted psychotherapy (KAP). The patient's Patient Health Questionnaire (PHQ-9) score decreased from 25 (severe depression) prior to treatment to 1 (not depressed) by the end of the treatment regimen. The patient reported complete resolution of both his suicidal ideation and fixation on specific traumatic events. He also showed a dramatic improvement in his academic performance. The patient maintained an average PHQ-9 score of 4 (range 1-10) over the next 10 months. These findings suggest that ketamine and KAP may provide long-term resolution to severe mental health disorders in healthcare students and professionals who do not respond to traditional treatment modalities.

**EMILY A. WRIGHT, GEORGINA G. BRUGETTE, RACHAEL C. WIEDMEIER, CALEB D. PHILLIPS, AND
ROBERT D. BRADLEY**

Up the nose: multi-locus sequence typing used to detect the first report of Mycoplasma ovipneumoniae in Texas desert bighorn sheep and exotic aoudad

Through phylogenetic analyses of *Mycoplasma ovipneumoniae* bacterial strains, bighorn sheep (*O. canadensis*) populations across the western US possess strains characteristic of sheep-like and goat-like *M. ovipneumoniae*. The strains of *M. ovipneumoniae* documented between domestic sheep (*Ovis aries*) and goats (*Capra hircus*) and bighorn sheep are a key risk factor for pathogen spillover between the three caprid species. With large numbers of exotic aoudad (*Ammotragus lervia*) in sympatry with low numbers of native desert bighorn sheep (DBS), a pathogen spillover event is likely in the Trans-Pecos Ecoregion of Texas. Data obtained from Texas Parks and Wildlife Department (R. Ditmar, DVM) indicated that *M. ovipneumoniae* was detected in blood and nasal swab samples recovered from aoudad captured and released during a research study. The Washington Animal Disease Diagnostic Laboratory (WADDL) developed a molecular method (multi-locus sequence typing, MLST) to detect *M. ovipneumoniae*. The MLST testing characterizes four loci (small ribosomal unit, 16S; 16S-23S intergenic spacer region (IGS); RNA polymerase B (*rpoB*); gyrase B (*gyrB*)) to confirm the presence of *M. ovipneumoniae*. Validation of this method in-house was confirmed using six samples of *M. ovipneumoniae*-positive rocky mountain bighorn sheep (RMBS) samples previously collected and archived in the Genetic Resource Collections at the Natural Science Research Laboratory. To date, we have sequenced all four genes for three DBS and four aoudad that share 100% sequence identity. An additional nine aoudad possess different *Mycoplasma* strains compared to DBS. These results match serology tests, confirming that the 13 aoudad individuals were positive for *M. ovipneumoniae*. Additional testing of both DBS and aoudad in Texas as well as more extensive phylogenetic analyses are needed to discern the strain differences among RMBS, DBS, aoudad, and domestic sheep and goats. With the decline in DBS in Texas, it is critical to identify potential causes and real-time management strategies.

MSI

**YAW ADU, ADITHI GOVINDAN, MICHELLE ONUOHA, KAILEE DOUGHERTY, LUIS CASTRO, ZACH SNEED
PHD, FIONA PRABHU MD, KELLY BENNETT MD**

Exploring the Impact of COVID-19 on Tobacco Use Patterns among Uninsured Individuals at a Student-Operated Free Clinic

The Federal Trade Commission's (FTC) annual cigarette report recently revealed an increase in tobacco spending and usage for the first time in twenty years. This trend is of concern for healthcare providers at the Free Clinic at Lubbock Impact, which serves uninsured, low-income patients. In light of this, a study was conducted to examine changes in tobacco consumption among the patient population and identify the reasons behind any such changes. The study recruited 67 tobacco-consuming patients from the clinic and distributed surveys to assess demographic variables, current and past tobacco consumption habits, tobacco side effect awareness, and preferred methods to promote tobacco cessation. The participants had an average age of 41.5 years and a 52.2% female representation. On average, respondents began consuming tobacco at 19 years of age and had been consuming it for 22.3 years. In the same time frame, 41% of respondents reported a decrease in tobacco usage, 24% reported an increase, and 35% reported no change.

YAW ADU, ADITHI GOVINDAN, MICHELLE ONUOHA, KAILEE DOUGHERTY, LUIS CASTRO, ZACH SNEED PHD, FIONA PRABHU MD, KELLY BENNETT MD (CONTINUED)

Despite 92.5% of respondents being knowledgeable about the negative side effects of tobacco, only 13.4% were willing to join a tobacco cessation program. Of those who reported an increase in tobacco usage, 73.3% attributed it to increased stress or anxiety, while 52% of those who reported a decrease cited a desire for better health. The results of this study differ from those expected based on FTC data, which may indicate that this change is due to a higher incidence of tobacco use among a younger demographic. As the majority of tobacco consumers in this study were aware of the negative effects of tobacco, novel methods for helping patients reduce and stop tobacco use should be developed. This study highlights the need for targeted interventions to address tobacco use among younger and low-income populations.

VISHAL BANDARU, BRANDON YOUSSE, DOUGLAS BETTARELLI, KELLY TRINH, ADILENE CHAPINA, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)*Differences in Large Burn Patients with Chronic Hypertension for Urine Output and Mortality*

Hypertension, defined by a systolic blood pressure above 130 mmHg and a diastolic pressure above 80 mmHg, affects nearly half the United States population. Evaluating urine output, and mortality, and total body surface area (TBSA) may give insight into fluid problems for hypertensive patients. We hypothesize that hypertensive patients have lower urine output as well as higher mortality. We obtained a patient list with burn totals over 20% and verified the inclusion of patients meeting the study criteria from July 01, 2011, to July 01, 2021. Afterward, data was initially extracted from electronic health records (EHR) and evaluated for hypertensive medications and diagnosis of chronic hypertension. The initial data set (n=333) was split into two groups, hypertensive (n=30) and non-hypertensive patients (n=160). Urine output was significant between the two groups (p=0.0044). The control group had an average TBSA of 42 while the hypertensive group had an average TBSA of 36.88, however, patient mortality was proportionally larger in the hypertensive group 30/160 versus 10/30. Hypertensive patients may require larger fluid resuscitation and the lower urine output may be indicative of a different problem that has been untreated so far.

VISHAL BANDARU, BRANDON YOUSSE, ROHAN PENDSE, COLTYN WAGNON, KAYLEN MEERS, VIVIE TRAN, LAUREN IRISH, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)*Frequency of Mental Health Issues, Self-Harm, and Suicidal Ideation in Self-Inflicted Burn Patients*

Self-inflicted burn (SIB) patients are approximately 1% of burn admits in the United States. Mental health issues are generally prevalent in the groups and are often associated with worse burns. We hypothesize that SIB patients in West Texas have high rates of mental health related problems, history of self-harm, and drug abuse.

We obtained a list of all patients diagnosed with Second/Third-degree from July 01, 2011, to July 01, 2021. Self-inflicted burn patients were identified based on diagnosis code.

Of 3985 burn patients, 47 were identified with the SIB diagnosis code; 1.2% of the total UMC burn admits. After manual chart review, 43/47 burns were considered intentional burns.

VISHAL BANDARU, BRANDON YOUSSE, ROHAN PENDSE, COLTYN WAGNON, KAYLEN MEERS, VIVIE TRAN, LAUREN IRISH, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI) (CONTINUED)

Suicidal ideation was present in 35/47 and drug abuse was present in 16/47. 36/47 of SIB patients had one or more mental health issue, the most common being depression 21/47, followed by schizophrenia and borderline personality disorder both at 7/47, then anxiety disorders at 4/47, 3/47 patients with PTSD, 2/47 patients with bipolar disorder, and 1/47 unspecified. 15/47 had admitted to some form of self-harm and 6 patients had a history of hospitalization from self-harm.

Though self-inflicted burn patients make up a fraction of burn patients, the frequency of mental health disparities in this group needs to be evaluated for better long-term treatment.

VISHAL BANDARU, BRANDON YOUSSE, ROHAN PENDSE, COLTYN WAGNON, KAYLEN MEERS, VIVIE TRAN, LAUREN IRISH, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)*Inhalation Injuries Frequency and Total Body Surface Area Burned in Self-Inflicted Burn Patients*

Self-inflicted burn (SIB) patients are generally patients that burn themselves with an intention of self-mutilation or suicide. Though only a small proportion of burns in the United States, approximately 1%, SIB patients are associated with higher levels of total body surface area (TBSA) burned and worse outcomes when compared to average burn patients. When compared to outcomes for the same TBSA or injury, they generally fare about the same. We hypothesize that SIB burn patients have an average TBSA greater than 20% and a frequency of inhalation injury over 20%. We obtained a list of all patients diagnosed with Second/Third-degree from July 01, 2011, to July 01, 2021. Self-inflicted burn patients were identified based on diagnosis code. Of 3985 burn patients, 50 were identified with the SIB diagnosis code; 1.2% of the total UMC burn admits. The average TBSA of SIB patients was 27% and 22/50 patients experienced some level of inhalation injury. The average 3rd degree burn was 18% while the average 2nd degree burn was 9%. 12/50 patients died due to burn complications. Though self-inflicted burn patients make up a fraction of burn patients, most SIB burns are considered large burns. Additionally, the national burn repository showed a survival rate of 96.8% which is significantly higher than the SIB survival rate of 76%. SIB burn patients may have more complications than their non-SIB burn counterparts.

VISHAL BANDARU, BRANDON YOUSSE, ANNA ROSSINI, HABIB ABLA, REN GLOVER, ASHTON WHITE, CATLIN LOWRY, TRAVIS COLE, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)*Fluid Resuscitation for Burn Patients based on Anatomical Region*

Fluid resuscitation remains a vital component of large burn patient care and treatment. Fluids must be closely monitored to ensure patient recovery otherwise serious complications that can lead to mortality can occur. We theorize that based on anatomical volume; fluid resuscitation may change in relationship with total burn surface area (TBSA). Methods: We obtained a list of all patients diagnosed with Second/Third-degree and verified the inclusion of patients meeting the study criteria from July 01, 2011, to July 01, 2021. Results: The initial data set (n=329) decreased due to missing burn documentation and exclusion of the inhalation injury group yielding the final data set (n=263). For the preliminary data, two groups of data were isolated – upper extremity (abdominal region, arms, head, neck, genitalia, and buttocks, n=123) and lower extremity (thigh, leg, and feet, n=22).

VISHAL BANDARU, BRANDON YOUSSE, ANNA ROSSINI, HABIB ABLA, REN GLOVER, ASHTON WHITE, CATLIN LOWRY, TRAVIS COLE, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)
(CONTINUED)

An unequal variance T-Test ($p=0.084$) was not significant but had higher fluid resuscitation differences from the predicted parkland formula between upper and lower extremities. Conclusion: While the P-value is not significant, the small sample size may be a factor in this p-value as it trends towards significance. TBSA does not explain the differences in fluid resuscitation according to the r^2 values. The difference between the values may assist with resuscitation requirements later and expectations of different compartment syndromes.

PRANATHI BINGI, MBA, BS, TTUHSC SOM JENNIFER KRABACHER, BS, BSN, RN, CPEN, TTUHSC SOM LORI THOMPSON, BS, TTUHSC SOM TIVA KASEMSRI, MS, MD, TTUHSC UMC ALAN PANG, MD, TTUHSC UMC PI: JOHN GRISWOLD, MD, TTUHSC UMC

Effectiveness of Precedex on Hypermetabolic Demand in Burn Patients

Burn wounds can result in a hypermetabolic state, which results in increased level of whole-body oxygen consumption and resting energy expenditure. This state can persist for years and can result in loss of lean muscle mass, becoming immunocompromised, delayed wound healing, and hepatic dysfunction. Previously, propranolol has been shown to be effective in mediating the hypermetabolic state as it is a beta-adrenergic receptors agonist that works to attenuate the effects of catecholamines in this stress response state. Dexmedetomidine also works to inhibit the sympathetic response, similar to propranolol, but in a different manner by as an alpha-2 agonist that inhibits the release of norepinephrine. Studies have shown that dexmedetomidine reduces heart rate, blood pressure, and inflammatory response which indicate it could be an effective mediator of the induced hypermetabolic state by patients with traumatic burns. It is important that this potential addition to the helpful benefits of dexmedetomidine be explored in addition to its already standard usage for reducing the opioid related analgesic needs and use for sedation. To accomplish this goal, we will use electronic medical records to compare the effect of different dosages of dexmedetomidine on patient's vital signs and other metabolic markers to illustrate any deviation from the hypermetabolic state inducted post traumatic burn. We posit that dexmedetomidine will serve as an effective mediator in managing the hypermetabolic state of burn patients.

ELISE BOLIN (MS1), KELLY MITCHELL

Analysis and Application of UMC/TTUHSC Intimate Partner Violence Policy in Ophthalmology

According to data collected by the CDC's National Intimate Partner and Sexual Violence Survey (NISVS), "about 41% of women and 26% of men "experienced some type of intimate partner violence (IPV) or domestic violence. The impact of IPV can be seen in any specialty, notably ER, psychiatry, and ophthalmology. With nearly 50% of injuries caused by IPV involving the face, orbital injuries, specifically orbital fractures, have a high prevalence (Loder & Momper). The goal of this project is to assess how the current policy for suspected or confirmed incidents of IPV at UMC/TTUHSC is integrated into the care provided by the department of ophthalmology and assess the need for specific protocols within ophthalmology. Additionally, we hope to educate staff on their role in caring for and supporting patients experiencing IPV and the role of reporting IPV across departments, specifically the emergency medicine department.

TRISTIN CHAUDHURY, VISHAL BANDARU, JAKE WILEMON, HANNAH CHAUDHURY, AKSHAY RAGHURAM, ROBYN TAPP, KHAJA SIDDIQU, TAHA JILANI, CHIP SHAW PHD., ALAN PANG M.D., JOHN GRISWOLD, M.D.

Retrospective Study Analyzing a Relationship between Natural Light Fenestration and Skin Graft Reuptake in Burn Patients

Skin grafts are essential to the process of large burns when grafts are attached to the skin. To measure this, skin graft uptake is the percentage of graft that has adhered to the skin. Mouse trials showed that blue light directly assisted in the healing processes of burned mice. Rooms in the burn ward are split between rooms with and without windows, which alters the amount of natural light that patients receive. We hypothesize that windows will allow for better skin graft uptake. A retrospective study reviewed patients between the ages of 18-89 from the burn intensive care unit for patients that stayed exclusively in rooms with windows and those without. Manual data collection for total body surface area (TBSA) burned, graft take percentage, area of graft, ReCell, and type of graft were collected. Patients with 0% burn and ReCell were excluded. Patients with no fenestration (n=73) had an average graft uptake of 92.6% while patients with fenestrated rooms (n=27) averaged 89.9% (p=0.14 one-tailed Welch Test). True graft area uptake was 505 cm² in no fenestration and 455.5 cm² for rooms with fenestration (p=0.343, one-tailed Welch Test). TBSA was 18.6% burned in no fenestration and 21.9% for fenestration (p=0.14 one-tailed Welch Test). Interestingly, while the rooms with no light seemed to fair better averages even though it was not significant, the TBSA burn percentage was higher in the light group by almost the same p-value. This may indicate that the larger the burns the worse the graft take which is consistent in the literature. The application of direct artificial blue light and analysis construction of windows may be necessary to better understand the healing factors.

HANNAH DANIEL, REBECCA JOSEPH, ARIEL SANTOS, MD

Rectal Fistula Causing NSTI of Buttock and Extremities

Necrotizing soft-tissue infections (NSTI) is a rare and rapidly progressing bacterial infection. We present a unique case of NSTI following colonoscopy associated with rectal carcinoma. A 66-year-old man noticed swelling and pain of his right lower extremity four days following a routine colonoscopy. The patient was diagnosed with NSTI and underwent surgical debridement. Three days later, colonoscopy report returned confirming rectal cancer which may have contributed to NSTI development. He was discharged 44 days after the first surgery. While immediate debridement is necessary for treating NSTIs, it is necessary for physicians to consider all potential underlying pathologies.

MITCHELL DEVOLDER, MOHAMMAD M. ANSARI, M.D.

Combination of covered and non-covered stents serves as viable treatment option of aortoiliac disease in patients deemed high risk for surgery

INTRODUCTION Peripheral artery disease (PAD) is one of the most underdiagnosed pathologies in the United States. PAD generally follows an asymptomatic course which eventually causes pain, claudication and muscle atrophy. PAD occurs predominantly in the lower extremities and is one of leading causes of amputation. Effective treatments for PAD have been and continue to be developed including open surgical revascularization and percutaneous intervention. Percutaneous intervention utilizes stents to recanalize the occluded vessel. Many different stent types have been developed.

MITCHELL DEVOLDER, MOHAMMAD M. ANSARI, M.D. (CONTINUED)

In this case study we discuss the use of a combination of both covered and bare stents in the treatment of severe aortoiliac disease who was deemed high risk for surgery. **CASE PRESENTATION** Male age 42, with past medical history of hypertension and peripheral arterial disease presented with pain in his bilateral lower extremities when walking. Routine angiography showed evidence of stenosis of the distal aorta with stenosis of the bilateral common iliac arteries worse on the left. The patient underwent PVI of his aortoiliac disease which was treated with a covered stent in the right common iliac and a combination of a covered and bare metal stent in the left common and external iliac, respectively. Utilizing the bare stent in the left external iliac spared flow to the left internal iliac with collateral flow to the leg. The procedure was successful, and the patient was discharged home the next day. **CONCLUSION** Our case demonstrates the viability of percutaneous intervention utilizing a combination of covered and bare stents in a patient with advanced aortoiliac disease who is not a candidate for surgical intervention.

SEENA FIROUZBAKHT, COLE POLLINA, ANTHONY BRUCCOLIERE, GEOFF THOMAS, ARDALAN NAGHIAN, ELWIN RUTAYOMBA, ANTHONY PHAM, ZEID NAWAS, KAILEY SHANNON, MARINA ISKANDIR, ALIAKBAR ARVANDI, MOHAMMAD M ANSARI*Utility of Three-Dimensional (3D) Printing in Procedure Planning and Patient Education for Structural Heart Disease and Advanced Vascular Cases*

BACKGROUND Absence of models for procedure planning of EVAR, TEVAR, and TAVR with difficult anatomy presents numerous challenges in effective management and treatment. However, utilization of 3D printed models (via US, Echo, CT) are promising methods to enhance patient education and procedure planning. 3D printing has been widely described in medicine for training and planning. Via a complex EVAR, TAVR, and TEVAR case series, we demonstrate benefits in patient education and procedure planning. **METHODS** For this purpose, three complex cases were selected. One EVAR with 6 cm AAA, one TEVAR having coarctation of aorta, and one TAVR with severe AS with bicuspid valve. Echocardiogram, abdominal US, and CT scan were performed. Diacom images were selected and independently verified by imaging the cardiologist and utilized for 3D printing at the Texas Tech 3D Printing Lab (Formlabs Form 3 SLA 3D). The models were then utilized for patient education, procedure planning. **RESULTS** Prior to scheduling, our patients presented in the outpatient clinic to discuss treatment. Our initial explanation through images and intervention details was insufficient (5/10, 6/10, 6/10). Thus, we decided to aid patient education via development of a 3D printed model. After which patient rated understanding improved (9/10, 10/10, 10/10). Physician treatment strategy and device selection of the case and treatment pre- and post-3D printing improved as well (75% to 100%). **CONCLUSION** From our experience, the use of CT-generated 3D printed models facilitate procedural feasibility and patient understanding about their unique anatomy. The advancement of 3D printing technology is likely to provide safer, faster and more efficient procedure planning in the reconstruction of complex aortic pathologies in patients with complex structural heart and advanced vascular disease.

**TAHA HASSAN, B.S., TTUHSC SOM PRANATHI BINGI, MBA, B.S., TTUHSC SOM BLAZE YEATER,
TTUHSC SOM COLTON SHEPHERD, TTUHSC SOM MERRY MATHEW, TTUHSC SOM ALAN PANG, M.D.,
TTUHSC UMC**

Altered coagulant activity in burn patients treated with albumin

Burn shock is a systemic inflammatory response to severe burns. Traditional management of burn shock utilizes fluid resuscitation, which involves colloid, plasma, or crystalloid solutions. Albumin has recently gained traction as a component of this fluid resuscitation; however, it has demonstrated anti-coagulant activity. It is imperative that we study potential coagulation changes as burn patients are already at risk for various other complications. This study aims to determine the effect of albumin administration in resuscitation therapy on coagulation in burn patients. To accomplish this goal, we will use electronic medical records to compare the indicators of coagulation change in individuals receiving albumin as a part of resuscitation therapy versus those who are not. We posit that the coagulation activity of burn patients will decrease in individuals receiving albumin as a component of fluid resuscitation compared to other solution types.

CRISTIAN J HERNANDEZ, RYAN D MORGAN, LASZLO NAGY MD

A comparative study of spinal deformity in high impact spinal fractures in young athletes versus that of low impact spinal fractures in the elderly- A Pilot Study

Due to an increase in sports training the incidence of stress fractures to the spine has increased in pediatric groups. The elderly, through osteoporotic diseases, also experience stress fractures. The purpose of this study is to compare spinal injuries between young and elderly patients. In this study, there are 3 pediatric patients and 3 geriatric patients. The mean age of pediatric patients was 14.7 years old, and their average BMI was 23.8. Two of the patients were injured playing sports, and the last patient was injured in a motor vehicle collision (MVC). The geriatric cohort had an average age of 74.7, and an average BMI of 26.4. All of the geriatric population presented following a ground level fall. Furthermore, each patient had a DEXA (dual-energy x-ray absorptiometry) scan on file prior to their injury. DEXA scans ranged from -2.2 to -4.2 qualifying each patient for a diagnosis of osteoporosis. The patients in both cohorts presented with compression fractures with a thoracolumbar spinal fracture classification score of A1. However, all three geriatric patients had one level compression fractures compared to the pediatric cohort where two patients had fractures in three of their vertebra, and one patient who had fractures in two of his vertebra. These findings suggest that adolescents who were injured during sports or a MVC and elderly patients with osteoporosis who experience ground level falls present with similar spinal fractures and severity.

SARAH NEAL SECREST HORNE, JAKE SELLERS, AND WERNER TW DE RIESE MD

The Origin of BPH and Prostate Cancer in the Different Prostate Zones and its Impact on the Incidence of Prostate Cancer: A Systematic Review and Update of the Literature for Urologists and Clinicians

Numerous clinical studies over recent years have reported an inverse relationship between benign prostatic hyperplasia (BPH) size and the incidence of prostate cancer (PCa) leading to the clinical hypothesis that the expanding BPH zone is damaging the glandular tissue where PCa predominately develops. The purpose of this systematic review is to establish a historical basis and reference on the zonal origin of BPH and prostate cancer (PCa) within the prostate.

SARAH NEAL SECREST HORNE, JAKE SELLERS, AND WERNER TW DE RIESE MD (CONTINUED)

Inclusion and exclusion criteria were defined, and an in-depth review was conducted utilizing studies published between January 1978 and November 2022 applying the PRISMA guidelines to data obtained through the PubMed database. Thirty-eight studies met the inclusion criteria, and all of them showed that BPH predominantly develops within the transition zone (TZ), and that prostate cancer predominantly develops in the peripheral zone (PZ) of the prostate respectively. This report provides a systemic overview of the historical evolution on the concept of zonal origin for BPH and PCa. The listed studies support the current clinical understanding that BPH mainly originates in the TZ, and that the majority of PCa originates in the PZ of the prostate. To our knowledge this is the first systemic review on the zonal origin of BPH and PCa, and an important step in the context of evidence-based medicine. This review should also encourage other clinicians and investigators to further study the dynamic interactions between the different prostate zones, in particular between the TZ and the PZ, and whether BPH size may be protective against development of PCa.

SUYASH JAIN MBA, JAD ZEITOUNI BBA, ALAN PANG MD, SHRUTI PATEL MBA, GENESY AICKARETH BS

The Prevalence of Deep Vein Thrombosis and Pulmonary Embolism in Electrical Injury Patients

Introduction Electrical burns occur when electricity exits the body via contact points, which causes damage to tissues. Deep vein thrombosis (DVT) is a blood-clotting condition that occurs in deep veins. If left undiagnosed, the blood clot can travel to the lungs, resulting in a pulmonary embolism (PE). A PE is an obstruction that prevents blood from circulating to the lungs. The likelihood of developing DVT increases with certain risk factors like injury to a vein, limited movement, hormonal changes, and obesity. Previous scholarship has evaluated the prevalence of DVT and PE in electrical injury. The study found there was a 6.5% incidence of DVT post electrical injury. Given the limited sample size, there is little information on the prevalence of PE after an electrical injury. We set out to find the prevalence of DVT and PE in a larger patient population utilizing a burn center that serves a large demographic population. Note that our burn center gives DVT prophylaxis treatment to electrical injury patients (5000 units of heparin three times daily). **Results** In a preliminary analysis of the data, we found low rates of PE/DVTs in electrical injury patients. There was a PE and DVT prevalence of less than 1 percent out of our patient population (N=218). **Conclusion** The preliminary data highlights a low prevalence of PE and DVT among electrical injury patients. This could be largely associated with standard DVT prophylaxis treatment that electrical injury patients are given at our burn center.

WOORYOUNG JANG, DANIEL NGUYEN, ISAIAH GARCIA, DR. JOEHASSIN CORDERO, DR. YUSUF DUNDAR

Sternocleidomastoid Abscess Secondary to Septic Arthritis: A Rare Case Report

Abstract: In deep neck space infections, structures within the fascial compartments may become compromised, leading to neurovascular, bony, or airway issues [1]. Most commonly, infections of the oral cavity, face, or superficial neck spread through the lymphatics into the deeper tissues, causing lymphadenopathy and suppurative fluid collection leading to abscess formation. [1]. While some neck abscesses occur idiopathically, a retrospective review found that dental infection was the most common etiology (43%), followed by IV drug use (12%) and tonsillitis (6%) [2, 3]. In contrast, our patient denied IV drug usage and had no significant medical or dental history that could account for her symptoms. Instead, she developed her neck abscess secondary to septic arthritis of the knee. Cultures taken from the knee and the neck were both sensitive to

**WOORYOUNG JANG, DANIEL NGUYEN, ISAIAH GARCIA, DR. JOEHASSIN CORDERO, DR. YUSUF DUNDAR
(CONTINUED)**

MRSA, as the bacteria formed the abscess within the left sternocleidomastoid muscle after traveling hematogenously from the knee. Rarely does a knee infection travel hematogenously and seed within the neck. Moreover, the abscess was lodged within the middle of the sternocleidomastoid muscle rather than within the fascial compartments. Physicians in the future should be aware of this distinct presentation of deep neck space abscesses.

KETAN JOLLY MS, FERRIS ZEITOUNI MS, HABIB ABLA MS, ALAN PANG MD, JOHN GRISWOLD MD

Autologous Skin Cell Suspension with Mechanical Dermabrasion to Accelerate Donor Site Healing: A Case Series

Donor sites in burn surgeries are often the limiting factor in how quickly a patient's burn injury can be healed. A patient with a large burn has limited areas for donor skin harvest. The previously harvested donor site must heal before re-cropping, which can take up to two weeks. No matter the depth of the donor site, healing resembles a second-degree burn. Autologous skin cell suspension (ASCS) is a recent development which allows for a 1cm² portion of split thickness skin graft (STSG) to be digested in enzyme and converted into a suspension. This suspension consisting of melanocytes, fibroblasts, and keratinocytes can be sprayed at a 1:80cm expansion ratio over viable dermis. We believe that ASCS is more effective when applied to a textured surface, as harvesting with precise tools may leave the wound too uniform. There is limited data demonstrating ASCS's effectiveness in treating donor sites. We present four cases of varying level donor sites treated with ASCS after mechanical texturization with a bristled scrub brush. The thickness of the harvested sites varied between 10-15 one-thousandths of an inch and were ready for re-cropping 5-7 days postoperatively. Although these donor sites were harvested for different indications such as a donor site for ASCS and STSG, their healing times were far faster than expected. We believe that ASCS is an efficacious modality to decrease healing times in donor sites. This is particularly important in large total body surface area (TBSA) burns which require multiple harvests of the same donor sites. Though we have yet to apply this to our larger TBSA burns, we believe that this method would act similarly in those cases and has the ability to decrease hospital length of stay and comorbidities associated with long wound closure times.

**SACHI KHEMKA, SHRUTI PATEL, VIVIE TRAN, DESTINY UGWA, VISHAL BANDARU, TRISTIN
CHAUDHURY, JAKE WILEMON, HANNAH CHAUDHURY**

Body mass index, a poor indicator for skin graft uptake

Body mass index (BMI) has often been associated with poor uptake of dermal grafts due to poor blood circulation to the graft. Burn patients that receive large burns require skin grafts to hasten their recovery. Without the grafts, open wounds tend to scar or cause additional ailments and may be an additional venue for pathogen spread. We predict that patients with a higher BMI will have a lower percentage of graft uptake. A retrospective study was conducted at the Timothy J. Harnar Burn Center; a subset of the burn patient population that received skin grafts was utilized to determine the efficacy to skin grafts for patients with high BMI. Patients from October 1, 2012 to October 1, 2022, were collected for factors such as BMI, dermal substitute type, graft take percentage, and graft area. Patients were divided into two different BMI groups: BMI 30 and greater (n=33) based on the BMI definition of obesity and BMI of under 30 (n=47). The less than 30 group averaged a percent graft uptake of 89.97% while the BMI of over 30 averaged 87.1% (p=0.237, one tailed Welch Test).

SACHI KHEMKA, SHRUTI PATEL, VIVIE TRAN, DESTINY UGWA, VISHAL BANDARU, TRISTIN CHAUDHURY, JAKE WILEMON, HANNAH CHAUDHURY (CONTINUED)

Averages between 20-25 (normal BMI), 25-30 (overweight), 30-35 (obese), 35+ (morbidly obese) had averages of 89.7%, 89.8%, 84.5%, and 88.5%, respectively. An ANOVA was not conducted due to unequal sample sizes and size of the data pool. While the data is not significant, the data trends seem to decrease skin graft as BMI increases. A larger sample population may change the BMI and graft uptake as the smaller sample size and cluster of graft may be causing concentrations that is not explainable. BMI might end up being related to the frequency or gravity of problematic graft uptake rather than changes in the average graft uptake.

AKASH MAHESHWARI MBA, MOHAMMAD PAKRAVAN MD MBA, CHAOW CHAROENKIJKAJORN MD, SHANNON J. BERES MD, ANDREW G. LEE MD*Pediatric Optic Nerve Glioma: A Case Report*

Optic pathway gliomas (OPGs) are primary tumors of the optic pathway involving one or both optic nerves, the optic chiasm, the optic tracts, and/or optic radiations. OPGs are primarily found in pediatric patients and are correlated with Neurofibromatosis type 1 (NF1) which often influences the severity and course of tumor growth. Clinical presentation and neuroimaging, particularly Magnetic Resonance Imaging (MRI) of the brain and orbit with gadolinium contrast, are most commonly utilized in diagnosis of OPG. Serial neuroimaging is recommended to monitor progression of OPG, especially if a patient is undergoing treatment. This case report describes progression and treatment of a patient with bilateral optic nerve gliomas. A 9-year-old boy with NF1 presented to the ophthalmology clinic for his first eye exam with vision in the right eye (OD) of 20/25 and normal left eye (OS) vision. There was a relative afferent pupillary defect (RAPD) and mild optic nerve atrophy OD. MRI of the brain and orbit with contrast demonstrated optic nerve enlargement with mild enhancement of the intraorbital portion of the optic nerve OD consistent with bilateral optic nerve gliomas without intracranial extension. The patient was initially observed for 3 months as the onset of the vision loss was unclear, but on close interval follow-up, the vision decreased (visual acuity 20/30 and HVF with increased mean deviation and arcuate scotoma OD) and repeat MRI showed increased enhancement of the right optic nerve mass. Vincristine and carboplatin-based chemotherapy was initiated, but the optic nerve glioma on the right eye had increased in size. A biopsy of the mass revealed BRAF mutation, and the patient was started on selumetinib; subsequent imaging while on selumetinib demonstrated glioma stability with no further growth over 1.5 years.

CAITLYN N. MATEJKA MS, JAD ZEITOUNI BBA, ALAN PANG MD, ELLIOT NORMAN BSPH, JOHN GRISWOLD MD*Silver Sponge Wound Vacuum as a Dressing for Kerecis*

Background Treating wounds properly is vital to prevent infection. Silver impregnated cloth dressing is standard for kerecis treatment alongside a bolster, such as negative pressure wound therapy (NPWT). Silver is often applied through cloth usage, and there is limited literature on sponges. This abstract will explore usage of silver impregnated sponge, versus cloth, and would healing advantages. Research Question This case study investigates wound healing using silver impregnated sponge alongside NPWT. Case Description 39-year-old female was transferred from an outside facility for abdominal abscess, ongoing for 1 day associated with pain, swelling, drainage, nausea, and vomiting.

CAITLYN N. MATEJKA MS, JAD ZEITOUNI BBA, ALAN PANG MD, ELLIOT NORMAN BSPH, JOHN GRISWOLD MD (CONTINUED)

Patient diagnoses included type II diabetes, with BMI of 80. Patient was admitted to Burn ICU for abdominal abscess and underwent debridement of necrotizing soft tissue infection with wound size of 30cm x 10cm x 10cm and sepsis. On day 3 patient underwent debridement with wound size measuring 64cm x 36cm x 15 cm. 11 days later, wound measurement was 64cm x 11 cm and kerecis was placed. NPWT with silver sponge was conducted on day 19. Patient was discharged to rehabilitation with continued NPWT on day 23 and wound closed well with no infection.

Discussion There are several noteworthy factors present. This patient has chronic kidney disease and is morbidly obese which directly increases risk of healing complications and healing time. Silver within these materials allows retention of antimicrobial properties and porosity manipulation.. Increased porosity helps remove excess fluid which would be trapped by less permeable cloth. These factors combined decreased maceration, infection, and patient discomfort. Infection wasn't developed despite the presence of necrotizing soft tissue infection and wound healed well. Conclusion Silver impregnated sponges could be a viable wound treatment resource in the future by improving wound healing and should be investigated in future studies.

AMBER NANNI, SUYASH JAIN, ALAN PANG, JAD ZEITOUNI, JINESH LACHMANSINGH, JOHN A. GRISWOLD

Extracorporeal Membrane Oxidation in Burn Patients with Severe Inhalation Injuries: A Case Study

Careful monitoring of ventilator settings, the use of prone positioning, infection control, and other supportive measures has been the standard of care when treating patients with acute respiratory distress syndrome (ARDS). However, with higher grade inhalation injuries (i.e., grade 4), standard of care treatment is often ineffective and lead to long recovery times. Here, we report a case study of the successful use of Venovenous Extracorporeal Membrane Oxidation (VV ECMO) in treating a grade IV inhalation injury post burn trauma. In this case, VV ECMO was effective in reducing the patient's pulmonary load allowing their respiratory system to heal. However, the use of VV ECMO for this patient also led to the formation of a clot due to increased blood-tubing surface area. We recommend the consideration of ECMO treatment with careful clot monitoring in patients with severe inhalation injuries in which standard of care treatments have proven ineffective.

ANGELICA NIBO, HALEY LEWSEY, NEETI SWAMI, RADHA PATEL, LAUREN COBBS M.D., M.ED.

A Review of Patterns of Efficacy in Cultural Competence Curricula in U.S. Medical Schools

Cultural competence is commonly defined in a medical context as the knowledge, skills, and attitudes conducive for cross-cultural communication in order to provide quality care. The idea of cultural competence emerged 30-40 years ago. As the U.S. becomes progressively more diverse, medical schools across the country have been implementing programs to establish cultural competence in their students, known as Cultural Competence Curricula (CCC). Our research intends to identify the optimal components of an efficacious CCC. The methodology for our project is a review of existing literature on CCC in medical schools across the U.S. We are exploring potential patterns and variation in CCC by year, region, teaching methodology, content, and outcomes. We will discuss the implications of the term "cultural competence" and the development of new language to improve its applications. Future research could expand on the comparison between cultural competence and cultural humility.

ELLIOTT NORMAN BSPH, FERRIS ZEITOUNI MS, JAD ZEITOUNI BBA, CHRISTINA ZHU BA BS, ALAN PANG MD, JOHN GRISWOLD MD

Autologous cell suspension with split thickness skin graft to treat burn wounds with delayed healing

Introduction: Burn wounds with delayed healing can lead to many comorbidities and necessitate many procedures. Delayed wound healing typically persists over three months. Standard of care is wound coverage with skin grafts. Autologous skin cell suspension (ASCS), a spray-on suspension composed of a patient's keratinocytes, melanocytes, and fibroblasts, has been shown to promote early re-epithelialization of deep and partial-thickness burns. ASCS, in combination with split-thickness skin graft (STSG), is associated with reduced length of stay and hospital costs compared to STSG alone. Case Report: A 56-year-old female presented with flame-induced 66% total body surface area (TBSA) partial and full thickness burns to bilateral arms, legs, torso, and back. Over her 83-day hospitalization, she underwent many procedures, including split-thickness skin grafting (STSG), ASCS to the right and left upper extremity and torso, and biodegradable temporizing matrix placement to all other burned areas. Her hospital course was complicated by deep vein thrombosis, urinary tract infection, and soft tissue/skin infection. After grafting and treatment for the infection, she was discharged to a rehabilitation hospital with 14% TBSA open. She was readmitted to our hospital six days later due to skin graft rejection and infection from neglected wound care. Results: Following extensive wound care including excision of all biofilm and granulation tissue, ASCS and STSG were applied to both thighs and shoulders with IV antibiotics. Notably, graft take percentage was 98% and 99%, respectively, despite an active wound infection. She was discharged 20 days later with 7% open TBSA. Conclusion: Wounds with delayed healing due to infection or other causes require aggressive debridement, including excision of biofilm and granulation tissue, if present, followed by intensive wound care. This patient developed graft failure secondary to recurrent infection but the use of ASCS with STSG allowed for delayed burn wound healing despite active wound infection.

FOSTER OGU, RYAN D. MORGAN, AND LASZLO NAGY, MD

Comparison of Degenerative Changes in the Spines of 10-16 Year Old Children Presenting with Lower Back Pain Based on BMI and Sport-A Pilot Study

Studies have shown that low back pain is a common complaint amongst athletes of all age levels, with a potential association between participating in youth sports and early signs of spinal degeneration. This study aimed to assess the correlation between spinal degeneration in youths, ages 10-16 years, participating in sports and those that do not. There were five patients in the sports cohort and five in the control cohort. The average ages between the sports and control cohorts were 15.2 years and 13.6 years, respectively. The sports group had an average body mass index (BMI) of 21.2, and the control cohort had an average BMI of 25.5. The patients who played sports were statistically more likely to show signs of spinal degeneration on imaging studies than their control counterparts (80% vs. 0%; $p < 0.001$). Of the four patients involved in sports who showed signs of degeneration, three participated in cheerleading/gymnastics, while the other was active in mixed martial arts (MMA). The other patient involved in sports with no signs of degenerative participated in running (cross-country and track) and basketball. This study suggests that pediatric patients between the ages of 10-16 years who play sports are more likely to present with spinal degeneration than those who do not play any sport. However, this study has a limited patient size, and more data is needed before any definitive conclusions can be made.

ERIKA ORLOV, RAINIER ALVIR, NEHA SAWANT, AND P. HEMACHANDRA REDDY*Mechanisms of Aging: Focus on Inflammation, Mitochondrial Dysfunction and Synaptic Damage*

Background/Purpose: Aging is the time-dependent process that all living organisms experience. It is characterized by declining physiological function due to epigenetic changes, telomere shortening, inflammation, oxidative damage, and mitochondrial and synaptic dysfunction. Recent research has revealed changes in the brain due to aging, particularly increased glia and astrocytes and reduced neurons. Mounting evidence suggests that aging plays a large role in neurodegenerative diseases, including Alzheimer's, Parkinson's, ALS, and Huntington's disease. Further, mitochondrial abnormalities, including mitochondrial dynamics (fission and fusion imbalance) has been shown in aging. Dynamin-related protein 1 (DRP1) regulates mitochondrial division and distribution and has been shown to be increased with aging and age-related diseases. In the current study, we investigated glia, astrocytes, and neurons in relation to mitochondria and synapse with aging. **Hypothesis:** We hypothesize that increased glia and astrocytes, and reduced neurons would be seen in the brain with age progression. Additionally, we also hypothesize that these changes in the brain are less prominent in heterozygous knockout mitochondrial protein dynamin-related protein 1 (DRP1^{+/-}) mice. **Methods:** We used immunoblotting and immunofluorescence analyses in wild-type (WT) and DRP ^{+/-} mice at five different time-points - 2 months, 10 months, 18 months, 25 months, and 31 months. Using cortical and hippocampal tissues from all 5 age groups, and studied glia, astrocytes, and neurons, and mitochondrial and synaptic proteins. We quantified protein levels and immunoreactivities of the proteins mentioned above using ImageJ and compared across age groups. **Results/Discussion:** Immunoblotting and immunofluorescence analyses revealed increased microglial and astrocytic proteins and decreased neuronal and synaptic proteins. Mitochondrial biogenesis and dynamics proteins were found to be altered with aging. **Conclusion:** These results indicate that aging plays a key role in inflammation, neuronal activity, mitochondrial dysfunction and synaptic damage. These observations may have therapeutic implications to delay aging and age-related neurodegenerative diseases.

SHRUTI PATEL MBA, GENESY AICKARETH BS, ALAN PANG MD, JOHN GRISWOLD MD*Biodegradable Temporizing Matrix (BTM) Utilization on a Pediatric Burn Following an Exploratory Laparotomy: A Case Study*

Background: Biodegradable Temporizing Matrix (BTM) is a synthetic polymer used to promote new tissue growth in full thickness wounds by providing a framework for the growth of neodermis. Because the neodermis layer contains vasculature, the graft can be adequately supported. There are no reports on BTM utilization immediately following the closure of a surgical incision. **Case Description:** A 19-month-old female presented to the emergency department with scalding burns. The patient developed abdominal compartment syndrome. Upon exploratory laparotomy a necrotic right colon was discovered, and a right hemicolectomy was performed. Following the incision closure, the patient underwent excision and grafting for her anterior torso burns. The patient's anterior torso skin graft was positively incorporated, and the incision site was appropriately healed. **Discussion:** Because the dermis surrounding a surgical incision initially has limited blood flow, graft incorporation may be difficult as vascularization is crucial to graft take. However, the BTM matrix provided a framework for neodermis to grow and increase vascularization, so that the graft would be successful. Moreover, incisions also require adequate blood flow to heal properly, so as the neodermis grew via BTM, more blood flow reached the incision site, aiding in the closure. **Conclusion:** This case highlights that BTM is appropriate to provide support in recent incision closure with concomitant full thickness excision and grafting.

AKSHAY RAGHURAM BA, JAD ZEITOUNI BBA, ALAN PANG MD, CAMERON TUAZON BS, AARON WOODARD PHARM D, DEEPAK BHARADIA MD, JOHN GRISWOLD MD

A Case Series Evaluating the Outcomes of Autologous Skin Cell Suspension on Necrotizing Soft Tissue Infections

Background: Necrotizing soft-tissue infection (NSTI) is a disease which causes inflammation and eventual death of soft tissue cells. For extensive skin injuries caused by NSTIs, autologous donor skin may be insufficient for early debridement and grafting, and also poses a risk of graft-site rejection and infection. The use of the autologous skin cell suspension (ASCS) on NSTIs offers the potential for optimal healing and decreased infection. We posit that patients who receive ASCS treatment for NSTIs instead of the current standard of care will have better outcomes.

Design/Research Question: A retrospective chart review of four patients was performed in this case series to evaluate the advantages of treating necrotizing soft tissue infections with ASCS. We evaluated variables such as hospital length of stay, healing time, graft take, and mortality.

Discussion: This case series demonstrates the applicability of autologous skin cell suspension (ASCS) in necrotizing soft-tissue infections. There is literature to support the use of ASCS in the treatment of burn wounds, but there is little literature discussing the use in the treatment of larger wounds such as necrotizing soft tissue infections. With the common graft site of the lower extremity being compromised, the significantly smaller graft required for ASCS was especially useful in this case. ASCS is also very useful in stimulating and increasing overall wound healing, seen by the 98% graft adherence 4 days after surgery in patient 2 (with an initial TBSA of 3.5%), and 100% graft take in patient 3 (with an initial TBSA of 10%). Conclusion: ASCS can be a valuable addition to the toolbox of burn and plastic surgeons to treat extensive NSTIs. This case series should open the way for larger prospective trials to further examine the benefit of ASCS to treat NSTIs.

HASSAN SALEH, MS1, SUYASH JAIN, MS1, PITCHAPORN YINGCHONCHAROEN, MD2, KENNETH NUGENT, MD2

Effect of continuous positive airway pressure therapy in patient with COPD and pulmonary hypertension: A literature review

Background: Patients with obstructive sleep apnea (OSA) and pulmonary hypertension (PH) have a reduced functional capacity and potential survival. Continuous positive airway pressure (CPAP) is the primary treatment for OSA, improving sleep parameters, functional activity, and possibly pulmonary artery pressure (PAP). This literature review summarizes available studies that have measured changes in PAP in patients with OSA after CPAP administration. Method: PubMed.gov database was searched via combination of keywords: (i) "Pulmonary Hypertension" (ii) "Obstructive Sleep Apnea" (iii) "Continuous Positive Airway Pressure." Then, specific inclusion and exclusion criteria were applied to select prospective studies. Finally, data was carefully extracted from each study. Results: 7 studies were isolated from a list of 272 results. While studies included a range of CPAP treatments, all showed significant improvement of PAP. The average improvement in PAP across all studies when weighted for number of participants is 9.33+/-0.55. Conclusion: Systematic literature review shows that CPAP treatment reduces PAP in patients with OSA. Treatment intervals ranged from 48 hours - 6 months to determine the effects of CPAP on PH in these patients.

MUHAMMED A SHARIFF, JACOB AWKAL, OBADA ALBAGHDADI, AKSHARKUMAR DOBARIYA, JUAN PASCUAL*Maintenance of Native Pig Neurophysiological Activity Under Isolated Extracorporeal Pulsatile Perfusion Control*

Current approaches to analyzing neurovascular properties are limited in their overall scope due to the influence of a concerted array of organs throughout the body. From pharmacological interventions to metabolic tracing analysis, neural property characterization following independent variable introduction is susceptible to the influence of organ specific confounds. To eliminate such variables, one approach is to isolate perfusion to the brain through the enlistment of extracorporeal perfusion control, allowing for closed loop access to the brain directly while maintaining normative physiology. Nevertheless, the lack of physiologically relevant pulsatility seen in commercial perfusion machines has been linked long-term to the abolishment of high-order neuronal activity, cerebral oxygenation, and vascular signaling. Thus, our approach attempts to fully regulate and maintain native cerebral hemodynamics all the while ensuring adequate perfusate homeostasis. The control, relying on software controlled machinery, has successfully maintained native-like vascular pressure, flow, and pulsatile waveforms characteristic of subject specific physiology. Viability of the brain was ascertained through continuous electrocorticography and brain depth recordings and yielded nearly identical values under both isolated and native circulation as were cerebral temperature, pressure, and oxygenation. As such, complete independence in circulation in addition to native-like physiology render our approach suitable for further neurovascular experimentation.

NEETI SWAMI BS, CAITLYN MATEJKA MS, SUYASH JAIN MBA, AMBER NANNI MS., CLS(ASCP), ALAN PANG MD, JOHN GRISWOLD MD*Retrospective evaluation of Burn Surgical Date and Patient Outcome Correlations*

Introduction According to the American Burn Association, approximately 450,000 people in the United States need hospital or emergency room treatment for burns in a year. Effective treatment of burns, especially when surgical treatment is necessary, is essential to have better patient outcomes. Establishing an optimal operation window is important for efficiency in patient care, especially in cases where resources for rapid burn surgery may be limited. **Hypothesis** We hypothesize that patients who are operated on sooner after their burn injury will have better outcomes than patients who have to wait longer when evaluated across a 10 day period. **Methods** In the investigation, retrospective data of burn patients from October 1st, 2012 to October 1st, 2022 are being collected to see if certain patients (i.e those with earlier operations) have significantly greater health outcomes. To test the hypothesis that shorter time to surgery has greater odds of positive outcomes, multivariable regression analyses are in the process of being used. Depending on if criteria is met, future potential analysis include multivariable Cox regression that will be used for time-based outcomes including ICU stay duration, ventilator days, and survival to discharge. Otherwise, we will use either Poisson or negative binomial regression for these time-based outcomes. **Results** Results are still in the process of being collected. We expect that sooner burn operations will have more positive outcomes based on past literature. **Conclusion** By analyzing outcomes of burn patients based on when they received surgical treatment, burn-surgery patient outcomes can be improved and risk of organ damage decreased. Determination of what operative period is appropriate for optimum patient outcomes could lead to further research identifying how best to optimize surgical intervention with burns.

VIVIE TRAN, ALIAKBAR ARVANDI, M.D., MOHAMMAD M. ANSARI, M.D.*A Case of Venous Insufficiency Misdiagnosed for Congestive Heart Failure*

INTRODUCTION Venous insufficiency is characterized by lower extremity edema, discomfort, and skin changes. If left untreated, venous insufficiency can lead to persistent pain, thrombophlebitis, and skin ulcers, leading to amputation. Diagnosis of venous insufficiency can be made with physical exam and venous imaging modality. However, it is a very underdiagnosed disease, and many have missed it. We present a case of severe venous insufficiency misdiagnosed initially as heart failure. **CASE PRESENTATION** Male aged 58, previously diagnosed with heart failure, presented with moderate to severe lower extremity edema. The patient was successfully diagnosed with venous insufficiency, and began venous therapy, including compression stockings, to no avail. Finally, a venogram was performed followed by intravascular ultrasound (IVUS) that confirmed severe compression of the iliac vein. Consequently, a 20x140 mm Venovo stent was successfully deployed. Post stenting IVUS showed excellent apposition and improved luminal gain. A venogram noted no leaks. Within 24 hours, 25% of the patient's symptoms resolved and a marked difference in his swelling was observed. **CONCLUSION** Our case highlights the importance of proper evaluation for venous insufficiency when presented with lower extremity swelling, since this disease, if left untreated, can cause severe consequences on the patient and is a very underdiagnosed disease. Proper evaluation and diagnosis can lead to a significant difference in the patient's lifestyle and wellbeing, as seen by our case.

NICHOLAS VOJTKOFSKY BS, MATTHEW BUXTON MBA, J. JOSH LAWRENCE PHD*Analyzing Relationships Between Fatty Liver Disease, Vitamin D, Alcohol Consumption, and Cognitive Impairment in a Rural West Texas Elderly Cohort: A Project FRONTIER Study*

As the proportion of the elderly population in the U.S. continues to grow, our understanding of cognitive dysfunction becomes increasingly important. One aspect of age-dependent cognitive decline that remains relatively understudied is the relationship between liver disease and cognition. This study aims to investigate the relationship between cognitive impairment and various markers of liver function as well as vitamin D level and alcohol consumption. This objective was achieved by comparing scores of a cognitive function test, RBANS, to a battery of serum biomarkers and diagnostic indexes for liver dysfunction available in Project FRONTIER using Pearson correlations and regression analysis. We discovered significant negative correlations between serum bilirubin, total serum protein, FIB-4 index, and NFS index, and RBANS total score. We also found a significant positive correlation between alcohol intake and RBANS. Finally, we found a significant negative correlation between the indexes HSI and FLI, and vit. D. In conclusion, our analysis supports the acceleration of age-related cognitive dysfunction by liver disease and identifies potential diagnostic measures that could improve future protocols for identification and treatment.

WILEMON J, ZEITOUNI J, PANG A, ZEITOUNI F, BHARADIA D, GRISWOLD J.*The Role of Biodegradable Temporizing Matrix in Improving Graft Take and Prevention of Associated Skin Graft Complications.*

Introduction: Biodegradable temporizing matrix (BTM) is a synthetic dermal substitute indicated for full thickness burns or necrotizing soft tissue infections (NSTI) that incorporates into the dermis to enhance the reconstruction of the deeper skin layers by providing a 3D scaffold. This allows blood vessel infiltration and fibroblast proliferation promoting dermal reconstruction and wound healing. With large burn injuries, the depth and extent of the burn decide if the patient requires surgery involving skin grafting.

WILEMON J, ZEITOUNI J, PANG A, ZEITOUNI F, BHARADIA D, GRISWOLD J. (CONTINUED)

Deep partial thickness burns and full thickness burns damage most of or the entirety of the dermal layer of the skin. Loss of the dermal layer of the skin can lead to graft loss and potential infection. We examine the graft take of patients given BTM prior to their graft and the associated outcomes in these patients in this pilot study. Methods: A retrospective chart review of patients was obtained for 10 patients that received BTM placement for the treatment of their deep partial thickness burn, full thickness burn, or NSTI. A dataset of 10 patients who were treated for similar burn and NSTI injuries served as the control group in this study. The control group was also chosen to have similar ages, gender, BMI, comorbidities, and graft size as the BTM group. A T test was performed confirming that these two groups were similar in age and BMI. The two groups' graft take percentage reported from their first surgery was compared. Results: We used a standard our results showed that the patient group who received BTM had an average 87% graft take percentage compared to the control group's average graft take percentage of 66.4%. These results were statistically significant ($P < .05$). Conclusion: The use of BTM may be a beneficial adjunct to skin grafts as a treatment modality in full thickness burns.

JOHN WOLPERT, JAD ZEITOUNI, ALAN PANG, FERRIS ZEITOUNI, ARSHAMA DEGHAN, GENESY AICKARETH, JACOB AICKARETH, STEPHANIE STROEVER, JOHN GRISWOLD*The Role and Influence of Bronchoscopy Quantity in Pneumonia Occurrence in Patients with Inhalation Injury*

Objective: Inhalation injuries are an urgent complication that increase mortality in burn patients. Bronchoscopies are utilized for injury visualization, washout of the bronchial tree, and for bronchioalveolar lavage in inhalation injuries. Bronchoscopies, however, are associated with complications including pneumonia. We hypothesized that the odds of developing ventilator-associated pneumonia (VAP) in patients with inhalation injury differ depending on number of bronchoscopies performed. Method: We included patients admitted between 2019 and 2022 that were 18 years or older with inhalation injury confirmed via bronchoscopy and excluded patients with pre-existing pneumonia. We performed multivariable logistic regression with number of bronchoscopies included as a categorical variable. We elected $\alpha = 0.05$ a priori. Results: Fifty-one patients with an mean age of 48 years were included. The median number of bronchoscopies performed was 1 (interquartile range = 1, 2), and 16 patients (31.3%) developed VAP. After controlling for the inhalation injury grade and percent total body surface area, the odds of developing VAP were significantly higher in patients who had 2 bronchoscopies compared to 1 (OR = 8.16, 95% CI = 1.44, 46.29, $p = 0.18$). There was no significant difference in VAP prevalence in patients who had 3 or more bronchoscopies compared to 1. Conclusion: This study points to a difference in prevalence of VAP among inhalation injury patients depending on number of bronchoscopies performed. Limitations to our study included being underpowered to find a difference in patients with more than 2 bronchoscopies and not controlling for fidelity to VAP-prevention measures or ventilator days.

FERRIS ZEITOUNI MS, ELIZABETH BROWN BS, RILEY FORTNER MS, ALAN PANG MD, DEEPAK BHARADIA MD, JOHN GRISWOLD MD*Autologous skin cell suspension in the treatment of partial thickness hand burns, a case series*

A difficult location for burn care is the hands. While the hands cover a small surface area of the body, they are disproportionately burned. Operative technique for deep 2nd and 3rd degree hand burns has remained sheeted or 1:1 meshed split thickness skin grafting (STSG) with postoperative

FERRIS ZEITOUNI MS, ELIZABETH BROWN BS, RILEY FORTNER MS, ALAN PANG MD, DEEPAK BHARADIA MD, JOHN GRISWOLD MD (CONTINUED)

immobilization. However, contracture and decreased postoperative range of motion (ROM) are common complications of this technique. Thicker grafts to the hand, as opposed to thin, high ratio meshed grafts, result in improved healing times and functionality with lower contracture rates and improved postoperative ROM. One novel technology is spray-on autologous skin cell suspension (ASCS), which is composed of a patient's own harvested fibroblasts, keratinocytes, and melanocytes. ASCS has been shown to improve healing and operation times, decrease pain, and possibly improve postoperative complications such as symptomatic scarring. We present four patients with deep 2nd and/or 3rd degree burns to bilateral hands treated with a 1:1 or 1:2 ratio meshed STSG with subsequent ASCS application. Range of motion, time to healing, and occupational therapy documentation were used to interpret success of this treatment. Patients aged 18-67 years old, underwent excision and grafting with subsequent ASCS application. All patients were able to initiate OT ROM exercises starting on postoperative day 4 at graft take down. All were discharged with full ROM with near complete healing of their burns. The use of ASCS in burn care has been increasing. ASCS has been shown to decrease hospital length of stay, increase epithelialization, and decrease healing times associated with 2nd and 3rd degree burn wounds. Treatment of hand burns is a difficulty faced by many burn and plastic surgeons with the most common complication being scar contracture which can be debilitating when spanning joints of the hand.

JAD ZEITOUNI BBA, KYLE MANGUM BS, DANIEL NGUYEN MD, YUSUF DUNDAR MD

Traumatic Gunshot Wound to the Oropharynx and Associated Pharyngocutaneous Fistula: A Case Report and Literature Review

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize and treat the potential complications, including a pharyngocutaneous fistula, from a traumatic gunshot wound to the oropharynx. **Objectives:** To describe a unique case of a gunshot wound (GSW) to the oropharynx with a resulting complication of a pharyngocutaneous fistula. **Methods:** A 17-year-old male presented with a GSW to the midline of the neck. The patient arrived intubated via air ambulance. Operative exploration found massive laryngeal-tracheal damage and an esophageal injury measuring 6 cm. Multiple bullet fragments were removed. A direct laryngoscopy and neck exploration on HD 6 found complete destruction of the laryngeal cartilaginous framework and obliteration of the upper airway. A pharyngocutaneous fistula developed on HD 20. A direct laryngoscopy and Esophagogastroduodenoscopy (EGD) was conducted the following day. A posterior cricoid tracheoesophageal fistula (TEF) and left pyriform sinus pharyngocutaneous fistula (PCF) was discovered. On HD 23, the patient underwent a pharyngoplasty and left pectoralis major myocutaneous flap (PMF) to rectify the wound and fistula. The wound measured 5 by 4 cm and had a 3 cm pharyngocutaneous fistula. Following surgery, the fistula resolved, and the flap progressively healed. The patient was discharged to a rehabilitation facility on HD 29. **Results:** There is scarce literature on traumatic GSW injury to the oropharynx. There is little to no literature regarding an injury of this size, involvement of a large pharyngocutaneous fistula, or the use of a PMF to rectify the injury. **Conclusion:** Oropharynx injuries due to GSW requires complex management, and providers should be prepared for complications like pharyngocutaneous fistulas. A Myocutaneous flap may be a useful strategy in reconstruction of the oropharynx and closure of the fistula.

JAD ZEITOUNI BBA, AKSHAY RAGHURAM BS, FERRIS ZEITOUNI MS, THEOPHILUS PHAM MD, ALAN PANG MD, JOHN GRISWOLD MD.

A Case Series Evaluating the Outcomes of Autologous Skin Cell Suspension (ASCS) in the Treatment of Indeterminate Thickness Facial Burns

Background: Indeterminate-thickness facial burns (ITFB) result in several difficulties including prolonged healing. The current standard of care for facial burns is monitoring for three weeks, with topical agents added to prevent infection. Autologous skin cell suspension (ASCS) can potentially expedite the healing time for these facial burns which can reduce scarring and improve the functionality of the face. We posit that patients receiving ASCS for ITFB instead of the current standard of care will have better outcomes related to healing time, additional procedures, infection, and hospital stay with this treatment. Design/Methods: The design type of this study was a retrospective review of nine patients in a case series. Data was collected using electronic medical records. This data evaluated infection, hospital length of stay, healing time, the requirement of additional procedures, and mortality. Results: ITFB treated with ASCS had rapid healing times, shorter hospital stays, and reduced infection. The rapid healing time among these patients (of 4 to 6 days) allowed patients to retain greater functionality of their faces. This also allows hospital stays to be shorter, as the current standard of care is inherently longer given the three-week waiting period. Conclusion The use of autologous skin cell suspension is a novel method surgeons should consider when treating indeterminate-thickness facial burns given it's shortened healing times and associated hospital stay. This study shows the need for further research into the use of ASCS for ITFB.

MS 2

HABIB ABLA, JEREMY GARZA, JANE-COLMER HAMOOD, JOHN GRISWOLD, MD, AND ABDUL HAMOOD

A potential protection against Pseudomonas aeruginosa sepsis through multiple doses of the recombinant R2 pyocin

Pseudomonas aeruginosa (PA) is a gram-negative pathogen that causes serious infections in immunocompromised individuals including severely burned patients. Once it colonizes burned wounds, PA translocates into the blood stream causing bacteremia, septicemia, septic shock, and multi-organ failure. The alarming rate at which PA antibiotic resistant mutants emerge, necessitates the search for alternative therapies to treat PA infections. One such therapy is the utilization of pyocins-narrow spectrum antimicrobials produced by PA to eliminate other competitive bacteria. We hypothesized that recombinant pyocin R2 interferes with PA sepsis. We tested this hypothesis using the murine model of thermal injury and a purified recombinant R2 pyocin (r-R2). We assessed the effectiveness of a single or multiple doses of r-R2 given at multiple time points post burn/infection through either the subcutaneous (S/Q, at the injection site) or the intraperitoneal (IP) routes. In all experiments and at 48 hours post infection (HPI), the mortality rate (MR) among the control groups receiving Normal Saline was 100%. A single S/Q dose of r-R2 produced 0% MR when given immediately after infection but 75% MR when given 4 HPI. However, the MR among mice treated with two single doses of r-R2 (one S/Q and another IP) at 4 HPI was 0%. The MR among mice treated with dual injections (S/Q and IP) at either 8 or 12 HPI was 66% at 72 HPI. In a group of mice treated with IP injection at 12, 18, 24, and 36 HPI, the MR was 33% at 48 HPI and 75% at 120 HPI, and one mouse was terminated at 240 HPI. These results suggest that: r-R2 treatment strategy consisting of multiple S/Q and IP doses prevents sepsis in severely burned/PA infected patients.

**ERIN ADAMS BA, YAW ADU MS, MERON TESFAYE MS, KOFI AGYARE BS, ROBERT JOHNSTON, MD,
ALAN PANG, MD***The Correlation between Mallampati Score and Thyromental (Submental) Distance with Increased Rates of Re-Intubation*

Intubation is a medical procedure in which a tube is inserted through a patient's oral cavity to prevent airway obstruction. This procedure is often performed on critically ill patients in the Intensive Care Unit (ICU) or Pre-Anesthesia Care Unit (PACU). Although intubation is typically followed by extubation and the patient's discharge, it has been estimated that 10-20% of patients will require reintubation. The reasons for reintubation can vary, but risk factors include age, prolonged ventilation, and electrolyte imbalances. Reintubation is a procedure in which the patient must undergo a repeated intubation after extubation under general or regional anesthesia. The Mallampati Score and Thyromental (Submental) Distance are two measures that anesthesiologists have implemented to help predict reintubation risk. The Mallampati Score is a measure of the size of the base of the tongue and its correlation with negative intubation outcomes. The score is determined by asking the patient to open their mouth and extend their tongue, with a higher score indicating an increased likelihood of airway obstruction during anesthesia. The Thyromental (Submental) Distance is the distance between the bottom of the chin and the top of the thyroid notch, and it is used to estimate the space in which the tongue will be displaced during intubation. Previous studies have evaluated the clinical relevance of the Mallampati Score and Thyromental (Submental) Distance, but there is little research on the correlation between reintubation rates and abnormal scores in these measures. In this study, we aim to examine if the prevalence of higher reintubation rates is correlated with problematic and complicated Mallampati scores and abnormal submental distances.

YAW ADU, GRACIE BAUM, CAMERON COX, BRENDAN MACKAY MD*Exploring the Impact of VersaWrap Tendon Protector on Functional Outcomes in Upper Extremity Tendon Repair*

Abstract: Tendon injuries and repairs can often result in adhesion formation, which can lead to persisting functional deficits post-repair. Despite improvements in techniques, there is currently no consensus on the most effective modality to decrease the incidence of adhesion formation. The VersaWrap Tendon Protector is a bioresorbable hydrogel that is FDA-cleared for use in tendon repair. It separates healing tendons from surrounding tissues and improves tendon gliding. The aim of this study was to evaluate the effectiveness of the VersaWrap Tendon Protector in improving tendon gliding and minimizing adhesions and tethering after tendon repair. Ninety-seven patients who met inclusion criteria were included in the study. The patients' age, sex, injury type, mechanism of injury, VAS pain scores, QuickDASH disability scores, active and passive range of motion (ROM), and percent return to normal function were collected at baseline and routine follow-up visits. The outcomes were classified according to the Strickland and Glogovac grading system. The results showed that the average active and passive ROM were 87.1% and 94.0% respectively, at the most recent follow-up (mean = 4.6 months). The average QuickDASH score was 31.0, and the average VAS pain score was 1.3. At the most recent follow-up, 64.9% of patients had excellent functional outcomes, 22.8% had good outcomes, 10.5% had fair outcomes, and 1.8% had poor outcomes. The average percent return of function was 86.4%. In conclusion, our data suggests that the VersaWrap Tendon Protector may be a useful adjunct in preventing tendon tethering adhesion post-repair. The study shows that VersaWrap improves tendon gliding and minimizes adhesions and tethering after tendon repair, thus providing an alternative option for improving the outcomes of tendon repair surgeries. Further studies with a larger sample size and longer follow-up periods are needed to confirm these findings.

KOFI AGYARE BS, YAW ADU MS, SANA ERABTI BS, GENESY AICKARETH BS, ELWIN RUTAYOMBA BS, ROBERT JOHNSTON MD, ALAN PANG MD

A Retrospective Study Evaluating the Risk Factors Associated with Unexpected ICU and Hospital Admissions Following Elective Surgeries

Elective surgeries, planned procedures that are not considered medical emergencies, can range from optional cosmetic surgeries to essential surgeries such as mastectomies following a breast cancer diagnosis. While these procedures do not carry the same level of mortality risk as emergency or urgent surgeries, they still come with significant risks for the patient. One marker for poor surgical and anesthesia outcomes is unexpected ICU and general admissions after a patient is discharged from the Post-Anesthesia Care Unit (PACU). To predict patient outcomes in the ICU, the American Society of Anesthesiologists Physical Status (ASA PS) Classification System is currently used. A higher ASA score, in addition to poor PACU outcomes, advanced age, and the duration of the procedure, have been found to correlate with an increased risk of unplanned ICU admissions after elective surgery. Previous studies have examined the clinical relevance of elective surgeries and risk factors associated with unexpected ICU admissions independently, but there is a lack of research on the correlation between these two subjects. Our study aims to fill this gap in the literature by identifying multiple risk factors that will allow clinicians to be better prepared to deliver appropriate interventions for these patients, potentially reducing the risk of negative outcomes following such procedures. We hypothesize that patients with multiple risk factors, particularly comorbidities such as diabetes and high blood pressure, will have an increased risk of unexpected ICU admission after elective surgery. Additionally, identifying common negative incidents in the PACU between patients will increase the predictability of unexpected ICU admissions post-elective surgery. To test this hypothesis, we conducted a retrospective chart review of a group of anonymous patients from January 1, 2014, to January 31st, 2022 that fit our criteria, with results and analysis pending. This research will provide valuable insights into the relationship between risk factors and unexpected ICU admissions after elective surgery, helping to improve patient outcomes in the future.

GENESY AICKARETH, ALAN PANG MD, JOHN GRISWOLD MD

Can TPN on Burn Patients be Considered Again?: A Case Report

Total parenteral nutrition (TPN) is a form of feeding that doesn't involve the gastrointestinal (GI) tract and instead uses a formula that is given intravenously. Enteral Nutrition (EN) is a form of feeding that directly delivers food into the GI tract. TPN is administered for patients with malfunctioning GI tracts, nutritionally deprived patients, or for patients who shouldn't receive fluids by mouth (5). Burn patients with significant burns can have a hypermetabolic state and can cause energy needs to be twice as normal (1). Patients need continuous aggressive feeding to maintain their body weight. Typically, burn patients are administered enteral nutrition. Burn patients who had EN are more likely to be safer, have improved gut function, and decreased hyperglycemia and hyperosmolarity (1). TPN use for burn patients started around the 1970's, however, it was quickly shown to lead to overfeeding which increases patient morbidity and mortality (7). TPN is the alternative that can be used in burn patients when EN is contradicted. Burn patients who have feeding intolerances, burn injuries to the stomach or small intestines, or intractable diarrhea are ideal candidates for TPN (6). In the past, TPN was seen as a riskier alternative because it was thought to have a higher risk for blood stream infections (BSI) coming from the central venous catheter (2). However, current literature shows that continuing TPN on patients with bacteremia is not associated with worse clinical outcomes (4).

GENESY AICKARETH, ALAN PANG MD, JOHN GRISWOLD MD (CONTINUED)

Frequent monitoring will be necessary to protect the patient against overfeeding. Parenteral support is usually given until enteral nutrition can be used to meet the patient's needs. This case highlights an instance when parenteral nutrition was used throughout a burn patient's stay. It is unique because it highlights a case when TPN was successfully used without use or supplementation of enteral nutrition.

MOHAMMAD M. ANSARI MD, ALIAKBAR ARVANDI MD, MARINA ISKANDIR MD, GEOFF THOMAS BS, ANTHONY PHAM BS, ARDALAN NAGHIAN BS, COLE POLLINA BS, ANTHONY BRUCCOLIERE MBA, ELWIN RUTAYOMBA BS, STEVEN DALEY BS, VICTORIA ACOSTA BS, LEWIS KELLY MS, KANISHK GOEL BS, DIXON SANTANA MD, JOHN GRISWOLD MD, SCOTT SHURMUR MD, STEVEN BERK MD*The Impact of Discrepancy of PAD-CLI Diagnosis on Gender: The Staggering Effects of Social Determinants Seen Highest in Women*

Peripheral arterial disease (PAD) is a clinical manifestation of atherosclerosis, affecting primarily the peripheral vasculature in the lower extremities. In its advanced form, PAD can result in critical limb ischemia (CLI) or critical limb threatening ischemia (CLTI). As such, early detection and proactive management are critical to patient outcomes. Diagnosis and treatment can be delayed, however, due to the wide spectrum of its clinical presentations. In our study we saw a notable difference in disparities affecting PAD care between males and females. However, while we did see a difference between hispanic male vs hispanic female and white male vs white female, what was remarkable is that the discrepancy is quite similar when it comes to hispanic females and white females, which concludes that females suffer the most disparities in the overall picture of PAD disparities.

VISHAL BANDARU, KELLY TRINH, DOUGLAS BETTARELLI, BRANDON YOUSSI, TAYLOR GOODFELLOW, ZARIF GANI, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)*Comparative Fluid Resuscitation in Dobutamine Patients within the First 48 Hours*

Background: Burn patients are often administered dobutamine after admission into the Burn Intensive Care Unit within the first 48 hours. Patients with burn shock usually arise with multiple issues, such as decreased cardiac output, increased vascular resistance, hypovolemia, and hypoperfusion. When burn shock occurs, dobutamine may be administered to provide systemic perfusion as an inotropic agent. We hypothesized that patients receiving dobutamine will require less fluid resuscitation than those without dobutamine and similar mortality rates will occur in both groups controlling for total body surface area (TBSA). Results: The initial data set (n=333) decreased drastically when evaluating dobutamine administration (n=7). Patients were matched based on demographic criteria such as age, gender, body mass index, and race as well as TBSA. Propensity scoring was attempted but not possible based on the small size of the data set. Of the 7 patients that received dobutamine, 1/7 survived the burn while 2/7 survived from the matched patients. When comparing total first 48 hours of fluid resuscitation via paired T-test, dobutamine patients received a larger volume of fluid than their matched counterparts (p=0.047). During the first 24 hours of fluid resuscitation, the dobutamine patients did receive more fluid (p=0.06),

VISHAL BANDARU, KELLY TRINH, DOUGLAS BETTARELLI, BRANDON YOUSSE, TAYLOR GOODFELLOW, ZARIF GANI, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI) (CONTINUED)

however, only 4 of the 7 patients received dobutamine within the first 24 hours. TBSA between the groups was not significant ($p=0.13$). Conclusion: Our findings were contrary to expectations and dobutamine patients required larger fluid resuscitation. The next step will be to evaluate the cardiac factors to analyze hypovolemia in the context of dobutamine. However, our findings were consistent with the literature, namely, events of hypovolemia occurring when dobutamine was administered.

VISHAL BANDARU, BRANDON YOUSSE, RYAN D MORGAN, KEVIN M NGUYEN, XIYU LIU, TRISTIN CHAUDHURY, ZARIF GANI, CHIP SHAW PHD, ALAN PANG MD, JOHN GRISWOLD MD (PI)

Second-Degree v. Third-Degree Burn Differences in Length of Stay

Length of stay (LOS) is a crucial element to patient care plans, hospital profit, and a patient's well-being. However, predicting LOS is difficult as burn injuries often have complications. The expectation for LOS in the burn ward is generally one day per percent of total body surface area (TBSA) burned. This prediction approximates the average but rarely represents true patient LOS. Healing times for second and third-degree burns differ, yet most studies only evaluate TBSA rather than 2nd and 3rd degree burns separately. We hypothesized that third-degree burns would have a longer LOS than same-sized second-degree burns. Results showed for every one percent second-degree burn increase, the LOS (in days) increases by 0.587 ± 0.057 ($p=3.07E-22$). For every third-degree burn percent increase, LOS increases by 1.328 ± 0.086 ($p=1.4E-42$). The intercept for the 3D scatter plot was set to 0 as a patient without burns or inhalation injury should have a LOS of 0. The r-squared value is 0.58 which shows a medium level of correlation. Our current equation: $LOS = 0.587(2nd\ degree-burn) + 1.328(3rd\ degree-burn)$. In conclusion the one-day per percent TBSA rule does not accurately predict LOS. Third-degree burn percentage may double the length of stay when compared to second-degree burns. More closely following 2nd vs. 3rd-degree burns and other comorbidities will give patients a more accurate estimate of their LOS.

EMILY BAYSDEN, SHREYA MALLENA, JANE MONTEALGRE, SUSAN PARKER

Understanding women's reactions to testing positive for high-risk HPV using an at-home self-sampling kit

At-home self-sample human papillomavirus (HPV) tests are an alternative screening strategy for underscreened women to improve cervical cancer screening participation. Reactions to results among women who test positive for high-risk (HR-) HPV are relatively unknown. Methods: Data were collected as part of the PRESTIS (Prospective Evaluation of Self-Testing to Increase Screening) trial. Trial participants are women enrolled in a public safety net health system, ages 30-65 years, and underscreened for cervical cancer. We conducted semi-structured telephone interviews of 10 English-speaking participants who received positive HPV results from a health system-employed patient navigator. We coded interview transcripts and analyzed them using a grounded theory approach. Results: Reactions were broadly characterized as distressed and non-distressed. Both distressed and non-distressed reactions were influenced by participants' knowledge about HPV and prior experience with HPV or cancer. Non-distressed participants generally expressed perceived lack of control over their health.

EMILY BAYSDEN, SHREYA MALLENA, JANE MONTEALGRE, SUSAN PARKER (CONTINUED)

Among participants who reported distress, several themes emerged, including fear of currently having or developing cancer and incomplete understanding of the health implications of a positive HR-HPV test. Conclusions: Many participants experienced distress around their positive HR-HPV test, predominantly due to fear that this indicated that they had or would develop cancer. Research is needed to understand how distress and cancer fears affect attendance to clinical follow-up among women who test positive for HR-HPV using self-sampling kits. Research is also needed to improve communication around HR-HPV test results to increase understanding and reduce maladaptive distress.

MATTHEW BENDER, JULIANNA MARIA SANTOS, JANNETTE DUFOUR, JAY J CAO, MOAMEN E. ELMASSRY JONATHAN MIRANDA, RACHEL WASHBURN, DEANNA HOPKINS, TAYLOR HIBLER, CHWAN-LI SHEN*Effects of Peanut Shell Extract (PSE) Supplementation in Obese Diabetic Mice*

Objectives Emerging evidence suggest dietary bioactive compounds with anti-inflammatory and antioxidant properties have great potential to improve Type 2 Diabetes (T2D)-induced disorders, such as hyperglycemia, insulin resistance, compromised innate and adaptive immunity, and bone deterioration. Peanut shell extract (PSE) and its main bioactive compound, namely luteolin, have shown hypoglycemic effects in high-fat-diet plus streptozotocin-induced diabetic mice. This study aimed to investigate the effects of PSE on T2D-induced disorders, especially glucose homeostasis, immunity and bone health, in obese db/db diabetic mice. Methods Twenty-one male db/db mice were divided into 3 groups: db/db group (DM), db/db mice supplemented with 0.5% low PSE (LPSE), and db/db mice supplemented with 1% high PSE (HPSE). Six C57BL/6 mice served as controls. All mice were fed AIN-93G diet for 5 weeks. Fasting blood glucose levels were measured biweekly. Following animal sacrifice after 5 weeks of treatment, a DNA microarray of innate and adaptive immune response genes was performed on liver, colon, and brain tissue. Additionally, microCT analysis was performed on vertebra, distal femur, and midshaft femur samples. Finally, serum was analyzed for insulin levels and HOMA-IR and HOMA-B were calculated. Results Relative to the DM group, LPSE and HPSE groups demonstrated significant decreases in serum insulin, HOMA-IR, and HOMA-B. The PSE groups did not demonstrate any hypoglycemic effects or differences in bone microstructure when compared to the DM group. The microarray analysis demonstrated significant gene regulation differences in adaptive and innate immunity between the DM and HPSE groups. Conclusions PSE treatment lowered serum insulin levels and decreased insulin resistance without effecting blood glucose levels. A possible explanation is that pancreatic beta cell function was decreased in PSE groups which resulted in PSE mice unable to secrete adequate amounts of insulin to lower blood glucose levels. Further studies need to be performed to understand the significance of the role of PSE in immune cell gene regulation.

RORIE BRISTER AND ROBYN TAPP

Implications of laterality in electrical path and correlation to cardiac injuries

Project Summary: Chart review/survey Electrical injuries elicit a complex modality of treatment. Factors that may complicate electrical injuries include voltage, duration of contact, the portion of the body that is affected, and secondary injuries that may result from fire or fall. An individual may present to the emergency department with diffuse external burn patterns and have no internal injuries. They may also only show contact points from electrical injury although they have extensive internal damage. We hypothesize that if the flow of an electrical injury remains on one side of the body, there will be a decreased probability of secondary cardiac abnormalities. This was evaluated by looking at all the patients admitted to the burn ICU with contact points where the flow of electricity entered and then exited the body and documenting the prevalence of cardiac anomalies. **Analysis:** The patient pool included 352 patients that were seen by the burn unit for electrical injuries. Of these patients, 15 patients were documented to have contralateral electrical injuries and experienced cardiac complications. These complications included two myocardial infarctions, five cardiac arrests, three episodes of atrial fibrillation, five patients with benign abnormal EKG findings, and one incidental finding of Type 3 Brugada syndrome. Two patients with ipsilateral electrical injuries were documented to have cardiac complications, one with sinus tachycardia, and one incidental finding of abnormal EKG findings, likely chronic in nature. **Conclusion:** There are many potential complications that may accompany electrical injuries, but there has not been a common consensus on how injury and patient presentation may predict feared complications throughout their medical course. Our data collection showed that while cardiac complications are not nearly as common as they have been proposed, they are more likely to occur in patients who are exposed to contralateral flow of current when compared to patients where the current remains ipsilateral.

KIMBERLY BROWN, DR. REGINA BARONIA, DR. SAMUDANI DHANASEKARA, DR. SARAH WAKEFIELD

Impact of Parent Involvement in Therapy on Parent-Child Reporting of Depression and Suicidality

Background: Previous studies show that child-parent agreement when assessing child mental health varies due to several factors including mental disorder type, parent demographics, and child age. However, which depressive and suicidal symptoms have a greater impact on child-parent disagreement and whether parent involvement in their child's psychotherapy relates to these discrepancies has been understudied. This study aims to evaluate the relationship between symptom type and parent involvement with parent-child disagreement. **Hypothesis:** We expect there to be decreased parent-child agreement on internalized depression and suicidality symptoms, and that this agreement would increase with the child psychotherapy and parent involvement. **Results:** Data analysis revealed no agreement when reporting major depressive episodes ($\kappa = -0.106$, $p = 0.005$), even with psychotherapy and parent involvement. Fair agreement was found when reporting suicidality ($\kappa = 0.397$, $p = 0.006$) and severity ($\kappa = 0.399$, $p < 0.001$), which became poor with parental involvement. A moderate agreement was seen when reporting suicide attempts ($\kappa = 0.490$, $p < 0.001$), preparatory acts ($\kappa = 0.437$, $p < 0.001$) and recent suicidal ideation ($\kappa = 0.369$, $p = 0.005$), which remained significant with psychotherapy and parental involvement. Fair to moderate agreement was seen in some externalized depressive symptoms. **Conclusions:** Our findings show that parent involvement in therapy may have a negative correlation with parent-child agreement when assessing for suicidality and a positive one for certain externalizing depressive symptoms. Overall, our results illustrate the importance of using multiple information sources when assessing child depression and suicidality.

ANTHONY BRUCCOLIERE, BRIDGET BOEGER, ALAN PANG, ROALD CREDO, VIVIE TRAN, JOHN GRISWOLD*THE ADDED EFFECT, INJURIES, AND COMPLICATIONS OF BLAST INJURIES AMONG BURN PATIENTS ON RESUSCITATION AND OUTCOMES*

Burn cases are inherently complex cases that require multiangular approaches to treatment. Many burn cases involve explosions which further complicate treatment and as a result, likely increase morbidity and mortality. Common indicators of blast traumas help identify patients that are experiencing further complications as a direct result of an explosion. Some common indicators include lung contusions, massive hemothorax, myocardial ischemia, myocardial infarction, and cardiogenic shock. All these factors have a significant effect on health indicators like cardiac output, intubation, and ICU length of stay. A retrospective review of 68 patients found that patients that experienced an explosion injury had significantly higher mortality than burn patients in the control group.

SCOTT BURNS, ASHLEY SELMAN, UJALA SEHAR, PRIYANKA RAWAT, ARUBALA P REDDY, P HEMACHANDRA REDDY*Therapeutics of Alzheimer's Disease: Recent Developments*

With increasing aging, dementia is a growing public health concern globally. Patients with dementia have multiple psychological and behavioral changes, including depression, anxiety, inappropriate behavior, paranoia, agitation, and hallucinations. The major types of dementia are Alzheimer's disease (AD), vascular dementia (VCID), Lewy body dementia (LBD), frontotemporal dementia (FTD), and mixed dementia (MiAD). Among these, AD is the most common form of dementia in the elderly population. In the last three decades, tremendous progress has been made in understanding AD's biology and disease progression, particularly its molecular basis, biomarker development, and drug discovery. Multiple cellular changes have been implicated in the progression of AD, including amyloid beta, phosphorylated tau, synaptic damage, mitochondrial dysfunction, deregulated microRNAs, inflammatory changes, hormonal deregulation, and others; based on these changes, therapeutic strategies have been developed, which are currently being tested in animal models and human clinical trials. The purpose of our article is to highlight recent therapeutic strategies' developments, critically discuss current strategies' failures, and propose new strategies to combat this devastating mental illness.

MATTHEW BUXTON, NICHOLAS VOJTKOFSKY, AND J. JOSH LAWRENCE*The Interplay between All-trans Retinoic Acid, the Gut-Brain Axis, and the Pathogenesis of Alzheimer's Disease: A Potential Mechanism*

Background Alzheimer's disease (AD) affects 6.5 million people in the United States. This is expected to increase to 12.7 million people by 2050. Studies demonstrating bacterial lipopolysaccharide (LPS) is present in the hippocampus of AD patients has warranted a closer examination of the role of the gastrointestinal (GI) tract integrity and the gut-brain axis (GBA) in AD. There is evidence the microbiota composition of the GI tract influences the signal sent throughout the GBA. The appearance of LPS in the post-mortem hippocampus could signify a compromised mucosal barrier and tight junction coupling between GI endothelial cells, which subsequently alters the GBA. The breakdown of mucosal and epithelial barrier integrity along with immune system activation results in a pathologic state that creates gut dysbiosis.

MATTHEW BUXTON, NICHOLAS VOJTKOFSKY, AND J. JOSH LAWRENCE (CONTINUED)

We propose tight junction deficiencies found in pathologic states arise through environmental causes. Methods A literature search utilizing PubMed was used to identify knowledge gaps and molecular interrelationships between VA and AD. Results There is evidence of Vitamin A (VA) dysregulation in AD pathogenesis and progression. Our currently funded NIH R01 grant addresses how brain transcriptomic, metabolomic and lipidomic profiles are altered by VA deficiency. All-trans retinoic acid (ATRA) is essential for expression of tight junction proteins ZO-1, occludin, and claudin-1. VA deficiency decreases the expression of these proteins, compromising tight junctions. VA is also required for Treg cell differentiation. We propose VA deficiency compromises tight junctions, resulting in pathologic metabolites (LPS) penetrating the epithelium and bloodstream. Treg cell loss cannot counteract the proinflammatory response, beginning a cycle of inflammation. In addition, butyrate, a short-chain fatty acid (SCFA) produced from Firmicutes through fiber fermentation, produces retinoic acid in gut epithelial cells by inhibiting HDACs. Conclusion This mechanism attempts to explain the interrelationship between VA, butyrate, AD, and the GBA. Targeting the dysregulation outlined above could ameliorate AD.

LUIS F. CASTRO, YESENIA BARRIOS, RYAN MORGAN, BENEDICTO BARONIA

An Excellent Functional Recovery following Grade IV Subarachnoid Hemorrhage from a Cerebral Aneurysm Rebleed with Ultra-Early Surgical Intervention – A Case Report and Review of Literature

Aneurysms are focal abnormal dilations of the arterial wall and are estimated to occur in 5% of the population. They frequently occur at branching points along the arteries of the base of the brain and they are more commonly found in the carotid circulation. Once thought to be congenital, the etiology of aneurysms is now thought to be multifactorial and sporadic. Genetic factors coupled with hemodynamic stress can lead to endothelial injury and formation of wall weakness. Aneurysmal rupture is one of the possible aneurysm complications and can cause aneurysmal subarachnoid hemorrhages (aSAH) which account for approximately 5% of all strokes. It is estimated that the overall mortality rate of a ruptured aneurysm is somewhere between 32% to 67%. Treatment of aSAH consists of pharmacologic, surgical, or endovascular approaches. Ultra-early intervention of ruptured aSAH is defined as definitive treatment within the first 24 hours after ruptured aSAH. This case report is about a 49-year-old obese male with multiple comorbidities that suffered from a grade IV subarachnoid hemorrhage and underwent an ultra-early surgical intervention with excellent functional recovery.

LUIS F. CASTRO, DEVI NAIR, MARIBEL CASTRO, RYAN MORGAN, BENEDICTO BARONIA MD

Neuroscience Block: Enhancing Medical Students Learning using Peer-to-Peer Instruction and 3D-printed Fiber Tract Dissection

Neuroscience is an important area of study that every physician should understand by the time they reach independent practice. Yet, medical students are expected to master this area of study in six short weeks. Every year, senior medical students apply to both Neurology and Neurological surgery residency and are equipped with knowledge gained through studies and residency audition rotations. This year, a Peer-Led Neuroscience Primer Lecture was given by a senior medical student prior to the initiation of the Neuroscience block and a few interested were given the opportunity to further their neuroanatomical understanding by participating in fiber tract dissections. Methods: A senior medical student prepared a Peer-Led Neuroscience Primer lecture to second-year medical students and a survey was given to attendees to assess their interest in receiving future Peer-Led Neuroscience Review lectures.

LUIS F. CASTRO, DEVI NAIR, MARIBEL CASTRO, RYAN MORGAN, BENEDICTO BARONIA MD**(CONTINUED)**

A select number of students participated in a supplemental fiber-tract dissection and were given the opportunity to create a 3D-model of their work. Results: 14 second-year medical students attended the lecture. A total of 9 survey responses were collected. Using a 5-item Likert scale, 100% of students agreed with "The lecture was well-organized," 100% agreed with "The lecture provided a good overview of the subject," 77.7% believed the material presented was "easy to understand." Additionally, 88.9% of students indicated interest for future peer-led review sessions if they were available, including a Step 1 Neurology review session. Examples of the 3D-printed fiber tract dissection models will be presented. This provides evidence that students could benefit from Peer-Led review sessions to supplement faculty lectures.

IRINA KIM CAVDAR, ANINDYA SAMANTA, ALEX PARK, KAITLYN SANTINEAU, DANG NGUYEN, COBY RAY, MATTHEW PORTER & CATHERINE REPPA*Home Oriented Visual Acuity Trial*

Home Oriented Visual Acuity Trial Introduction: When triaging patient symptoms remotely in telemedicine, the ability to measure visual acuity (VA) is often requested in ophthalmology. Hypothesis: This ongoing prospective, real-world study tests if participants can accurately measure their VA at home with no training. Methods: Adult patients from the ophthalmology clinics at Texas Tech participated in this study. A 20 feet Snellen chart was used to measure VA (CVA). Patients were randomized into either a validated, printable VA chart or one of the two validated VA applications (Peek Acuity and OdySight). Patients tested their VA at home (HVA1) and answered a 5-point Likert survey. No training was given to patients. The difference (Δ VA) between the HVA and CVA with 95% confidence interval (CI) was calculated. Results: For the 96 eyes (50 patients), Δ VA was -0.11 (95% CI -0.06 to -0.16) logarithm of the Minimum Angle of Resolution (logMAR), 0.04 (95% CI -0.01 to 0.08) logMAR, and 0.07 (95% CI 0.07 to 0.22) logMAR for the ETDRS, OdySight and Peek Acuity arm, respectively. For all three arms, patients liked their device and the ability to measure VA at home. Conclusion: Patients can accurately measure VA using a smartphone app (OdySight) at home without any training.

ROALD CREDO MS, ELIZABETH BROWN, ZHEYAR SEYAN, ELWIN RUTAYOMBA, TAYLOR PROSSER, ALAN PANG MD, DEEPAK BHARADIA MBBS MPH, JOHN GRISWOLD MD*Investigation of Operating Time with Autologous Skin Cell Suspension on Burn Patients*

Background: Split-thickness skin grafts (STSG) is the current standard of care for second- and third- degree burns. A newer technique has emerged in recent years for skin transplantation; autologous skin cell suspension (ASCS) utilizes minimal donor skin by providing a 1:80 donor to wound site ratio compared to the traditional 1:2 mesh ratio of STSG. ASCS has demonstrated decreased hospital costs, length of stay (LOS), and number of subsequent operations. Given the effectiveness and reduced number of operations with ASCS application, we hypothesize that patients who receive STSG combined with ASCS will have lower total operating time compared to patients who undergo STSG alone.

Methods: This was a retrospective cohort study of burn patients at a major burn center from 2011-2022 undergoing STSG and/or ASCS. The primary outcome was operating time with secondary outcomes being number of operations and LOS. Analysis was done via a two-sample t-test.

ROALD CREDO MS, ELIZABETH BROWN, ZHEYAR SEYAN, ELWIN RUTAYOMBA, TAYLOR PROSSER, ALAN PANG MD, DEEPAK BHARADIA MBBS MPH, JOHN GRISWOLD MD (CONTINUED)

Results: Data of 451 patients was analyzed. Sixty-seven patients received STSG alongside ASCS while 384 patients received STSG only. Patients undergoing STSG with ASCS had decreased total operating time on average compared to patients only receiving STSG ($p=.01$). Those who underwent the combined approach demonstrated more operations and longer LOS on average ($p<.05$). The combined cohort had a higher average total body surface area compared to the solitary group (23% vs 11%, $p<.05$).

Conclusion: While STSG remains the gold standard for severe, deep second- and third-degree burns, ASCS elucidates the benefits of using newer technology in conjunction with traditional techniques. The combined approach cohort, on average, received more operations and had a longer LOS. Our study showed that patients who received both STSG and ACSC had a decrease in total operating time compared to STSG alone. This is crucial for improved patient outcomes as well as hospital resources.

JEAN DAI, ANNA FAROOQI, LINDSAY PENROSE, SAMUEL PRIEN

Determination if the DISC collection device significantly reduces human sperm DNA damage and the importance of a media component in the process

Background

DNA damage is thought to be a major cause of defective sperm function. Previous research from this lab suggests a change in the collection environment, termed the device for improved semen collection (DISC), can improve semen physiology. The device is a redesign of the standard specimen cup (SSC), containing a measured amount of culture media to help regulate cell processes, specifically designed for semen collection. A recent modification of the DISC incorporated ROS scavengers (DISC+) in the cup itself in an effort to prevent fragmentation, leading some to question the need for the original media component. The present study was designed to examine the effects of adding the measured amount of media by comparing the SSC, DISC, and DISC+ with and without the media components over a 48 hr period.

Methods

Paid donors were recruited to provide semen samples for this study. Each donor provided a single semen sample. Samples that met the study criteria were randomly assigned to one of the six treatment groups with the goal of collecting five samples in each media device combination. Once collected, semen was maintained at an ambient temperature for 48 hours to lower ROS formation. At assigned sampling intervals, physiological and biochemical samples were obtained, including DNA fragmentation.

Results:

Sample collection remains ongoing. To date, a total of 38 samples have been obtained, with 21 meeting the criteria. DNA fragmentation slides were obtained and stained at all time points and are awaiting scoring by a trained panel of analyzers.

Discussion:

Based on a previous study where ROSs were purposely generated within the semen samples, it is anticipated that the DISC devices will provide better DNA protection compared to the SSC. The data should also clarify the necessity of media in the collection process.

DAVIN DEVARA AND SUBODH KUMAR*Role of microRNA-502-3p in Alzheimer's disease*

Alzheimer's disease (AD) is the most common cause of dementia in elderly individuals. Synapse is the initial target that is hit during AD progression. Most common causes of synapse dysfunction are amyloid beta, phosphorylated tau and microglia activation. MicroRNAs (miRNAs) are non-coding RNAs that play a major role in gene regulation in several diseases. MiR-502-3p has been previously characterized in a variety of human diseases, including human cancers. Our studies recently explored the new role of miR-502-3p in regulating synapse function in AD. MiR-502-3p is localized and over expressed in AD synapses. Overexpression of miR-502-3p correlated with AD severity in terms of Braak stages. MiR-502-3p strongly modulates Glutaminergic and GABAergic synapse function in AD. The current study emphasis is to discuss the in-depth roles of miR-502-3p in AD and the future possibilities concerning miR-502-3p as therapeutics for AD treatment.

KEEGAN DUNN, DR. FRANKLYN BABB*Analyzing and improving the utilization of statin drugs in family medicine patients with T2DM*

Background: Cardiovascular disease is the leading cause of death in both males and females in the United States despite it also being one of the most preventable causes of death. The ACC recommends that any patients with type 2 diabetes mellitus (T2DM) between the ages of 40-75 be on a statin. Methods: To determine the percentage of patients being treated with a statin, we used a retrospective chart search of the T2DM patients seen in the family medicine clinic in the last year. Using data from the charts, we input data into the ACC/AHA risk calculator. A survey of family medicine residents and faculty was used to assess what the perceived barriers to a patient taking a statin is. Results: Chart review showed that 75.2% of the patients recommended to be on a statin were prescribed a statin. The physician survey found that the greatest barriers were the patient not wanting to be on another medication, being worried about side effects or having already experienced side effects on a statin. Conclusions: In order to improve statin use, a flyer addressing the benefits of being on a statin will be distributed to patients in the clinic. Reevaluation of statin use will be done in 6 months to determine if the intervention was effective.

SANA ERABTI, MSII, ALEXANDER ZAPATA, MSIV, EASTON BREWER, MSIII, ZIYANG LI MSI, KELLY BENNETT MD, FIONA PRABHU MD*Chronic OTC Pain Management in Relation to Substance Use at The Free Clinic*

Background: Among Free Clinic patients, who are generally of low socioeconomic status, over-the-counter (OTC) medications are effective, affordable analgesia options. However, patients with chronic pain may turn to other substances. Moderate alcohol use has been shown to improve pain relief, and both alcohol use and chronic pain share neural substrates. This study aims to find correlations between those who rely on OTC analgesics and alcohol use, as well as other substances such as tobacco or recreational drugs, and if these relationships are clinically relevant. Methods: A randomized retrospective chart review was performed using data collected from patient encounters that took place at the Lubbock Free Clinic from January 1, 2021 – November 30, 2022. Information collected included demographic data, OTC analgesic use, scores from the Alcohol Use Disorders Identification Test (AUDIT) and the DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure (CCSM) which patients completed during their visit.

SANA ERABTI, MSII, ALEXANDER ZAPATA, MSIV, EASTON BREWER, MSIII, ZIYANG LI MSI, KELLY BENNETT MD, FIONA PRABHU MD (CONTINUED)

Results: Data from 456 patient encounters was collected. OTC analgesic use was recorded at a rate of 34%. Among these patients, 28% recorded recreational drug use compared to 7% in those who did not have recorded OTC analgesic use. In contrast, for those who filled out the CCSM, non-OTC users scored over 2 times higher than OTC analgesic users in the substance abuse section (section XIII). Additionally, the average recorded AUDIT score was 0.88 for OTC analgesic users and 1.96 for non-users. Current tobacco use was 36% vs 40% and previous tobacco use 27% vs 21%, respectively. Conclusion: While alcohol and tobacco use is similar among those who do and do not regularly use OTC analgesics, and recreational drug use seems higher among medicated patients, there is conflicting data in the CCSM. The correlations made merit further exploration on chronic OTC analgesic use and its associations with alcohol, tobacco, and drug use.

ANNA FAROOQI, JEAN DAI, SARAH RASBERRY, MYAH BAKER, SAMUEL PRIEN, LINDSAY PENROSE

Evaluating DNA fragmentation in sperm collected in a new device to reduce reactive oxygen species

Background: The efficacy of fertility in vivo and in vitro is dependent on a multitude of factors, including the overall health of the sperm and egg cells. In particular, sperm cells are vulnerable to environmental damage caused by pH shifts, osmotic pressure shifts, and reactive oxygen species (ROSs) due to sperm having limited repair mechanisms. Damage, especially DNA damage, has been linked to both assisted reproductive technique (ART) failure and increased rates of miscarriage. Therefore, it is crucial to maintain sperm in as healthy and intact a condition as possible when performing ART. This study is the first to evaluate a new technology to reduce DNA damage in sperm caused by ROSs at the time of collection. Methods: The objective of this study was to evaluate the effectiveness of different collection techniques in mitigating DNA damage in semen samples. Paid donors provided 4 samples; a test to verify donor met inclusion in the study, then one sample each in random order, in the Device for Improved Semen Collection (DISC) and the DISC modified to include a technology to reduce reactive oxygen species (DISC+). Semen samples were collected and maintained at 37°C to induce ROS formation. Fragmentation and degradation of sperm samples were monitored at set time points for a 24-hour period. Results: Data collection and analysis is currently ongoing, but preliminary results show increased sperm fragmentation as time intervals increase in most samples, but under certain treatments, samples remained intact with minimal fragmentation. Discussion: As expected, early indications are that DNA damage increases with time in culture. However, preliminary data analysis suggests the steps taken to reduce ROSs may reduce fragmentation over time.

JOHN FREE(MS2), BLAKE HARP(MS2), DR. BETSY JONES*Medical Student Attitudes Related to Therapy Assistance Online*

Introduction: Texas Tech University Health Sciences Center (TTUHSC) provides medical students free access to Therapy Assistance Online (TAO), a web-based resource aimed to help students overcome anxiety, depression, and other mental health concerns. However, medical students' usage of TAO has yet to be explored. This quantitative descriptive study aimed to elicit the attitudes of medical students at TTUHSC on using TAO for mental health support. **Methodology:** Data were collected using an anonymous 11-item questionnaire that was available to MS1 and MS2 students between January 2nd-14th, 2023. Descriptive statistics were generated through Qualtrics. **Results:** The survey received 233 responses; 64.7% of the MS1/MS2 cohort elected to respond. Of those, 61 (26.2%) students reported seeking mental health support during medical school. 29 (12.5%) reported using online resources for mental health support other than or in addition to TAO, while 23 (9.9%) reported previous use of TAO. Of those students who used TAO, 12 (52.2%) found TAO to be helpful or held a neutral opinion. **Discussion:** We found that only 10% of pre-clinical students had used TAO, and almost half of these participants did not find it helpful. Over one-third of participants agreed there is a stigma attached to students seeking mental health assistance; nevertheless, two-thirds reported they would prefer face-to-face sessions over an online platform for mental health support. Only one-quarter of respondents agreed that online self-help programs like TAO effectively respond to the mental health needs of students. **Conclusion:** Medical schools must ensure students have mental healthcare resources they find useful. Despite increasing reliance on online mental health resources, programs allowing face-to-face interactions may be valued more among users. Nevertheless, medical schools must promote and ensure easy access to therapy options and communicate clearly that students will remain anonymous with any care they seek out.

TAYLOR FUQUAY, BS; DUKE APPIAH, PHD MPH*The Association of Maternal Infection During Pregnancy and Risk of Cyanotic Congenital Heart Disease in Offspring in the United States, 2011-2020.*

Cyanotic congenital heart disease (CCHD) accounts for more than a quarter of all congenital heart defects and have a one-year survival rate of 75.2%. The etiology of CCHD is not well understood, but limited evidence suggests maternal antenatal infections may play a role in its occurrence. This retrospective cohort study used information from the National Center for Health Statistics natality database with the goal of evaluating the relationship between maternal antenatal infections and risk of CCHD. Information was obtained from medical records for individuals aged 15 to 49 years with infections while pregnant (gonorrhea, syphilis, chlamydia, hepatitis B, and hepatitis C) who had singleton live births from 2011 to 2020. During the study period, the incidence of CCHD decreased by 18% from 0.76 to 0.62 per 1000 persons, while total maternal infections increased by 20% from 23.51 to 28.21 per 1000 persons. Adjustments for sociodemographic and maternal health factors, including pre-pregnancy body mass index, diabetes, hypertension, smoking during pregnancy, prenatal care initiation time, and pregnancy complications were made. Having any maternal infection was associated with elevated odds of CCHD (OR: 1.25, 95% CI: 1.15-1.37). Higher positive associations were found for the sexually transmitted infection (STI) chlamydia (OR=1.26, 95% CI: 1.14-1.40) and hepatitis C viral infection (OR=1.30, 95% CI: 1.07-1.57). In this population-based study, maternal antenatal infection was associated with a modest risk of offspring CCHD, with the association being higher for chlamydia and hepatitis C infections.

TAYLOR FUQUAY, BS; DUKE APPIAH, PHD MPH (CONTINUED)

The steady increase in maternal infections, with chlamydia remaining a leading source, is cause for concern for expecting mothers and their newborns. More studies are needed to determine the causal factors and types of CCHD caused by these infections. However, reduction in STIs and timely treatment of them during pregnancy may provide an avenue to prevent the occurrence of CCHD.

JEREMY GARZA, JANE-COLMER HAMOOD, ABDUL HAMOOD, BRINKLEY COVER, LEANNE THOMAS

Human serum alters the production of several Pseudomonas aeruginosa outer membrane proteins.

Pseudomonas aeruginosa (PA) is a gram-negative pathogen that causes bacteremia and septicemia in severely burned patients; a situation that often leads to multiorgan failure and death. Despite our extensive knowledge of PA wound infection, there are several gaps in our understanding of the PA response to the blood environment. We recently showed that upon its growth in human blood or human serum (HS), PA strain PAO1 alters the expression of more than 1,000 genes. Many of these alterations may occur through the PA-outer membrane proteins (PA-OMPs). OMPs contribute significantly to the pathogenesis of gram-negative pathogens. We hypothesized that HS alters the production of PA-OMPs. To test this, we grew PAO1, which causes sepsis and death in the murine model of thermal injury, in Luria-Bertani broth (LBB) or LBB containing 10% HS, extracted the OMPs, and analyzed their profile using SDS-polyacrylamide gel electrophoresis. Analysis of the silver-stained gels revealed that 10% HS repressed the production of at least six OMPs with molecular weights (MW) of 68.2, 34.5, 23.8, 17.9, 13.7, and 11.9 kDa but induced the production of at least five others (MW 66.1, 41, 28.5, 22.8, and 22 kDa). Similar to PA-PAO1, PA-PA14 causes sepsis and death. However, its genome is larger than that of PAO1 and it carries several additional virulence genes. Therefore, we also compared the OMP profile of PAO1 and PA14. Although the two strains share multiple common proteins, each strain has its own unique ones. As with PAO1, HS manipulated the production of several PA14 OMPs. These results suggest that 1) in response to different components of HS, PA varies the production of its OMPs, 2) virulent PA strains differ in their OMPs, and 3) HS-induced OMPs may be targeted in future investigations designed to produce potential serum therapies for PA infected/severely burned patients.

BETH GREEN, DEVIN BIRD, JEREMY BRANDON, ALEXANDER DRUSCH, DONALD GARNSEY, SHALINI GHURYE, JAYTON MAKUTA, PHEEM SOPONTAMMARAK, JESSICA SUTTERFIELD, JULIANA TOVAR, JOSHUA VILLA, RON COOK DO, JENNIFER WARD MD, KEELEY HOBART MD, BETSY JONES EDD

Family Medicine Accelerated Track Students Develop an OSCE Clinical Reasoning and Communication Case for Pre-Clinical Student Peers

Purpose: Our institution has a 3-year MD curriculum leading to FM residency (FMAT), which includes a systems-based 8-week course between the MS1 and MS2 years that focuses on the top 24 diagnoses in primary care. The course also uses a unique method of training for and assessing clinical competence in pre-clinical students—the Student-Generated Simulated Clinical Encounter, which provides opportunities for real-time teaching for students who generate the patient case, for those who serve as student doctors, and for those who observe. **Methods:** For this initiative, FMAT students studied strategies for integrating clinical reasoning skills in primary care and integrating opportunities to practice those skills in their simulated clinical encounters.

BETH GREEN, DEVIN BIRD, JEREMY BRANDON, ALEXANDER DRUSCH, DONALD GARNSEY, SHALINI GHURYE, JAYTON MAKUTA, PHEEM SOPONTAMMARAK, JESSICA SUTTERFIELD, JULIANA TOVAR, JOSHUA VILLA, RON COOK DO, JENNIFER WARD MD, KEELEY HOBART MD, BETSY JONES EDD (CONTINUED)

Learning objectives for this activity include developing a patient case appropriate for an MS2 simulation, developing evaluation tools for the experience, piloting the case within the FMATI course, implementing the case in a 1-day session for an entire MS2 class, and submitting the case for peer-review. Students also participated in developing pre- and post-simulation evaluation tools and facilitated the large-scale OSCE activity performed by 20 small groups. Results: The student-developed simulation was implemented with all MS2 students in the fall of 2022, with medical students randomly assigned as simulated patients/family members, student doctors, and to a differential diagnosis team. Evaluation results showed a strong evaluation for the experience overall (overall rating of 4.48/5.0). Pre-/post- measures of confidence showed interesting differences depending on participants role in the simulation, with student doctors reporting the highest gains. Conclusions: The simulation activity challenged FMAT students to develop an OSCE case that can be used to give classmates practice in H&P skills, clinical reasoning, oral presentation, and documentation skills. The OSCE case further provided peers with opportunities to practice communication skills and receive feedback from faculty and peers.

YEZAN HADIDI MS, KELLY MITCHELL MD, DAVID MCCARTNEY MD

Retrospective Study Evaluating the Etiologies of Rhegmatogenous Retinal Detachment in Non-Elderly Patients

Rhegmatogenous retinal detachment (RRD) is a common ophthalmologic issue pertaining to the separation of the neurosensory retina from its underlying membrane due to a break or opening that allows vitreous fluid to accumulate in the potential space between the layers. This disorder is considered a surgical emergency due its ability to lead to visionary problems and potential blindness. It is also the most common of the retinal detachment types affecting approximately 1 in 10,000 people per year. Although aging is a key factor in its development, there are several other risk factors that can lead to this severe form of vision loss. The limited literature available necessitates research into how RRD develops in young males and females.

BLAKE HARP, CORNELIA DE RIESE, WERNER TW DE RIESE

Effect of Gender on Patient Satisfaction Scores: A Systemic Review

Introduction: Patient satisfaction surveys can be a large factor in determining physician reimbursement through Medicare's Merit Based Incentive Payment System (MIPS). Many papers reported a scoring bias associated with non-modifiable patient demographics, such as gender. We performed a systemic review across multiple specialties, including Urology, to determine if patient satisfaction scores differ by gender. Methods: A focused literature search according to PRISMA guidelines was performed from 2007 to the present using PubMed. Odds ratios, fixed-effects modeling and presence of publication bias were calculated for an overall summary. Results: Out of 360 reviewed papers, 26 articles were selected for this systemic review resulting in a total of 242,124 patients. Two studies were in Urology, and the other selected studies were in other surgical specialties such as Otolaryngology, General Surgery, and Orthopedic Surgery. Our analysis revealed an odds ratio of 0.97 (95% confidence interval [CI], 0.95 to 0.99; I² = 86.3%; P=0.001).

BLAKE HARP, CORNELIA DE RIESE, WERNER TW DE RIESE (CONTINUED)

A potential publication bias trend was observed in the funnel plot, but the Egger's test revealed no statistically significant small-study effect (p value of 0.078). Conclusions: Although women had slightly lower odds of submitting higher patient satisfaction scores than men, the overall summary estimate of the odds ratio was very close to 1, indicating that gender and patient satisfaction have an unlikely association. These findings should alleviate any concern that gender might affect patient satisfaction surveys, and therefore, physician reimbursement.

TAHA HASSAN, RYAN DEAN MORGAN, KIRIE PSAROMATIS, BEN BARONIA

A Genetic Component to Chiari I Malformation: Involvement of all five family members in a case series of Chiari I Malformation

Under certain classifications, a Chiari Type I (CMI) malformation can be characterized as a herniation of the cerebellar tonsils greater than 3 mm. Patients with CMI often have a smaller posterior fossa volume, which results in a smaller amount of space for the cerebellum, leading to the herniation of the cerebellar tonsils through the foramen magnum. Although inheritable factors such as posterior fossa volume can be traced to specific genes, there has not been a gene that can be attributed to directly causing CMI. However, several cases of CMI have exhibited a familial inheritance pattern. There are mixed findings regarding the exact nature of its inheritance, with some papers arguing in favor of an autosomal dominant pattern. In this case series, we detail a mother, father, and all three of their children diagnosed with CMI. Previous literature has not included both a mother and father with CMI.

CLARISSA HOFFMAN, MEGAN MAI, MARY DYSON, ANDRE MILLER, FARZANEH BANKI

Fundopexy: an Alternative to Toupet Fundoplication, Better Symptomatic Outcomes, and Lower Reoperation Rate

Introduction: Laparoscopic hiatal hernia repair with Toupet fundoplication results in good outcomes. Prevention of recurrent hiatal hernia remains a challenge. Toupet fundoplication was replaced by fundopexy in selected patients to minimize recurrent hiatal hernia. Methods: A retrospective review of hiatal hernia repairs with Toupet fundoplication vs. fundopexy was conducted. Outcomes were assessed by obtaining a symptomatic questionnaire by phone and the reoperation rate for symptomatic recurrent hiatal. Toupet was replaced with fundopexy in patients ≥ 60 years, hiatal hernia type III/IV, and esophageal dysmotility or chief complaint of dysphagia. Fundopexy was performed by placing interrupted stitches below the gastroesophageal junction between the entire fundus of the stomach and the left upper abdominal wall to maintain maximum intra-abdominal esophageal length and to prevent a recurrence. Values are median (IQR). Results: Out of 256 primary repairs, Toupet was performed in 133/256 (52%) and fundopexy in 123/256 (48%). There was no difference in sex or BMI. At a median chart follow-up of 38.4 months (29.0-44.6) in the Toupet group vs. 19.7 months (14.2-23.5) in fundopexy, the reoperation rate for symptomatic recurrent hiatal hernia was 15/133 (11.3%) vs. 0/123 (0%) ($p < 0.001$). The median time to reoperation was 15.9 months (11.8-23.6). A questionnaire at 26.6 months (16.9-32.3) in Toupet vs. 16.1 (11.3-21.2) in fundopexy group, $p < 0.001$, was obtained in 102/133 (76.7%) vs. 102/123 (82.9%) patients, $p = 0.216$, and showed that 69/102 (67.6%) vs. 87/102 (85.3%) were free of preoperative symptoms, $p = 0.005$, and 76/102 (74.5%) vs. 95/102 (93.1%) were off proton pump inhibitors, $p = 0.003$. Conclusion: Fundopexy resulted in a better symptomatic outcome and less need for reoperation for recurrent hiatal hernia in the short term. Longer follow-up and larger sample sizes with objective diagnostic studies are needed to confirm the long-term advantages of fundopexy.

NUTTHAKORN HORUGSA, M.D., JIYEON KIM, JUDY LALMUANPUII, M.D.*Spontaneous pneumomediastinum in a patient with marijuana use*

Spontaneous pneumomediastinum (SPM) is described as the presence of air in the mediastinum that occurs without a clear, causative etiology such as trauma or tracheoesophageal injury. One rarely reported association of SPM includes marijuana use, in which patients often present with nausea and vomiting. Cyclic vomiting from marijuana use, the various smoking techniques, or both can trigger alveolar rupture and cause subsequent air leakage from the bronchovascular sheaths into the mediastinum, a phenomenon known as the Macklin effect. A 22-year-old male with a history of recent marijuana use presented to the emergency department with chest pain, body aches, muscle spasms, and nausea and vomiting. The chest radiograph showed pneumomediastinum with subcutaneous emphysema of the neck and left chest wall without visible pneumothorax. Laboratory findings were significant for leukocytosis, hyperkalemia, and elevated creatinine, BUN, and creatinine kinase. The diagnoses of rhabdomyolysis with acute kidney injury and pneumomediastinum were made. Considering the timeline of this patient's symptoms, we believe that his excessive vomiting was a result of acute marijuana toxicity, which ultimately triggered the pneumomediastinum. However, the pneumomediastinum was not found to be a cause of concern as it was consistent with his episodes of retching and caused no significant effects on cardiac function. The patient was started on aggressive intravenous fluid hydration for his acute kidney injury and ondansetron and morphine for nausea and pain, respectively. The patient's symptoms improved, and he was discharged on the third day of hospitalization without a follow-up appointment. SPM is usually a benign and self-limiting condition.

NICHOLAS HOUSEHOLDER, KIRIE PSAROMATIS, AKSHAY RAGHURAM, MADISON PARKER*Influence of Mental Health and Emotional Wellbeing on Joint Pain and Functionality During the Initial Postoperative Period in Patients After Total Knee Arthroplasties at a Large Community Hospital*

Introduction: Total knee arthroplasty (TKA) is one of the most common knee operations and is considered the definitive treatment for severe primary osteoarthritis. The recovery timeline for a given patient post TKA can vary greatly between cases, but is generally considered to be 6-12 weeks. Factors affecting recovery efficacy following TKA are divided into preoperative factors (comorbidities, immune factors, hematologic factors etc.) and postoperative factors (immobilization, splinting, mobility, physical therapy, regimen adherence, etc.). Mental health is an interesting factor to investigate as it relates to recovery post TKA, as current research suggests that mental health can potentially augment both preoperative and postoperative factors. Our study investigates the influence of mental health factors on the 6-week recovery status of patients post TKA. **Methods:** In this longitudinal study, patients undergoing TKA at UMC were consented & interviewed within the immediate 1-4 days preceding their operation. At this meeting, an SF-36 questionnaire was administered in order to obtain preoperative mental health measurements. A knee function score (Knee Society Score) was obtained at this time through physical examination performed by a medical student. This provides a baseline knee functioning score. Patients were then seen within 4 days of their 6 week postoperative date, and another knee examination was performed and a Knee Society Score (KSS) was generated. **Results:** Our data did not reveal statistically significant effects with regard to preoperative mental health scores on the difference between pre-op and post-op Knee Society Scores. The data did, however, show a weak positive correlation towards greater knee score improvement in patients with higher scores in pre-op: energy, wellbeing, and health perception.

NICHOLAS HOUSEHOLDER, KIRIE PSAROMATIS, AKSHAY RAGHURAM, MADISON PARKER**(CONTINUED)**

Discussion: It is extremely difficult to objectively quantify and measure the effects of mental health on one's recovery post joint replacement. In this study, we utilized the SF-36 questionnaire to objectively score a patient's energy levels, wellbeing, and health perception, and then cross referenced this with the change in KSS score from pre-op to 6 weeks post op. While limited by a somewhat small sample size (n=65), we did not observe a statistically significant effect for any of these mental health scores on KSS improvement. There was, however, evidence of a weak positive correlation.

HANNAH JACKSON, RADHA PATEL, KEEGAN DUNN, ASHLEY SELMAN*Crafting a Physician: Evaluating the Impact of Creative Arts on Medical Student Wellbeing*

Medical student wellness has been a topic recently brought to the front lines by the transition of the USMLE Step 1 exam from a three-digit numeric score to a pass/fail score. According to the president of the Federation of State Medical Boards, a co-sponsor of USMLE, the transition was made in part to address concerns about how Step-1 scores were impacting student wellbeing. There are many activities that can improve perceived student wellness, but we are specifically interested in the impact of the creative arts. In the fall of 2022, we restarted the Art in Medicine (AiM) elective that had been discontinued years prior. We hypothesize that giving students exposure to the arts through lectures from artists in the medical field and interactive art studio sessions will decrease their stress and enhance their overall medical school experience. To explore this hypothesis, the elective hosted six lecture sessions ranging on topics from art therapy for aphasia patients to skills of observation for examining paintings and patients. Additionally, six studio art sessions were offered to students using mediums such as crochet, photography, painting, mosaics, and more. Following the conclusion of the elective in early spring of 2023, a survey including several Likert scale-based questions will be given to evaluate student perception of how the AiM elective has impacted their stress levels and views on the value of creative arts in the medical realm. Analysis of survey results will allow us to determine the effectiveness of the elective in enhancing medical education simultaneously with student wellness. Conclusions drawn from the data can be used by future AiM leadership to improve the elective and enhance student wellbeing. The results may also be useful for other organizations and schools interested in implementing the arts in their curriculum.

WOORYOUNG JANG, CYNTHIA SCHWARTZ, AKSHAY RAGHURAM, JAD ZEITOUNI, YUSUF DUNDAR*Gold Laser Tonsillectomy: Effect of Energy on Postoperative Complications*

Background: The objective of this study was to determine if the energy delivered by the Gold laser impacted post-operative complication rates after adenoidectomy, tonsillectomy, and adenotonsillectomy. Methods: A retrospective chart review identified 420 patients within the last five years who met the criteria. Indications for the surgeries included recurrent tonsillitis, obstructive sleep apnea, sleep disordered breathing, adenoiditis, peritonsillar abscess, and others. The relationship between the energy delivered (kJ) and various complications such as bleeding, pain, dehydration, readmission, emergency center visits, and clinic calls were evaluated. Results: There was a significant correlation between higher kJ delivered and incidence of major bleeding requiring cauterization in the operating room ($p=0.0311$). In addition, emergency center visits ($p=0.0131$) and readmission ($p=0.0210$) showed significant correlation with the amount of energy (kJ) delivered. Furthermore, higher energy correlated to higher maximum post operative pain scores ($p=0.0302$).

WOORYOUNG JANG, CYNTHIA SCHWARTZ, AKSHAY RAGHURAM, JAD ZEITOUNI, YUSUF DUNDAR

Attendings displayed a different pattern of energy delivery compared to residents ($p < 0.0001$), which also differed by PGY ($p < 0.0001$). Conclusion: There are significant correlations between higher energy delivered in kJ using the Gold laser and less desirable post-operative results. In addition, residents tend to utilize higher levels of energy, but this trend tapers off in the 4th and 5th years. Clinicians utilizing the Gold laser during adenotonsillectomy should be mindful about the amount of kJ they use and aim to use less energy if possible.

WOORYOUNG JANG, ZHEYAR SEYAN, RICARDO ISAAH GARCIA, CYNTHIA SCHWARTZ, WINSLO IDICULA*Evaluation of Dexmedetomidine on PO intake Post-operatively*

Introduction: Dexmedetomidine is an alpha-2 agonist with sympatholytic, sedative, and anesthetic effects given selectively to patients experiencing anxiety or agitation prior to surgery. The object of this study was to determine if administration of dexmedetomidine in patients undergoing tonsillectomy and adenotonsillectomy impacted postoperative fluid intake. Methods: A retrospective chart review performed at University Medical Center identified 534 patients within the last five years who met the criteria. Indications for the surgeries included recurrent tonsillitis, obstructive sleep apnea, sleep disordered breathing, and speech delay. Patients with concurrent peritonsillar abscess drainage, microlaryngoscopy, bronchoscopy, supraglottoplasty, and other procedures that may impact fluid intake were excluded. The relationship between dexmedetomidine and fluid intake were evaluated using unpaired t-test via Graphpad Prism. Results: Administration of dexmedetomidine did not significantly impact the amount of fluid intake ($p = 0.22$), fluid intake per kilogram per hour ($p = 0.50$), nor average postoperative pain levels ($p = 0.51$) in patients who underwent tonsillectomy or adenotonsillectomy. Conclusion: Dexmedetomidine does not influence postoperative fluid intake levels in patients and should continue to be utilized in patients experiencing anxiety or agitation prior to surgery.

LEWIS KELLY M.S.; MOHAMMAD M. ANSARI, M.D.*Clinical and Procedural Outcomes in TAVR for Bicuspid Aortic Valve Stenosis – A Case Series*

Background: Transcatheter aortic valve replacement (TAVR) treated bicuspid aortic valve (BAV) stenosis is notoriously difficult due to anatomical challenges. These challenges formulate risks of problems such as frame distortion and paravalvular regurgitation. BAV was regarded as a contraindication for TAVR procedures as well as exclusion criteria for previous randomized TAVR trials. Methods: This case series evaluates the procedural outcomes of ten patients with severe BAV stenosis who underwent TAVR at the University Medical Center at Texas Tech University Health Sciences Center. Primary outcomes included ≥ 2 aortic insufficiency (AI) and 30 days mortality. Secondary outcomes included pacemaker implantation, neurological events, major bleeding and mean aortic gradient post-TAVR. Results: Our case series patients were considered high risk due to their multiple comorbidities. Each TAVR procedure utilized the Sapien 3 Edwards Pericardial Valve. One patient's immediate post-implantation TEE images revealed mild-moderate perivalvular leak. This patient remained in the ICU for 5 days. Another patient's one year follow-up TTE showed a TAVR prosthesis with moderate valvular regurgitation. This was the only case with post-procedural grade 2 AI identified. There was no 30-day mortality. No pacemaker implantation, neurologic events, or major vascular complications occurred. All mean gradient pressures post-TAVR were under 20 mmHg, falling below the criteria for mild aortic stenosis.

LEWIS KELLY M.S.; MOHAMMAD M. ANSARI, M.D. (CONTINUED)

Conclusion: The results from this case series suggests that TAVR can be utilized in patients with BAV stenosis with good results. When comparing TAVR to surgical aortic valve replacement in bicuspid valves, our outcomes have been better. Having the capability to successfully provide TAVR to individuals with bicuspid aortic valve stenosis provides a safe and feasible treatment option as compared to surgery.

NEDHA KINNARE, RADHA PATEL, DR. CHERYL ERWIN

PRESSURES OF MEDICINE CAN BE ALLEVIATED BY RELATIONSHIP BUILDING, MINDFULNESS, ENCOURAGING HEALING THROUGH BUILDING PERSPECTIVES

Physical, emotional, and mental stressors in healthcare settings increase risks of burnout for patients and physicians a lot. Humanities research has focused on methods to mitigate risks of burnout, increase self-awareness, and develop resilience. However, there have not been many methods to compare these strategies for physicians and patients. Our research focused on reviewing a broad cross-section of humanities articles, films, literature, music, and art to identify the areas of flourishing that have been identified by positive psychology as important to the psychology of flourishing. We used a coding system to categorize primary and secondary sources according to a 5X5 coding chart with the five different themes and five modalities of the humanities. The themes were modeled from the PERMA theory and included Positive emotions, Engagement, Relationships, Meaning, and Accomplishments. The modalities included personal insight, perspectives, skills, reasoning, and balance. After organizing themes, the following topics in the humanities were researched: poetry, the works of Victor Frankl, neuroscience of empathy, visual arts, positive distractions, balance and self-care, yoga, purposive reactions, meditation, faith, hope, emotional intelligence, relationships and social support, and contemplative studies. While all the areas of the humanities that we studied can increase well-being, we further delved into three topics of the humanities each for patients and physicians to understand how they can serve as forms of stress management. For physicians the three most effective methods are relationship building, mindfulness, and encouraging healing through changing perspectives. For patients the three main perspectives are regulating emotions, change your thinking, and overcome learned helplessness. Overall, the humanities allow us to align to our needs and develop an understanding of our experiences and the nature of living.

JULIA LANGE, HARRISON WOODS, NIKHITA PRABHAKAR, LAUREN GLOVER

Investigating College Student Knowledge about Sexually Transmitted Infections and Barriers to STI testing

Given the notoriety surrounding STI prevalence in college student populations, a multiple choice question survey was administered to young adults age 18-30 enrolled in the TTU Honors College to evaluate their understanding of STI transmission and prevention, awareness of on-campus testing services, and their comfort level accessing said services. A second objective was to assess the bearing of several factors on students' decision to pursue STI testing. Survey participants were asked to assign a value of 1-5 to each factor, with higher scores corresponding to a higher likelihood of that factor discouraging testing. 44 responses were obtained. Most participants correctly answered both general STI knowledge questions. 37% of respondents who answered both questions missed 1 question; no participants missed both. STI transmission was the most missed topic; 35% of responders chose "vaginal and oral sex" rather than "any kind of sex where bodily fluids are exchanged". 32% of participants were not aware that STI testing is available on campus.

JULIA LANGE, HARRISON WOODS, NIKHITA PRABHAKAR, LAUREN GLOVER (CONTINUED)

Survey results indicated that respondents were fairly comfortable with making appointments and discussing STIs with their partners. The average participant ratings for “confidentiality of results”, “cost”, and “uncertain about symptoms” were 2.41, 2.59, and 2.59 respectively. “Confidentiality of testing location” was the most notable deterrent to testing, with an average score of 2.66. In conclusion, the data collected suggests that factors affecting STI prevention in the student population could include confusion surrounding STI transmission, underutilization of local testing resources, and perceived lack of clinic confidentiality. It should be taken into consideration that the low number of participants and the exclusive administration of the survey to the Honors College limit the generalizability of this study. Future studies should aim to explore these topics in a larger student population in order to make adjustments to STI education on campuses.

MIKKA LANKFORD, MADISON PARKER, RADHA PATEL, HANNAH JACKSON, KIMBERLY BROWN, JIYEON KIM*Mental Health and Coping in Medical School*

Sleep, mental health, and obesity are closely intertwined. A systematic review published by JAMA reported that adults with depression are 58% more likely to develop obesity. Furthermore, a recent study found a strong bidirectional association between obesity and depression in young and middle-aged students. However, little research has been conducted to examine this relationship in medical students. Considering that medical students are often placed in high-stress environments that could negatively impact their mental health, the focus of our study was to analyze depression, sleep, self-harm thoughts, and coping mechanisms among male and female medical students in their first year of medical school. This project used the TTUHSC School of Medicine P3-1 Honors Project Omnibus Survey to survey first year medical students. Survey questions included Likert-type questions involving mental health and personal priorities. A second questionnaire within the same survey asked participants to choose their top 10, 5, then 3 most used positive coping strategies out of 20 choices. We also asked them to choose their top 5 then 3 most used negative stress management strategies out of 10 choices. We received a total of 170 responses for our questions. We found that students who received around 4-6 hours were more likely to have thoughts of self-harm and depression than those who slept 7-9 hours daily. In addition, students chose sleeping 8 hours a night as the third most common positive coping mechanism, followed by exercise and family time respectively. Self isolation and over/undereating were the two of the top three chosen negative strategies, further strengthening the association between depression and obesity. This study is the start of an area of research that needs to be investigated in order to best serve current and future medical students.

MATTHEW LI, SELVIN VILLEDA, M.D.; KIRSTEN ROBINSON M.D.; TAMMY CAMP, M.D.*Differential Diagnosis of Failure to Identify a Gallbladder on Ultrasound in a Term Infant*

A 9-day old, former 37-week AGA infant, presents to the clinic following discharge from newborn nursery. He is formula feeding 2-3 ounces every 3-4 hours with normal voiding and stooling. Evidence of stool in the clinic is yellow and seedy. Review of newborn records show a normal newborn exam. However, due to prenatal abnormal enlargement of the right heart, an echocardiogram was obtained in the nursery and demonstrated an incidental finding of air in the liver. Subsequent serial abdominal ultrasounds failed to identify the gall bladder, while the rest of the liver was unremarkable.

MATTHEW LI, SELVIN VILLEDA, M.D.; KIRSTEN ROBINSON M.D.; TAMMY CAMP, M.D. (CONTINUED)

Notable laboratory findings included a maximum direct bilirubin of 0.3 mg/dL (Range 0-0.2 mg/dL). Upon outpatient pediatric gastroenterology follow up, hepatobiliary iminodiacetic acid (HIDA) scan revealed contrast flowing into the small bowel. Differential diagnosis included the following: biliary atresia (ruled out with HIDA scan), imaging error (unlikely since multiple modalities and repeat imaging were performed), and congenital gallbladder agenesis (CGA). The patient was diagnosed with CGA. CGA is a rare malformation of the biliary system with an estimated incidence of 9/100,000 births. The majority of cases are asymptomatic and often detected during surgery in the patient's 20's and 30's. In this case, CGA was diagnosed postnatally due to an initial incidental finding on echocardiogram, leading to further imaging, workup, and eventual conclusion with diagnosis.

BENJAMIN LIN, IRINA KIM CAVDAR, MATTHEW BUXTON, JAKE SELLERS, LUIS BRANDI, NASEEM HELO, WERNER TW DE RIESE

Association between prostate size and glandular tissue volume of the peripheral zone via novel combined MRI and histopathology: possible pathophysiological implications on prostate cancer development

Purpose: Benign prostatic hyperplasia (BPH) and prostate cancer (PCa) are the two most prevalent urologic diseases affecting elderly men. An inverse relationship between BPH/prostate size and PCa incidence is well documented in the current literature, but the precise mechanism is poorly understood. This study aims to investigate the effect of total prostate volume on total glandular tissue volume of the peripheral zone via a novel combination of magnetic resonance imaging (MRI) and histo-anatomical imaging. Methods: 42 male patients between ages 53-79 years underwent both radical prostatectomy and pre-operative MRI scans. Prostate sizes ranged from 14.8-133.3cc. Quantitative measurements of surgical capsule thickness and glandular epithelial cell density within the peripheral zone (PZ) were obtained on histo-anatomical slides using computer-based imaging software. Quantitative prostatic zonal measurements were obtained from MRI scans. Combining MRI- and histopathology-obtained parameters allowed measurement of the total glandular tissue volume of the PZ (GVPZ). Statistical analysis was performed to identify associations between total prostate volume (TPV) and GVPZ. Results: The Mann-Whitney U-test showed significant decreases in GVPZ in larger prostates when compared to smaller prostates. Conclusions: Combined MRI and histopathology techniques provide a novel method for accurate measuring of glandular tissue content within the prostatic PZ. The findings of this pilot study support the hypothesis of PZ compression by an expanding transition zone in large BPH prostates, leading to atrophy of PZ glandular tissue. As the majority of PCa originates in the PZ, this dynamic process may explain the protective effect of large BPH prostates against PCa development.

SHREYA MALLENA, EMILY BAYSDEN, JANE R. MONTEALEGRE, SUSAN PARKER

Barriers and facilitators to follow-up for women who tested positive for high-risk HPV using a self-sample kit during the COVID-19 pandemic

At-home self-sample human papillomavirus (HPV) tests are an alternative screening strategy for individuals underscreened for cervical cancer, but barriers and facilitators to follow-up among those who test positive for high-risk (HR-) HPV are relatively unknown. Data were collected as part of the PRESTIS (Prospective Evaluation of Self-Testing to Increase Screening) trial. Trial participants are women enrolled in a public safety net health system, ages 30-65 years, and underscreened for cervical cancer.

SHREYA MALLENA, EMILY BAYSDEN, JANE R. MONTEALEGRE, SUSAN PARKER (CONTINUED)

We conducted semi-structured telephone interviews of 10 English-speaking participants who received positive HPV results after completing at-home self-sampling. We coded interview transcripts and analyzed them using a grounded theory approach. Participants either attended their follow-up (n=6), scheduled their follow-up (n=3), or didn't attend their follow-up (n=1). Participants reported COVID-related barriers to follow-up, including delayed appointments due to COVID-19 infection and fear of acquiring COVID-19 when attending for follow-up. Lack of time constraints was a commonly reported facilitator among those who attended for follow-up. Additionally, self-motivation driven by fear of developing cancer and taking responsibility for personal health was an internal factor that influenced a participant's decision to attend their follow-up. COVID-19 was an important barrier to follow-up among women who received a positive self-sample HPV test. Despite being previously under screened for cervical cancer, participants were highly motivated to attend their clinical follow up due to internal and external factors. Further research is needed to better understand these barriers and facilitators to follow-up for future implementation of HPV self-sample kits.

CHRISTINA MATL, MS; JAMES WANG, MD/PHD; ABDUL HAMOOD, PHD; JOEHASSIN CORDERO, MD; PHAT TRAN, PHD

Minimum Inhibitory Concentration of Essential Oils To Inhibit S. aureus, MRSA, and P. aeruginosa

Background: Bacterial biofilm formation can impair wound healing and proves problematic to treat since biofilms have increased antibiotic resistance. Non-antibiotic therapeutics are therefore being explored. Previous work has demonstrated clove leaf and cinnamon leaf essential oils (EOs) are capable of inhibiting 24-hour biofilms formed by *S. aureus* (SA), MRSA, and *P. aeruginosa* (PA). Our objective is to determine the minimum inhibitory concentration (MIC) of clove and cinnamon leaf oils for these pathogens. Methods: An in vitro study was done to determine the MIC of clove and cinnamon leaf oils on various pathogens. Cellulose disks were subjected to concentrations of 100%, 50%, 25%, and 12.5% of either clove leaf or cinnamon leaf oil and inoculated with overnight cultures of SA, MRSA, and PA. After 24 hours of incubation, remaining bacteria were quantified using a colony-forming-unit assay. Results: The lowest concentration tested at which cinnamon leaf oil resulted in complete eradication of SA, MRSA, and PA were 25%, 100%, and 100%, respectively. The lowest concentration at which clove leaf oil resulted in complete eradication of SA, MRSA, and PA were 25%, 25%, and 100%, respectively. Conclusion: Overall, clove and cinnamon leaf oil proved equally efficacious at eradicating SA and PA, but clove leaf oil was more efficacious at eradicating MRSA. Both EOs were most effective on SA and least effective on PA. Future experiments will be to determine the efficacy and toxicity of these EOs in vivo experiments to further evaluate if these oils can be used as an alternative to antibiotic treatments.

ROBERTO MENDÓZA, JULIANNA SANTOS, ZAREK DRIVER, VIREN BHAKTA, VOLKER NEUGEBAUER, CHWAN-LI SHEN

Gingerol-Enriched Ginger Mitigates Anxiety-like Behavior of Neuropathic Models by Attenuation of Neuroinflammation via the Gut-Brain Axis.

Introduction: Decreased exploratory drive and other anxiety-like behaviors have been reported in neuropathic pain (NP) models. This study aims to explore how anxiety-like behavior can be mitigated by gingerol-enriched ginger (GEG) through the gut-brain axis in the spinal nerve ligation (SNL) rat model of NP. Methods: Twenty-nine Sprague-Dawley rats were divided into 3 experimental groups: sham+vehicle (n=9), SNL+vehicle (n=10), and SNL+200 GEG (SNL+200 mg

ROBERTO MENDÓZA, JULIANNA SANTOS, ZAREK DRIVER, VIREN BHAKTA, VOLKER NEUGEBAUER, CHWAN-LI SHEN (CONTINUED)

GEG/kg BW) (n=10) via oral gavage for 5 weeks. RNA was extracted from amygdala right, frontal cortex right, hippocampus right, and hypothalamus followed by cDNA conversion for later qRT-PCR. Gene expressions for MAOA, HTR2C, HTR2A, BDNF and CX3CR1 were measured by qRT-PCR using the β -actin gene as control. Additionally, the Elevated Plus Maze (EPM) behavior test was performed at baseline and the end of study to evaluate the effects of GEG on anxiety-like behavior. Results: GEG administration mitigated SNL-induced anxiety-like behavior, as shown by increased center duration, frequency, and time in EPM behavior test. Furthermore, qRT-PCR results demonstrated that GEG reversed or mitigated the SNL-induced changes in gene expression of MAOA in all brain regions, BDNF in hippocampus and frontal cortex, and HTR2C, HTR2A and CXCR1 in the hippocampus and amygdala. Conclusion: The current study shows beneficial effects of GEG on NP-related anxiety-like behavior and on the serotonergic system, neuroplasticity and neuroinflammation in brain regions associated with pain and affect modulation.

RYAN D MORGAN BS, JOHN GARZA PHD, LASZLO NAGY MD

Prognostic and Predictive Anatomical Factors in Pediatric Cerebellar Contusions

Literature is lacking in prognostic and morphological factors relating to the clinical picture and outcomes of pediatric cerebellar contusions. This study aimed to evaluate the impact of prognostic and anatomic factors on the clinical outcomes of pediatric patients with cerebellar contusions. The study included 21 patients 18 years old who had cerebellar contusions and 25 controls with other traumatic brain injuries. Patients were stratified within the study population based on discharge Glasgow Outcome Scale (GOS) and reviewed for prognostic factors contributing to outcome. Mid sagittal area of the 4th ventricle and cisterna magna were measured using magnetic resonance imaging. Poor outcome at discharge (GOS<4) was associated with decreased admission Glasgow Coma Scale (GCS) ($p=0.003$), admission motor response ($p=0.006$), pupil reactivity ($p=0.014$), presence of concomitant subarachnoid hemorrhage ($p=0.010$), contusion volume ($p<0.001$), decreased area of the cisterna magna ($p=0.012$). The average area of the 4th ventricle and cisterna magna were significantly smaller in the cerebellar contusion cohort ($p<0.001$, $p<0.001$; respectively) on admission with no remaining differences at follow-up. These findings suggest that specific prognostic and anatomic factors play a role in the clinical outcomes of pediatric patients with cerebellar contusions.

RYAN D MORGAN BS, KEVIN NGUYEN BS, REAGAN A COLLINS BA, SIRIN FALCONI BS, LASZLO NAGY MD

Incidence of Transverse Sinus Hypoplasia in Pediatric Patients With Chiari 1 Malformations - A Population Control Based Study

With an incidence between 1 and 3.6%, Chiari I Malformations (CM1) are a common congenital cerebral disorder. CM1 are often asymptomatic but can present with Valsalva-responsive occipital headache among other symptoms. CM1 malformations have been linked with venous sinus variabilities in the adult population though this correlation has not been adequately explored in the pediatric population. In this study, we sought to determine if there is an association between transverse sinus variability and CM1 in the pediatric population through a retrospective comparison of patients with and without CM1. There were 87 patients diagnosed with CM1 who

RYAN D MORGAN BS, KEVIN NGUYEN BS, REAGAN A COLLINS BA, SIRIN FALCONI BS, LASZLO NAGY MD (CONTINUED)

met the inclusion criteria with only 27 having a sufficient magnetic resonance venography. These patients were compared to a control of 32 patients. Patients with CM1 had a significantly greater mean incidence of transverse sinus hypoplasia than the control group (44% vs 22% respectively, $p=0.033$). Female patients with a CM1 were over 5 times more likely to have transverse sinus hypoplasia than males (OR 5.5 [CI, 1.0, 28.9]). Pediatric patients with Chiari 1 malformations have a higher incidence of transverse sinus hypoplasia and further studies are required to uncover the linking pathology.

RYAN D MORGAN, BS; KIRIE M PSAROMATIS, MBA; NICHOLAS A VOJTKOFSKY, BS; ANILA CHINTAGUNTA, MS; BENEDICTO BARONIA, MD; MUHITTIN BELIRGEN, MD

Seizure Caused by Intraparenchymal Hemorrhage from Migration of Mandibular Dental Wire Through Foramen Ovale in a Child - A Case Report

The foramen ovale (FO) is a structure formed from neural crest-derived mesenchyme located on the greater wing of the sphenoid bone. It allows for the extracranial passage of multiple significant intracranial structures including the mandibular branch of the trigeminal nerve (CN V3). This branch supplies sensation to the lower face, jaw, and anterior tongue, plus motor input to the muscles of mastication. Here we report the case of a 12 y/o male who presented to the emergency department with a 2-day history of nausea and emesis and a 1-day history of altered mental status. Prior to presentation, he started speaking only Spanish and showed signs of absence seizures. Computed tomography showed his orthodontic wire entering his skull through FO, terminating within the inferior temporal lobe. Associated with the wire was an intraparenchymal hemorrhage. Imaging indicated the sparing of the internal carotid artery and its major branches. The wire was safely removed with no complications. Same day and follow-up neurologic exams all demonstrated no deficit in CN V3 or any of the surrounding structures. To our knowledge, this is the first case described in the literature in which a foreign object penetrated the skull floor through FO.

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A Unique Case of Large Left-Sided Sinus of Valsalva Aneurysm Successfully Diagnosed and Treated with Autogenous Pericardium Repair

Background Sinus of Valsalva Aneurysms (SVA) carry high mortality with a median survival rate of 3.5 years if untreated. SVA's occur due to an abnormal dilation of the aortic root located in between the sinotubular junction and aortic valve annulus (NIH). SVA's are rare with a prevalence of 0.09%, however, carry a high mortality if ruptured. Non-ruptured SVA's are mainly asymptomatic and associated with aortic regurgitation. If untreated, ruptures create a significant risk for death due to shunt formation. Case Male aged 71 presents with palpitations, dyspnea, and AF. Present medical history includes HTN and chest pain. CT heart indicated a non-ruptured left SVA, arising from the left coronary cusp measuring 2.8 cm * 2.9 cm. TEE revealed concentric left ventricular hypertrophy with EF of 64% and mild aortic and mitral regurgitation.

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Results CT surgery was subsequently called and patient underwent procedure to repair the aneurysm. Aortotomy was performed 1 cm above the right coronary ostia to expose the patient's SVA. Autogenous pericardium was successfully used to patch the aneurysm orifice. Post procedure issues only included AF. Shortness of breath, chest pain, and palpitations subsided after repair. Conclusion Sinus Valsalva Aneurysms present as unique cases to be examined due to their low prevalence. This case presented with a non-ruptured left SVA, providing significantly greater odds of survival post-repair. Symptoms were consistent with SVA's and resolved once treated. Despite the high mortality of ruptured SVA, surgically repaired aneurysms provide a 90% 15-year survival rate, remarkably extending a patient's lifetime.

ZEID NAWAS, MS, ANDREW IBRAHIM, MOHAMMAD ANSARI, MD, MARINA ISKANDIR, MD

Shockwave Intravascular Lithotripsy of an Extremely Calcified Iliac Artery: a Case Report

Introduction: A significant proportion of peripheral artery disease lesions treated with transcatheter interventional procedures exhibit a moderate to severe level of calcification. Compared with non-calcified lesions, calcification within the plaque is associated with worse clinical outcomes, major adverse cardiovascular events, lower procedural success rates, and increased peri-procedural adverse events. Because calcified peripheral artery lesions are difficult to dilate with conventional balloons during transcatheter interventional procedures, adjunctive strategies of plaque modification have been utilized. Since not many atherectomy devices can be utilized in the aortoiliac region, we present a case utilizing the novel Shockwave intravascular lithotripsy (IVL) in which acoustic shockwaves in a balloon-based delivery system to induce calcium fractures, facilitating appropriate stent expansion and positioning. Case presentation: Female, age 66 with a past medical history of coronary artery disease, hypertension, and dyslipidemia presented with bilateral lower extremity Rutherford III claudication with severe peripheral arterial disease featuring calcified plaques with severe stenosis in the right common iliac artery. After a thorough review, the decision was made to utilize the novel Shockwave IVL strategy. We treated a heavily calcified lesion in the right common iliac artery, and it was subsequently stented. Post-operative angiography showed excellent distal perfusion without dissection, perforation, or embolization. Conclusion: Given the difficulty of using conventional balloon stent strategies and the nonavailability of atherectomy devices in aortoiliac disease, new strategies must be explored to prepare the plaque for better access and luminal gain. This report highlights the successful application of the Shockwave IVL technology in a patient with severely calcified peripheral arterial disease facilitating appropriate stenting. Our case is a glaring example of how this technology that is traditionally used for the nonsurgical treatment of kidney stones can be adopted to treat severely calcified aortoiliac disease percutaneously.

PRACHI PATEL, DR. ARAVINDAN KALYANASUNDARAM, DR. AFZAL SIDDIQUI

Identification of immunological markers responsible for innate and adaptive immune-protection in Sm-p80 +GLA-SE immunized mice

Despite the pressing global health concern presented by schistosomiasis, treatment with praziquantel remains the primary control strategy. A vaccine against this chronic helminth infection would present a major breakthrough in prevention and control of the disease. Here, we present data on the immunogenicity of our vaccine candidate targeting Sm-p80, a functionally

PRACHI PATEL, DR. ARAVINDAN KALYANASUNDARAM, DR. AFZAL SIDDIQUI (CONTINUED)

important subunit of the *Schistosoma mansoni* calpain protease, formulated in Glucopyranosyl Lipid Adjuvant-Stable Emulsion (GLA-SE). We focus on understanding the innate and adaptive immune responses induced by a single dose of Sm-p80+GLA-SE through the analysis of secreted cytokines in a mouse model. Mice were stimulated with vaccine and adjuvant, and after six hours, monocytes were collected for cytokine secretome analysis specific for markers of innate immune response. CD4+ and CD8+ cells were collected from stimulated mice after seven days to assess for secreted cytokine markers of the adaptive immune response. The profiles of the secretome based immune responses for both innate and adaptive immunity achieved by Smp-80+GLA-SE are presented here. These results will be used to help define parameters to guide the efficacy assessment of the current human clinical trials of our vaccine candidate. In addition, detailed immune profiling for reactions caused by antigen from a multicellular pathogen can be applied more broadly to the development of vaccines targeting many of the parasites still causing significant disease burdens around the world.

RADHA PATEL, NEDHA KINNARE, DR. CHERYL ERWIN

The Humanities and Healing: Ways to Manage the Pressures of Medicine and the Tragic Triad

Patients and physicians face a lot of physical, emotional, and mental stressors that can increase risk of burnout. Previous studies have shown that the humanities can help mitigate the risk of burnout, increase self-awareness, and develop resilience. We reviewed a broad cross-section of humanities articles, films, literature, music, and art to identify the areas of flourishing that have been identified by positive psychology as important to the psychology of flourishing. We used a coding system to categorize primary and secondary sources according to a 5X5 coding chart with the five different themes and five modalities of the humanities. The themes were modeled from the PERMA theory and included Positive emotions, Engagement, Relationships, Meaning, and Accomplishments. The modalities included personal insight, perspectives, skills, reasoning, and balance. The following topics in the humanities were researched: poetry, the works of Victor Frankl and Robert Sapolsky, the neuroscience of empathy and emotional regulation, visual arts, positive distractions, balance and self-care, yoga, purposive reactions, meditation, faith, hope, emotional intelligence, relationships and social support, and contemplative studies. While all of the areas of the humanities that we studied can increase well-being, we further delved into three topics of the humanities each for patients and physicians to understand how they can serve as forms of stress management. Three areas of the humanities that my part identified as especially appropriate to aid physicians in the management of the pressures of medicine, including conflict and burnout, loss of meaning, and human error were: visual art, yoga, and self-care. Three areas identified as especially appropriate to aid patients in the management of the tragic triad of suffering, guilt, and death were: positive distractions, balancing competing commitments, and poetry. Overall, the humanities allow us to align to our needs and develop an understanding of our experiences and the nature of living.

ANTHONY PHAM BS, ARDALAN NAGHIAN BS, MARINA ISKANDIR MD, ALIAKBAR ARVANDI MD, MOHAMMAD M. ANSARI MD

Utilization of the Penumbra Ruby Coil for Coil Embolization in a Perforated Coronary LAD Artery to Successfully Treat Coronary Cameral Fistula

Introduction: Coil embolization is an endovascular approach allowing for precise resolution for abnormal blood flow in the blood vessels. In this case study, we explore the use of the coil

**ANTHONY PHAM BS, ARDALAN NAGHIAN BS, MARINA ISKANDIR MD, ALIAKBAR ARVANDI MD,
MOHAMMAD M. ANSARI MD (CONTINUED)**

embolization technique in a revascularization procedure of a totally occluded left anterior descending artery complicated by a coronary cameral fistula. Case Presentation: Male aged 42 with a past medical history of tobacco usage, substance abuse disorder, and no prior cardiac illness presented with constant severe chest pain associated with nausea and vomiting. Upon examination, the patient quickly went into ventricular tachycardia arrest, cardiac arrest-ventricular fibrillation. EkG displayed acute anterolateral ST elevation MI. Emergent coronary angiogram was performed revealing complete occlusion of the proximal left anterior descending artery (LAD) with elevated LVEDP requiring intervention. After adequate assessment, percutaneous intervention (PCI) was performed. Two passes of thrombectomy were done followed by balloon angiography of the proximal LAD. Several times throughout the case, rhythm was noted to be ventricular fibrillation for which cardioversion was performed. Patient was successfully resuscitated each time. Procedure was further complicated with a coronary cameral fistula into the left ventricle showing persistent perforation. Due to lack of covered stents of appropriate size, a decision was reached to perform coil embolization to the LAD with the 3.0 x 12 mm Ruby coil. Angiography was done showing appropriate deployment. Patient was then transferred for a successful emergent placement of the Impella 5.0 device. Conclusion: Though rare, revascularization of fully thrombotic coronary vessels may result in complex complications requiring quick, out-of-the-box treatment options. Knowledge of various endovascular closure techniques such as coil embolization is imperative for efficient treatment of such complications, especially when there is limited availability on covered stent sizes.

COLE POLLINA BS, LUIS FERNANDEZ-NAVA MS, AND COOPER W. PHILLIPS MD

The Effects of Body Habitus, Age, and Sex on Adequate Propofol Dosing and Infusion for General Anesthesia

Propofol is the most widely used IV anesthetic for induction and maintenance of general anesthesia. Its rapid onset, fast recovery, and antiemetic properties make propofol a popular anesthetic drug of choice over competing drugs like etomidate, ketamine, and halogenated gases. While there is general agreement about the physiological effects of propofol, inconsistent dosing metrics likely complicate its disputed effects on peri- and post-operative hemodynamics and cardiac function within the literature. In this review, we seek to provide rationale for the recommended dosing metric of propofol and to clarify the bodily effects of dose-appropriate propofol use. This was achieved through a systematic review of propofol's mechanism of action and observed physiological effects with respect to body habitus, age, and sex.

TAYLOR PROSSER, LAUREN ROBINSON, BAO CATTEAU, KAITLYN SANTINEAU, KADE ANGELL, BETSY JONES, EDD

A Visual Infographic as Method for Educational Intervention for the COVID-19 Pandemic

Background: Due to an abundance of resources through which the public can receive information, combating misinformation has become increasingly difficult, even for healthcare professionals. The COVID-19 pandemic has provided a unique scenario in which misinformation has spread rapidly, causing mass skepticism and uncertainty. Thus, it is vital to ensure that the public has access to reliable and verified scientific information. We proposed that a visual infographic with important facts regarding the COVID-19 virus and vaccination could be an effective means by which to educate the public and overcome misinformation,

TAYLOR PROSSER, LAUREN ROBINSON, BAO CATTEAU, KAITLYN SANTINEAU, KADE ANGELL, BETSY JONES, EDD

using TTU and TTUHSC students as a sample population. Methods: Part one of this study consisted of a survey distributed to TTU students designed to assess whether the resources through which they received information were associated with beliefs regarding COVID-19. We then developed an infographic designed to provide important, verified information about the COVID-19 pandemic. In part two, we administered a quiz to a group of preclinical students before and after viewing the infographic, then compared results. Results: Data from part one demonstrated that students who received information from a reliable, verified resource were more likely to rate the pandemic as more severe. Statistical analysis of part two data using a T-test revealed that the percentage of students answering questions correctly was significantly higher after viewing the infographic, when compared to the baseline ($p=0.003$). Conclusions: The beliefs that an individual holds regarding the COVID-19 pandemic are related to the sources through which they receive information. However, a visual infographic can be an easily accessible source to provide information regarding the COVID-19 virus and vaccination, making it a useful intervention to combat misinformation. Future studies should be repeated on a larger scale, include a more diverse sample population, and could be extrapolated to include other common misconceptions of medically related topics.

AKSHAY RAGHURAM BA, NICHOLAS HOUSEHOLDER BS, WOORYOUNG JANG BS, ANTHONY BRUCCOLIERE BSA, JUNIOR CLARK BA, ALAN PANG MD, JOHN GRISWOLD MD*A Retrospective Study Evaluating the Outcomes of Co-located Orthopedic and Thermal Injuries*

Introduction: Co-located burn-fracture injuries are typically associated with extensive trauma accidents such as motor vehicle collisions, explosions, or electrical injuries. With progressive technological advancement and increased access to high-energy technology, especially in transportation, the prevalence of high-energy trauma injuries is expected to increase. This likely corresponds to an increase in the frequency of trauma patients presenting with simultaneous burn and fracture injuries. Therefore, trauma, burn, and orthopedic physicians should be aware of what to expect when treating patients with co-located burn-fracture injuries. Hypothesis: We hypothesize that amongst patients who have sustained both orthopedic and thermal injuries, the patients with co-located injuries will demonstrate higher levels of infection, greater difficulty with tissue coverage, and greater morbidity rates. An analysis of these patients will lead to a better understanding of how to effectively manage co-located injuries within the burn intensive care unit. Results: The results of statistical analysis were very close to proving a significant correlation for both increased TBSA and burn degree with colocation. Additionally, our stats were close, but not significant, regarding increased length of hospitalization, increased number of orthopedic and burn procedures, and increased duration from intake to first operation. The single significant finding was that co-located burn-fracture injuries required a significantly greater number of burn procedures versus non-located burn-fractures. Conclusion: The results dictate a clear trend towards increased burn severity, hospitalization time, procedural requirements, and procedural delay with co-located fractures versus non-located ones. However, due to the limited sample size ($n=52$), a statistically significant finding was not observed. It was found that collocated injuries required on average significantly more burn procedures than did non-located injury. If our sample size was larger, we would expect to see a statistically significant correlation on all dependent variables.

AKSHAY RAGHURAM BA, JAD ZEITOUNI BBA, ALAN PANG MD, REHAN ZAHID MD, JOHN GRISWOLD MD, DEEPAK BHARADIA MD*A Comparative Study of the Early Use of Autologous Skin Cell Suspension and Autologous Split-Thickness Skin Graft in the Treatment of Indeterminate Partial-Thickness Burns*

Background: Sprayed autologous skin cell suspension (ASCS) for treatment of acute thermal burn injuries is a recent innovation that has been proven to shorten length of stay, decrease costs, reduce postoperative pain and improve wound healing compared to split-thickness skin grafts (STSG). The early use of ASCS in indeterminate partial-thickness burns has not been investigated to this date and offers an interesting research opportunity which may allow to expedite recovery and improve surgical outcomes as already proved for the regular ASCS use. Our purpose is to investigate the potential benefits of the early use ASCS obtained with the ReCell system® versus Autologous STSG for treatment of indeterminate partial-thickness burns. Hypothesis: We hypothesize that burn patients that undergo the early use of autologous skin cell suspension (ASCS) will demonstrate improvements in postoperative outcomes such as healing time, hospital length of stay (LOS), ICU LOS, wound closure, and mortality when compared to patients who receive the traditional treatment of autologous split thickness skin graft (STSG). We believe that this protocol could shed light into improving the management of partial-thickness indeterminate burns and will positively impact patient outcomes. Results: As this is a prospective study with an estimated time span of three years, a formalized statistical analysis has not yet been performed. The authors are in the process of evaluating patients based on the inclusion criteria. Using double-blind randomization, the patients are separated into two groups: early use of ASCS or traditional autologous STSG. Preliminary statistical analysis revealed that we will evaluate a total of 80 patients to achieve >80% power. Conclusion: Future directions include continuation of patient evaluation and potential surgical intervention if indicated. Once patients are randomized and have been treated with ASCS or STSG, we will perform daily wound checks until discharge and will continue evaluation through post-operative follow-up visits.

JESSICA RAMIREZ, ISHA SHURA, NEDHA KINNARE, LIAM UNG, SHREYA MALLENA, ARDALAN NAGHIAN, THERESA BYRD*Limiting the Impact of COVID-19 on Rural Homeless Shelters: Using Past Experiences to Inform Future Strategies*

In this study, local homeless shelters in Lubbock were surveyed to understand the issues they faced during the COVID-19 pandemic. This study aimed to analyze methods that were used to stop the transmission within shelters, challenges that each site faced, and willingness of both the residents and staff/volunteers to get vaccinated. Administrators at Open Door, Family Promise, and the Salvation Army were interviewed to better understand the issues they faced during the COVID-19 pandemic and how they have worked to limit COVID-19 transmission among their population. The shelters surveyed did not have the means to collect actual statistical information, thus, much of the data was estimated and/or qualitative. Overall, there were low rates of transmission in homeless shelters among residents. Most of the homeless population was receptive to social distancing and COVID-19 regulations, but were often weary of vaccination. All organizations had a difficult time balancing safety measures and the amount of people they could assist. Additionally, resources were limited, making it difficult to maintain a safe and clean environment and enforce social distancing guidelines. After data was collected, an infographic was created and distributed to each of the shelters to disseminate information about taking precautions, providing resources, data tracking, and collaboration within respective homeless shelters' communities.

NICOLE REMMERT, NAWA MOINL, MBBS; KARLA DANIELE, MD*Accessory breast carcinoma: a case series*

Accessory breast carcinoma (ABC) accounts for 0.3-0.6% of all breast cancers. Accessory breast tissue occurs due to the failure of the embryonic mammary ridge to resolve during fetal breast development. Due to its likeness to normal breast tissue, accessory breast tissue is also susceptible to developing malignancies. As primary accessory axillary breast carcinoma is rare, diagnosis can be challenging. Here we present 2 cases of invasive carcinomas arising from the accessory breast tissue in the axilla. Case 1: A 49-year-old female presented with a right axillary mass present for 1 month. On examination, a 2 cm mass was palpated. Biopsy showed invasive ductal carcinoma (IDC). The patient underwent ultrasound-guided margin-negative resection of the right accessory breast with sentinel lymph node biopsy (SLNB). Final pathology reported IDC, grade 2, ER/PR positive HER2 negative and 1 of 3 lymph nodes (LNs) positive for metastatic carcinoma. Case 2: A 47-year-old female presented for evaluation of an enlarging right axillary lump present for 12 months. On examination, bilateral accessory axillary breast tissue with a 3 cm mass in the right axilla was palpable. Workup confirmed the presence of a mass, and biopsy showed IDC with lobular features. The patient underwent ultrasound-guided, margin-negative resection with SLNB of the right side and a prophylactic resection of the left accessory breast. Final pathology reported IDC with lobular features, grade 2, ER/PR positive HER2 negative, and blue node with metastatic carcinoma. Both cases were symptomatic and had nodal involvement at the time of diagnosis. Likely explanations for this advanced stage at presentation are delayed diagnosis and increased malignant potential in aberrant breast tissue. Patients with accessory breast tissue should be educated about the risk of cancer and advised to report abnormalities promptly. Breast examination screenings should include accessory breast tissue for early recognition of carcinoma.

ANTHONY G. RUDD, MOSHARAF MAHMUD SYED, BOVEY LIU, J. JOSH LAWRENCE*Vitamin A Deficiency Drives Alzheimer's Disease Progression through Dysregulation of Glucocorticoid Signaling*

Glucocorticoid (GC) signaling plays a central role in cellular activity, stress, and immune response. GCs bind to mineralocorticoid and glucocorticoid receptors, and because of their involvement in the stress response, they play a significant role in CNS functions like learning and memory. Previous research has shown that there are strong interrelationships between dysregulation of the hippocampal-pituitary-adrenal axis, GC overexposure, increased serum levels of pro-inflammatory cytokines, and the pathogenesis of Alzheimer's disease (AD) and major depressive disorder (MDD). There is also increasing evidence linking Vitamin A (VA) deficiency in AD. All-trans retinoic acid (ATRA) is the bioactive derivative of VA. Research connecting VA with glucocorticoid expression has shown that VA deficiency leads to an increase in the levels of glucocorticoids in serum of rats but retinoic acid (RA) treatment is able to decrease those levels to baseline. In rodents, VA treatment improves symptoms of AD in vitro and in vivo by reducing proinflammatory cytokines and amyloidogenesis. Moreover, VA deprived mice exhibit impaired learning. In this study, we investigated the most dysregulated ATRA-sensitive pathways in the human hippocampus in AD. We performed an in silico experiment via Ingenuity Pathway Analysis (IPA) from the publicly available human AD hippocampal transcriptomics data generated by van Rooij and colleagues (2019) and Annese and colleagues (2018) using 673 ATRA-sensitive genes. The van Rooij dataset consisted of 18 AD cases (including both male and female) and 10 control samples.

ANTHONY G. RUDD, MOSHARAF MAHMUD SYED, BOVEY LIU, J. JOSH LAWRENCE (CONTINUED)

The Annese dataset consisted of 6 AD, 6 PD, and 6 control human brain samples. The top canonical pathway within the van Rooij dataset was glucocorticoid receptor (GR) signaling ($p=4.86E-34$). The most dysregulated ATRA-sensitive gene in the Pathway was UQCRC2 ($FDR=9.86E-14$), which was downregulated in complex III located within mitochondria. A total of 36 genes, including NDUFA genes, in the Mitochondrial Dysfunction pathway were dysregulated ($p=2.27E-21$), further linking ATRA deficiency to mitochondrial dysregulation in human AD. Several previous studies have implicated the importance of dysregulated GR signaling in AD. Our analysis also reveals that ATRA-sensitive neuroinflammatory genes ($p=1.63E-22$) are upregulated in AD. Combining these results with work done by others, it may be that NF- κ B1 upregulation in MDD is a major pathway for the development of AD later in life. Finally, our IPA analysis highlighted that the top Upstream Regulator among the van Rooij data was tretinoin (ATRA itself), validating the ATRA sensitivity of our enriched gene set and the regulation of the GR pathway. Our study provides a wealth of new knowledge regarding interactions between ATRA availability, GR signaling, and mitochondrial function.

ELWIN RUTAYOMBA, ANTHONY PHAM, ARDALAN NAGHIAN, COLE POLLINA, ANTHONY BRUCCOLIERE, GEOFF THOMAS, RYAN RUSY, LEWIS KELLY, KANISHK GOEL, MARINA ISKANDIR, ALIAKBAR ARVANDI, MOHAMMAD ANSARI

Utilizing the Fluoroscopy-Guided Tibial Balloon Puncture Technique for Limb Salvage- a Case Series

Introduction: Critical Limb Ischemia (CLI) is an extreme blockage of vessels in the extremities. CLI can cause significant difficulties for providers in approaching proper treatment due to chronic wound layer dressing. Our case series highlight how the Fluoroscopy-guided tibial balloon puncture technique saved a limb due to the presence of layered dressing as Ultrasound-guided couldn't be utilized. Cases: Male, age 57, with PMHx of CAD s/p toe amputation, HTN, DLD, DM2, and smoker. The patient presented with nonhealing wounds. Angiography via the right lower extremity was performed and revealed CTO of AT. Other 2 cases had similar disease patterns. Methods/Results: Since Ultrasound-guided groin access had severe limitations due to patient's habitus, decision was reached for pedal access. Ultrasound-guidance couldn't be utilized due to presence of multiple chronic wound layer dressing. Thus, direct fluoroscopy guided access was attempted. Then decision was reached to utilize anterograde access and placement of balloon after crossing the pedal arch and in the dorsalis pedis. Under fluoroscopy guidance, needle puncture of the balloon was performed and a wire was entered in the dorsalis pedis and extended up after withdrawing the balloon and puncturing the distal cap of the AT CTO followed by revascularization. Conclusion: While the Ultrasound-guided technique is the standard protocol in endovascular procedures, Fluoroscopy guided technique is a great alternative where the Ultrasound-guided proves to have limitations. Our case series further demonstrates limitations where Ultrasound-guided is not possible due to chronic wound layer dressing and even fluoroscopy-guided requires further utilizing balloon angioplasty needle puncture technique.

KAITLYN SANTINEAU, ANINDYA SAMANTA, ALEX PARK, DANG NGUYEN, IRINA KIM, PATRICIA NELSON*Home Visual Acuity Testing Update*

The ability to measure a patient's visual acuity at home (HVA) is by far the most desired remote telemedicine capability sought by ophthalmologists. A systemic literature search using Pubmed was used to search for publications from 2010 to 2022 in English reporting on studies that compared a patient's HVA to the clinic visual acuity (CVA). Approaches to measuring HVA included using a phone-based application, a physical chart, and a personal computer. The most accurate but also the most involved was the use of a computer software (COMPLong) at home with guidance from an eye professional with a mean difference between the HVA and CVA being -0.01 logMAR. The most accessible and reliable was the use of a printable visual acuity chart, available in the public domain, that had a difference between HVA and CVA of -0.02 to -0.07 logMAR. Phone apps (Verana Vision) and stand-alone websites (Farsight.com) had a greater mean difference -0.12 and -0.13 logMAR, respectively, with a moderate correlation coefficient. Overall, all three methodologies demonstrated a good negative predictive value to be an effective screening tool to flag drastic vision decline between clinic visits.

ASHLEY SELMAN, SCOTT BURNS, ARUBALA P. REDDY, JOHN CULBERSON, AND P. HEMACHANDRA REDDY*The Role of Obesity and Diabetes in Dementia*

Chronic conditions such as obesity, diabetes, and dementia are increasing in the United States (US) population. Knowledge of these chronic conditions, preventative measures, and proper management tactics is important and critical to preventing disease. The overlap between obesity, diabetes, and dementia is becoming further elucidated. These conditions share a similar origin through the components of increasing age, gender, genetic and epigenetic predispositions, depression, and a high-fat Western diet (WD) that all contribute to the inflammatory state associated with the development of obesity, diabetes, and dementia. This inflammatory state leads to the dysregulation of food intake and insulin resistance. Obesity is often the cornerstone that leads to the development of diabetes and, subsequently, in the case of type 2 diabetes mellitus (T2DM), progression to "type 3 diabetes mellitus (T3DM)". Obesity and depression are closely associated with diabetes. However, dementia can be avoided with lifestyle modifications, by switching to a plant-based diet (e.g., a Mediterranean diet (MD)), and increasing physical activity. Diet and exercise are not the only treatment options. There are several surgical and pharmacological interventions available for prevention. Current and future research within each of these fields is warranted and offers the chance for new treatment options and a better understanding of the pathogenesis of each condition. Keywords: Western diet; type 2 diabetes; dementia; obesity; depression; Mediterranean diet.

KAILEY SHANNON, LIAM UNG, JACOB NICHOLS, SHARILYN ALMODOVAR*Severity of COVID in People Living with HIV: A Single-center, Retrospective Study*

Background: Current studies suggest decreased severity of COVID within the HIV population globally. Risk factors for COVID include age, cardiovascular and pulmonary disease, which are common with people with HIV. HIV/SARS-CoV-2 coinfection should result in more severe outcomes, however, HIV does not seem to follow this pattern.

KAILEY SHANNON, LIAM UNG, JACOB NICHOLS, SHARILYN ALMODOVAR (CONTINUED)

Problem: The severity of COVID is thought to be governed by the over-activation of the immune system, which does not appear to occur in immunocompromised HIV-positive patients. **Hypothesis:** Coinfection with HIV and SARS-CoV-2 is less severe and presents with mild COVID manifestations. **Methods:** The severity of COVID-19 was assessed by chart review of people with HIV. The TTUHSC IRB approved evaluation of 29 medical records of subjects with documented HIV and SARS-CoV-2 coinfection, who visited UMC Health System in Lubbock, TX between Jan/01/2020 and June/30/2022. COVID-19 severity was assessed by length of hospital stay, intubation status, and the development of sepsis, pneumonia, or death. Coexisting conditions including diabetes, renal failure, COPD, stroke, hypertension, dysrhythmia, and congestive heart failure were also reviewed. **Preliminary Results:** In a study population of 79% male, 45% Hispanic, and 69% overweight/obese, 62% were admitted to the hospital. Of hospitalizations, 11% required intubation, 28% in ICU, 50% developed pneumonia, and 17% resulted in death. Of patients admitted, 39% had hypertension, 11% COPD, and 28% diabetic. 86% were on antiretroviral therapy and 73% HIV viral loads <20 copies detected. **Conclusion:** To our knowledge, this is the first profile of the impact of COVID-19 in HIV patients living in West Texas. Comorbidities such as diabetes and hypertension as well as demographics such as ethnicity and excess weight are known contributors to severe disease progression but their interplay with HIV remains largely unclear. Larger studies are required to truly understand the relationship between HIV and SARS-CoV-2.

MUNEEZA SHEIKH, YAW ADU, MICHELLE ONUOHA, LUIS CASTRO, AHMAD LAMBERT, FIONA PRABHU MD, KELLY BENNETT MD

Unveiling the Complexities of Diabetic Control in an Underserved Population: A Disparity Analysis

Underserved populations have been described as those that are socioeconomically disadvantaged, people of color, and/or women and children. Studies have shown that individuals living in underserved communities are at an increased risk of developing and poorly controlling chronic conditions such as diabetes. The Free Clinic at Lubbock Impact primarily serves a patient population from these communities, and many of its patients suffer from diabetes while lacking access to proper nutrition and funds for medications to properly control their disease. This study aimed to assess whether being a minority while also being a part of an underserved community compounded the negative outcomes of the disease as compared to racial majority counterparts. A retrospective chart review of 29 caucasian (average age 49.6) and 45 hispanic (average age 49.6) diabetic patients, with 54% female representation, was conducted. Hemoglobin A1c levels were assessed from baseline to initial follow-up. Patients whose diabetic levels improved by 2% or fell below 7% were considered well-controlled/improving control, while all others were considered poorly controlled. At initial follow up, 68.9% of Hispanic patients were considered poorly controlled, while 55.2% of Caucasian patients were considered poorly controlled. Lower-income patients were also more likely to have poorly controlled diabetes as compared to higher-earning patients. However, upon univariate review, no statistical significance was found between ethnicity, income, and gender with diabetic control. This study suggests that more attention and resources must be directed towards diabetes management in underserved communities, particularly in minority populations. It also highlights the importance of addressing socioeconomic factors, such as income, in diabetes management. Further research is needed to fully understand the complex interactions between ethnic, socioeconomic, and gender factors in diabetes control.

SHYAM SHELDIA, SHIVAM SHELDIA, RISHI VIRANI, AND P. HEMACHANDRA REDDY*Dementia and COVID-19: An African American Focused Study*

Dementia and coronavirus disease 2019 (COVID-19) are two separate illnesses responsible for high levels of morbidity and mortality within the general United States population. Both diseases have differing origins, symptoms, and pathological processes within the human body as dementia is primarily a neurological disease while COVID-19 is a disease of the respiratory system. Nevertheless, minority racial/ethnic groups within the United States, such as African Americans, face one of the highest burdens of both dementia and COVID-19 due to four specific risk factor categories: 1) unmodifiable risk factors, 2) modifiable risk factors, 3) age-related chronic diseases, and 4) environmental risk factors. Unmodifiable risk factors include increasing age and predisposing genetics. The major modifiable risk factors of concern are low income/socioeconomic status, low educational attainment, lack of exercise, poor diet, and smoking alongside the usage of tobacco products. Additionally, the higher prevalence of age-related chronic diseases such as diabetes, kidney disease, hypercholesterolemia, cardiovascular disease, and chronic lung diseases within the African American community places them at a higher risk for the future development of dementia as well as a fatal COVID-19 infection. Lastly, the African American population within the United States faces additional environmental risk factors, such as social inequalities and lack of access to healthcare, due to pre-existing systematic biases. With African Americans being one of the largest racial/ethnic minority groups with the United States, this particular chapter will only focus upon the research and statistics associated with dementia and COVID-19 within the African American population of the United States. This chapter will also explore each of the four aforementioned risk factor categories in further detail as they greatly contribute to the development of dementia and COVID-19 within the African American population.

ISHA SHURA, DR. REGINA BARONIA, DR. SAMUDANI DHANASEKARA, DR. SARAH WAKEFIELD*Clinical and Social Factors that Impact Treatment Adherence in Child Psychiatry*

Background: While the impact of several clinical and social factors on depression treatment nonadherence in adults has been well-categorized, the same extent of analysis is lacking in pediatric populations. Research in adult psychiatry has looked at the effects of demographic factors, medication side effects, depression symptom severity, and engagement in concurrent psychotherapy on depression treatment adherence. The aim of this study was to analyze the impact of several similar variables on self-reported depression medication adherence in pediatric populations in West Texas. Survey responses were collected from participants (ages 8 through 20) in the Texas Youth Depression and Suicide Research Network (TX-YDSRN). **Hypothesis:** Participants from minority backgrounds, of lower socioeconomic status, and with lower perceived depression severity will be more likely to be nonadherent with depression treatment. Additionally, youth with lower reported satisfaction with psychiatric care will be more likely to be nonadherent with depression treatment, while variables like age and sex are less likely to impact the results significantly. **Results:** A total of 75 participants were included in the analysis conducted via R statistical software. 34 (45.3%) of these participants were adherent, whereas 41 (54.7%) were not. There was no significant difference in age, sex, household income, or urban-rural status between the adherent and nonadherent groups ($p > 0.05$). There was a higher proportion of minorities and participants who consumed alcohol in the nonadherent group compared to the adherent group ($p = 0.047$ and $p = 0.035$, respectively). Compared to the nonadherent group, the adherent group reported a trend in greater satisfaction and perceived helpfulness of pharmacologic treatment ($p = 0.081$).

**ISHA SHURA, DR. REGINA BARONIA, DR. SAMUDANI DHANASEKARA, DR. SARAH WAKEFIELD
(CONTINUED)**

Conclusion: Pediatric patients who are nonadherent with depression medications are more likely to come from a minority background, consume alcohol, and report less satisfaction with their psychiatric care, especially the pharmacologic aspects of that care.

KHAJA SIDDIQUI MPH, KRIPA SHRESTHA MBBS, MPH, HUAN VU MD, MILOS BUHAVAC MD, BRITTANY BANKHEAD MD, JAYNE MCCAULEY MD, ROBYN RICHMOND MD, FACS*MEASURING THE EFFECTIVENESS OF A FACULTY-DRIVEN OR CARD AS A SURGICAL TRAINING EVALUATION TOOL IN A GENERAL SURGERY RESIDENCY PROGRAM*

Surgical training evaluation tools are critical in developing skills in an operative setting. While standardized evaluation models exist for surgical education in the operating room (OR), residency programs often utilize variations of these models depending on their goals. Understanding the reliability of a customized assessment tool in a general surgery residency program will help us optimize the accuracy of the assessment of residents and improve the feedback process. 30 surgical residents from post-graduate years (PGY) 1 through 5 were surveyed to assess views on the educational value and feedback usefulness of an OR card assessment tool based on operative competency evaluations used in a general surgery residency program. Residents shared their level of agreement and confidence level in performing procedures between OR card evaluations on a list of statements with a range of 1 (strongly agree) through 5 (strongly disagree). Of the 30 surgical residents surveyed, 21 residents completed the survey. Junior residents, PGY1 and PGY2, reported higher mean scores of agreements on feedback utility of the OR card compared to more Senior residents, PGY3 and above (4.3 and 3.3 vs 2.4, 3.3 and 3.9). PGY3 residents scored the lowest on feedback usefulness from the OR card. Additionally, PGY3 residents scored confidence level improvements for performing procedures between the OR card evaluation (2.25 ± 1.89) and agreement on the belief that the OR card was an effective learning tool (1.75 ± 0.95) lowest compared to their Junior and Senior colleagues. Surgical assessment tools provide varying levels of feedback utility and confidence in different levels of training. A Faculty-driven OR card seems a reliable tool in the early years of training, but it loses this ability over years of residency, particularly the PGY3 year. Further research is needed to determine the value of assessment tools between surgical training years.

KELSEY SPRINKLES, DR. THERESA BYRD, DR. JULIE ST-JOHN, DR. JEFF DENNIS, ERIKA CARRILLO*Health equity for Parmer and Deaf Smith Counties*

Public health efforts to address inequity require communities to engage residents to identify strengths and areas for improvement. This study uses a community health needs assessment (CHNA) in Parmer and Deaf Smith Counties, Texas to assess health care access, COVID vaccine uptake, and social determinants of health toward developing plans with the communities to reduce the impact of future public health emergencies. The CHNA methods included key informant interviews and a community survey. Key community issues identified through survey responses and interviews included a lack of health literacy, education and access to needed services due to inability to pay and lack of health insurance coverage. Over one third of respondents reported delaying health care because of lack of insurance, and similar proportion reported delaying care due to not being able to take time off work. In addition, approximately half of respondents reported having received the COVID-19 vaccine.

**KELSEY SPRINKLES, DR. THERESA BYRD, DR. JULIE ST-JOHN, DR. JEFF DENNIS, ERIKA CARRILLO
(CONTINUED)**

Primary concerns among those reporting not having taken the vaccine included possible side effects and a feeling that it had not been studied enough. The CHNA data and results lead to identification by community members of an intervention to address these key issues—which entails the creation of a series of educational videos for distribution in these counties with the goal to improve health education in these communities. Additionally, the research team is working with key community leaders and stakeholders to develop a sustainable coalition that will lead and continue implemented interventions as well as monitor and evaluate them.

GEOFF THOMAS, B.S., RALPH PAONE, M.D., MOHAMMAD M. ANSARI, M.D.*First Reported Case of Rapidly Recurring Metastasis of Malignant Non-Small Cell Primary Lung Carcinoma to the Heart*

Background Intracardiac masses are often a result of thrombosis or tumor formation within the heart. Cardiac tumors have the potential to be benign or malignant. Many of these tumors are metastatic, originating from primary tumors found elsewhere in the body. We present our case of a 64 year old male with a recurring right atrial mass identified through imaging studies. **Case Description** Male age 64 with PMH of CVA with a left middle cerebral artery stroke, a left internal carotid artery occlusion, mural aortic thrombus, HTN, tobacco abuse, COPD, and lung nodules presenting with shortness of breath and elevated troponin concerning for NSTEMI. Selective coronary angiography, echocardiography and CT were performed on this patient. Results Coronary angiography showed 3 vessel CAD. Imaging from echocardiography and CT revealed a 7 cm right atrial mass. Initially the patient was referred for percutaneous clot retraction with minor success, after which the patient underwent surgical extraction of the mass which was successfully performed. Patient was subsequently discharged only to return 2 weeks later with repeat imaging revealing a new malignancy of the same size presenting in the exact same location. **Conclusions** The patient was diagnosed with multivessel CAD. Biopsy results of the right atrial mass determined that it was a malignant keratin-positive neoplasm, likely a metastasis from the patient's primary lung carcinoma. Our case demonstrates the first ever reported case of rapidly recurring metastasis (within 2 weeks) of malignant non-small cell primary lung carcinoma to the heart.

**LEANNE THOMAS, BRINKLEY COVER, JEREMY GARZA, JANE- COLMER HAMOOD, AND ABDUL
HAMOOD***Human serum alters the production of several Pseudomonas aeruginosa outer membrane proteins*

Pseudomonas aeruginosa (PA) is a gram-negative pathogen that causes bacteremia and septicemia in severely burned patients; a situation that often leads to multiorgan failure and death. Despite our extensive knowledge of PA wound infection, there are several gaps in our understanding of the PA response to the blood environment. We recently showed that upon its growth in human blood or human serum (HS), PA strain PAO1 alters the expression of more than 1,000 genes. Many of these alterations may occur through the PA-outer membrane proteins (PA-OMPs). OMPs contribute significantly to the pathogenesis of gram-negative pathogens. We hypothesized that HS alters the production of PA-OMPs.

LEANNE THOMAS, BRINKLEY COVER, JEREMY GARZA, JANE- COLMER HAMOOD, AND ABDUL HAMOOD (CONTINUED)

To test this, we grew PAO1, which causes sepsis and death in the murine model of thermal injury, in Luria-Bertani broth (LBB) or LBB containing 10% HS, extracted the OMPs, and analyzed their profile using SDS-polyacrylamide gel electrophoresis. Analysis of the silver-stained gels revealed that 10% HS repressed the production of at least six OMPs with molecular weights (MW) of 68.2, 34.5, 23.8, 17.9, 13.7, and 11.9 kDa but induced the production of at least five others (MW 66.1, 41, 28.5, 22.8, and 22 kDa). Similar to PA-PAO11, PA-PA14 causes sepsis and death. However, its genome is larger than that of PAO1 and it carries several additional virulence genes. Therefore, we also compared the OMP profile of PAO1 and PA14. Although the two strains share multiple common proteins, each strain has its own unique ones. As with PAO1, HS manipulated the production of several PA14 OMPs. These results suggest that 1) in response to different components of HS, PA varies the production of its OMPs, 2) virulent PA strains differ in their OMPs, and 3) HS-induced OMPs may be targeted in future investigations designed to produce potential serum therapies for PA infected/severely burned patients.

LORI THOMPSON, ALAN PANG, JOHN GRISWOLD, HABIB ABLA

Effectiveness of Methadone as analgesia based on body mass index in burn patients

Methadone is a widely used synthetic full agonist of mu-opioid receptors and a non-competitive antagonist of NMDA receptors in the human body. This is often used in recovering opioid addiction patients to provide long-lasting relief from withdrawal pain. In our burn unit, we use methadone as an analgesic for acute pains from burn injuries. We have found this to be an effective measure for acute pain. However, methadone is unique in that the half-life is based on opioid naïve versus dependent patients. In tolerant patients, this is often only 24 hours; in naïve patients it can be up to 55 hours. This is partially due to its lipophilic nature and wide tissue distribution. This can lead to complications such as respiratory depression, which lasts much longer than any analgesic effect. We posit that higher BMI patients will have more complications and higher doses (per weight) of methadone when required. They will have more sustained pain relief if they are on the regimen for greater than the 3 to 5 day onset, which is representative of methadone.

LIAM UNG, KAILEY SHANNON, STEVE PRESLEY, JACOB NICHOLS, AND SHARILYN ALMODOVAR

Long COVID sequelae in People Living with HIV: A Single-center Chart Review

Background. Long COVID refers to the multisystem effects following infection with SARS-CoV-2. Nearly 10-20% of people infected with SARS-CoV-2 have experienced Long COVID. With a global 668 million cases of COVID-19 as of January 2023, the potential magnitude of Long COVID cases is a rising issue. **Problem.** Documentation of Long COVID symptoms and severity remain understudied in People Living with HIV (PLWH). The unique immune features in PLWH call for more insights to better understand the pathophysiology behind Long COVID and maintenance of immunity and HIV control post-COVID. **Hypothesis.** PLWH are already at risk for chronic morbidities due in part to their weakened immune system. Therefore, we hypothesize that PLWH present serious complications following acute SARS-CoV-2 infection. **Methods.** We investigated the prevalence of Long COVID symptoms by chart reviews of PLWH who had experienced HIV/SARS-CoV-2 co-infection.

**LIAM UNG, KAILEY SHANNON, STEVE PRESLEY, JACOB NICHOLS, AND SHARILYN ALMODOVAR
(CONTINUED)**

TTUHSC IRB protocol approved the evaluation of 29 electronic medical records of PLWH who visited the UMC Health System in Lubbock with documented current/past co-infection with SARS-CoV-2 between 01/Jan/2020 and 30/June/2022. Long COVID was reviewed from HIV follow-up primary care visits, usually within 3 months post-COVID-19. Preliminary findings. Study population: 79% males between 22-69 years, 45% Hispanic, 69% overweight/obese, HIV duration between 0-30 years, 86% receiving antiretroviral therapy, 73% HIV suppressed, 7% with CD4 counts <200, residing in four different counties in West Texas. The most frequent Long COVID symptoms in PLWH were dyspnea (52%), cough (49%), tiredness/fatigue (49%), and headache (31%). Intriguingly, we observed that 24% of PLWH have not experienced Long COVID, 52% reported 3-6 symptoms, and 7% reported 7-8 symptoms. Conclusion. PLWH are experiencing multi-symptomatic Long COVID; the severity and length of those symptoms compared to uninfected people is worth studying. Multiparametric and longitudinal studies are needed to better understand the long-term impact of COVID-19 in PLWH, particularly in West Texas.

SHREYA UPPALA, TENLEY LEHMAN, JONATHAN JARMAN, MOHAMAD M. AL-RAHAWAN

Evaluating the incidence of fever following vincristine administration in pediatric patients through a retrospective chart review

Background: Vincristine is a commonly utilized chemotherapy agent for various types of pediatric cancers. The FDA label for vincristine states that fever is a possible side effect, meaning fever without underlying etiology following the administration of Vincristine is possible. Fever in patients receiving chemotherapy always triggers a sepsis workup. Only a handful of vincristine-induced fevers have been reported in literature, but true incidence is not known. Methods: In collaboration with the Clinical Research Institute at TTUHSC, we decided to compare the incidence of fever after vincristine administration vs administration of all other chemotherapy agents in children being treated in Lubbock, TX. This study is an IRB approved retrospective chart review of children 0-17 years old receiving chemotherapy from January 1, 2017 – January 1, 2022. Any temperature exceeding 100.4 F is considered a fever. Fever within 48 hours following the administration of chemotherapy is considered related to the administration of chemotherapy. Results: We identified 63 patients who fit the inclusion criteria at one of the 2 centers treating our target population. Data from the other center is forthcoming. The average age of these patients is 9.5 years old with 33 males and 30 females. Acute lymphoblastic leukemia was the most common diagnosis with 29 out of the 63 patients with this type of cancer. This sample includes patients who had vincristine monotherapy or multidrug chemotherapy with or without vincristine. Therefore, the incidence of fevers following vincristine can be compared to the incidence of fever following other chemotherapy agents. Discussion: We have not harvested enough data to allow a meaningful analysis yet; however, we want to share our interim progress. Once available, the information provided by this investigation can help to further understand the correlation between vincristine and fever. This can help better inform the management of fever in vincristine receiving children.

NICHOLAS VOJTKOFSKY, BS, SEHAM AZZAM, BS, SAI PRANATHI BINGI, MBA, BS, JUNIOR CLARK, BS, ALAN PANG, M.D, JOHN GRISWOLD, M.D.

Analyzing the Relationship between Administration of Postoperative Antibiotics and Graft Outcomes in a Burn Center

Burn wounds are associated with significant morbidity, mortality, and distress. High severity burns require crucial medical intervention due to slow healing. Moreover, the immunosuppressed state often leads to bacterial colonization in large burn wounds. Skin grafting is an effective treatment option for both partial and full thickness burns. In this surgical procedure, healthy skin is transplanted onto damaged tissue, restoring the wound's epidermis or dermis. The success of graft incorporation is graft take percentage. The immunosuppressed state of burn patients and resulting infections can prevent proper healing of grafts. To mitigate the risk of infections, IV antibiotics are given perioperatively. However, there is little to no data on the efficacy of administering antibiotics postoperatively between the initial grafting procedure and undressing of the grafted wound. To answer this question, we utilized medical records of patients in the Burn Intensive Care Unit at the University Medical Center in Lubbock, TX to analyze the relationship between graft take percentage and antibiotic treatments. We hypothesize that graft take will increase with administration of postoperative IV antibiotics between graft take and dressing.

NICHOLAS WAGNER, ELWIN RUTAYOMBA, JAD ZEITOUNI, KOFI AGYARE, ALAN PANG MD, JOHN GRISWOLD MD

Evaluation of fluid resuscitation volumes in burn patients with inhalation injuries vs. non-inhalation injuries.

Introduction: Inhalation injuries are a severe clinical entity that has increased morbidity and the probability of death in the burn population. Prior studies have shown that burn patients with inhalation injury had greater than a 40% mortality rate, while burn patients without inhalation injury showed around a 7% mortality rate. Due to the limited amount of treatment modalities currently and the absence of clear diagnostic criteria, additional clinical studies are imperative to serve better patients who have sustained inhalation injuries. We posit that fluid resuscitation could improve the health of burn injuries, primarily those affected with additional inhalation injuries, regardless of the TBSA burn. We hypothesize that in patients with similar TBSA, we suspect that concomitant inhalation injuries will make for a more severe burn shock and require more initial resuscitation volume. Methods: This is a retrospective cohort study of burn patients at a major burn center from 2015 -2022 that incurred inhalation injuries. We will then compare them with TBSA-matched burn patients who didn't have inhalation injuries. The primary outcome was total fluids given; the secondary outcome will compare the actual fluids resuscitation given to patients to the predicted volume by the recommended parkland formula. Results: Preliminary data of 200 patients was analyzed, 120 patients without inhalation injuries and 80 with inhalation injuries. We found a significant difference in total fluids resuscitated with a higher average in burn patients with inhalation injuries than without inhalation injuries ($p=5.85e-05$). Additionally we found that in lesser total burn surface area (<40%) and concurrent inhalation injury, patients received more volumes than predicted. This trend was not observed in patients without inhalation injuries or bigger burns. Conclusion: While the parkland formula is the standard protocol in fluid resuscitation calculations in burn patients, Alternative measures and new treatments modalities are necessary in medicine where the parkland formula prove to show limitations.

HARRISON WOODS AND FRANKLYN BABB MD

Evaluating the utilization of sodium-glucose cotransporter 2 inhibitors for cardiovascular protection in family medicine patients with type 2 diabetes mellitus and cardiovascular disease

Context: Cardiovascular (CV) complications are the leading cause of mortality in patients with type 2 diabetes mellitus (T2DM). Thus, improving CV protection in T2DM patients should be a priority for physicians. American Diabetes Association guidelines recommend a sodium-glucose cotransporter 2 inhibitor (SGLT2i) with demonstrated CV benefit to reduce the risk heart-failure hospitalization and CV events in T2DM patients with atherosclerotic cardiovascular disease (ASCVD) and/or heart failure (HF). Objective: To evaluate SGLT2i utilization in Texas Tech University Health and Sciences Center (TTUHSC) family medicine (FM) patients with T2DM and ASCVD and/or HF. Design: Chart review was performed to identify T2DM patients who could benefit from a CV protective SGLT2i. Eligibility criteria were established ASCVD (coronary artery disease, cerebrovascular disease, atherosclerotic peripheral vascular diseases, and/or history of myocardial infarction, stroke/transient ischemic attack, or revascularization procedures) and/or HF, and an estimated glomerular filtration rate (eGFR) ≥ 30 mL/min/1.73m² within the past year. Patients: The study included 1,764 FM patients with T2DM. Results: 574 T2DM patients had ASCVD and/or HF. 91 (15.9%) were currently using an SGLT2i, 359 (62.5%) qualified but were not currently using an SGLT2i, and 124 (21.6%) had insufficient renal function to initiate SGLT2i therapy or no eGFR recorded in the past year. Conclusion and Next Steps: SGLT2i medications are underutilized in TTUHSC FM patients with T2DM and ASCVD and/or HF. Lectures emphasizing CV protection in T2DM, services patients can access to attenuate medication cost, and new SGLT2i renal guidelines were delivered at resident didactic sessions and faculty physician meetings during Fall of 2022. Additionally, a “provider guide to SGLT2i use in patients with T2DM and CVD” was created and made available for reference in clinic. Beginning in 2023, SGLT2i utilization amongst eligible patients will be re-evaluated quarterly for one year. Our objective is a sustained utilization increase of 10%.

**THOMAS B. YEATER, GRACIE R. BAUM, MICHAEL DANG, ELIZABETH BROWN, CAMERON T. COX,
BRYAN BOURLAND M.D., BRENDAN J. MACKAY M.D.**

Threaded intramedullary headless nail fixation for fractures requiring carpometacarpal stabilization

Carpometacarpal (CMC) fracture-dislocations are uncommon hand injuries, with few studies available regarding their treatment. The current operative treatment options include fixation with K-wires, mini-screws, or plates, though there is no standardized approach because of varying injury patterns and complications associated with each device. The INnate™ threaded intramedullary nail is a relatively novel treatment option that has shown promise in metacarpal fracture fixation by facilitating faster mobilization and recovery with enhanced rotational stability and no compression to prevent fracture displacement and shortening. This study assesses the efficacy of the INnate™ nail for fixation of CMC fracture-dislocations of the second through fifth joints. Nine patients with fourteen CMC fracture-dislocations treated with the INnate™ nail at the University Medical Center between 2019 and 2021 were enrolled in the study. We evaluated postoperative outcomes in terms of pain, total active range of motion (TAM), and return to normal activities. Of the nine patients, seven returned for follow-up. The average time to radiographic union was 11.5 weeks. At final follow-up, no patient reported pain (n = 6). Four patients had 100% TAM, 1 had 95% TAM, and 1 had 25% TAM. The average percentage of normal activity resumed was 84.0% (n = 5).

**THOMAS B. YEATER, GRACIE R. BAUM, MICHAEL DANG, ELIZABETH BROWN, CAMERON T. COX,
BRYAN BOURLAND M.D., BRENDAN J. MACKAY M.D. (CONTINUED)**

No significant complications were reported. One patient had a dorsal spanning plate; hence, we were unable to record outcomes measures regarding the CMC injury. An additional patient had diminished ROM of the injured hand, but his last follow-up was only 1 month postop. Our pilot data overall suggest that the INnate™ threaded intramedullary nail has the potential to improve treatment algorithms for CMC fracture-dislocations.

MADLINE YUAN, ANASTASIA RUIZ MD, ZOE DAVIS MS3

Prevalence of adverse childhood experiences, abuse, and trauma history in West Texas perinatal psychiatric patients: a retrospective chart review

The perinatal period can be stressful for women and may pose risks due to psychiatric disorders. Perinatal psychiatric illnesses range from mild to very severe and include both disorders present before pregnancy or that emerge during the pregnancy or postpartum period. Given the range of these conditions and their outcomes, it is critical to continue exploring risk factors for perinatal psychiatric conditions for proper prevention and prophylaxis. Currently, the state of Texas has the highest rates of child abuse and neglect in the country, with Lubbock County as one of the major contributors to this statistic. Knowing this, we seek to explore the impact that childhood abuse, categorized as one of the adverse childhood experiences (ACEs) as a social determinant of health, can have on various adult outcomes, such as pregnancy and peripartum. It has been established that a history of child abuse and trauma is a risk factor for developing bipolar disorder and a significant predictor for postpartum depression. Through a retrospective chart review at the Perinatal Clinic associated with TTUHSC, we would like to assess the prevalence of ACEs in our patients. Afterwards, we hope to explore if there is a correlation with trauma history to specific psychiatric diagnoses. We posit that a history of ACE's and trauma are significantly prevalent in our patient population at the Perinatal Clinic, and that there is a correlation with diagnoses including, but not limited to, post-traumatic stress disorder and anxiety disorders. A future implication of this study includes extensive and early routine screening of OBGYN patients on childhood history, psychiatric symptoms, and referral to psychiatric care in a timely manner. Early detection of risk factors for perinatal psychiatric disorders are critical to the wellbeing of women and their children, with hopes of breaking the cycle of abuse in our community.

MAREENA ZACHARIAH, LUCAS TOBAR, INDIKA MALLAWARACHCHI, ANWAR GHANDOUR

Induction Therapy with Basiliximab versus Thymoglobulin in African-American Kidney Transplant Recipients in the Current Era of Immunosuppression

*Purpose: It is now common practice in the transplant community to select induction therapy on the basis of perceived immunological risk for acute rejection which commonly includes African American (AA) ethnicity, PRA>20%, and re-transplants. There is little data to support non depleting induction agents in black recipients of renal transplantation. *Methods: Study population is summarized using frequency and percentages. Unadjusted logistic regression models were used to identify the factors associated with graft outcome. Backward stepwise regression was carried out to obtain the final adjusted model. Time to graft loss was modeled using Cox proportional hazard regression. All the analysis was done using STATA 15.

MAREENA ZACHARIAH, LUCAS TOBAR, INDIKA MALLAWARACHCHI, ANWAR GHANDOUR**(CONTINUED)**

*Results: This is a retrospective single center analysis of predominantly African American kidney transplant recipients n=173, followed over mean duration of 49±24 months for first Biopsy proven acute rejection (BPAR), viral, bacterial, fungal infection, and graft loss compared between induction agents rATG and IL2RA. All recipients were maintained on calcineurin inhibitor based triple IS. There were 173 first kidney only transplant recipients of whom 41% received induction with rATG and 59% IL2RA. Majority had EPTS > 20 (72%), peak PRA>50% (16%), KDPI >20 in (69%), CIT>24(17%), DCD (18%). Multivariate analysis, showed no difference in graft survival between induction agents rATG vs. IL2RA (21% vs.18%, p=.70). History of first BPAR was similar between groups rATG n=12 (17%) and IL2RA n=27 (27%) and not significant (p=0.14). When compared with IL2RA, induction with rATG increases the odds of having viral infections adjusted for being on dialysis ≥3 years vs <3 years and re- transplants; OR 2.44 (CI 1.2-4.8, p=0.011), Bacterial infections OR 2.1 (CI 1.05-4.2, p= 0.03), any infection; OR 2.2 (CI 1.1-4.6, p=0.035). The cause end stage renal disease (ESRD): FSGS, DM, GN, and donor age were independent risk factors for any infection post-transplant (P<0.05). Overall graft and patient outcome were not different between the two induction groups. Type of Induction agent, history of rejection, or infection were not independent risk factors for graft loss (p=.75). However GN as cause of ESRD and donor age (p= .03 and p= .05 respectively) predicted graft outcome. *Conclusions: In our single center analysis of predominantly AA renal transplant recipients, type of induction agent used did not demonstrate benefit for graft survival or rejection free survival. There was a significant risk for infection with rATG. Depleting therapy should be balanced against the risks of infection or malignancy in the context of a lack of long-term data demonstrating a graft survival benefit with type of induction used. Risk stratification based on ethnicity status alone needs to be reconsidered and future research needed to determine the ideal induction agents for specific immunological risk.

JAD ZEITOUNI, MICHAEL DANG, AKSHAY RAGHURAM, ALAN PANG, JOHN GRISWOLD*Retrospective Study Evaluating The Role Of Nystatin And Chlorohexidine In Mediating Pneumonia in Inhalation Injury Patients*

Introduction: Inhalation injuries are a serious clinical entity that has increased morbidity and the probability of death in the burn population. There is currently no standardized procedure for mitigating negative outcomes associated with these patients. A prevention “package” was implemented for burn patients with inhalation injury; this was done to prevent pneumonia. This prevention package revolved around a topical decontamination of the upper respiratory tract using Nystatin and Chlorohexidine. Methods: Using the electronic health record, we obtained the records 179 patients who had been admitted with an inhalation injury (with an inhalation grade from 1 to 4) who were older than 18 and were admitted within the last 6 years. Results: A logistic regression was fitted to retrospective data on 179 patients to model the incidence of pneumonia with a pool of predictors consisting of treatment type (none or both nystatin and chlorhexidine) and percent of body surface area burned (TBSA). We found that the treatment type and TBSA is highly predictive of pneumonia occurrence (p<0.004). Conclusions: The results reveal that, for the treated group, the probability of pneumonia is approximately 50% across all levels of TBSA, with a gradual decline as TBSA increases. For patients receiving no treatment, the outcome is dramatically different, with the probability of pneumonia increasing steadily from 20% at the lowest values of TBSA to 80% at the largest values. We believe this study shows the potential benefits that this topical treatment could have for inhalation injury patients with large TBSA burns; however, further research is necessary.

RICHARD ZHU, DEVARAJA RAJASEKARAN, AND YANGZOM D. BHUTIA

SLC6A14 blockade induces macropinocytosis as a compensatory mechanism for amino acid acquisition in pancreatic cancer cells

SLC6A14, an amino acid transporter is significantly upregulated in pancreatic ductal adenocarcinoma (PDAC). Using genetic deletion as well as pharmacological blockade we have already demonstrated that SLC6A14 inhibition attenuates PDAC growth. Mechanistically, we have shown that SLC6A14 blockade leads to amino acid deprivation and thereby inhibition of mTORC1 signaling pathway. However, nutrient deprivation could trigger upregulation of alternate nutrient acquisition mechanisms to meet the nutrient demands of the highly proliferating cancer cells. In this study, we wanted to test whether SLC6A14 blockade induces macropinocytosis in PDAC cells, a highly conserved endocytic process by which extracellular fluid and its contents are internalized into cells via large vesicles known as macropinosomes. If this is true then induction of macropinocytosis could partially compensate for the loss of SLC6A14. To test that, we cultured SLC6A14-positive HPAF-II and MIA PaCa-2 PDAC cells, either in the presence or absence of 1mM alpha-methyl-L-tryptophan (a-MLT) for 24h, followed by TMR- Dextran (100 µg/ml) staining for 30 min, fixing, mounting with DAPI, and confocal microscopy. The process of macropinocytosis was monitored by the cellular entry of the fluorescent marker TMR-dextran. It was interesting to observe that a-MLT treatment increased the level of macropinosomes as indicated by the TMR dextran puncta compared to the control. Addition of 5-[N-ethyl-N-isopropyl] amiloride (EIPA), a specific inhibitor of macropinocytosis in both the conditions significantly reduced the number of TMR dextran suggesting that the observed red puncta are specific to macropinocytosis. In order to inhibit a-MLT-induced macropinocytosis, the cells were also cultured in the presence of hydroxychloroquine (HCQ), an inhibitor of macropinocytosis. Our data indicated that HCQ inhibited a-MLT-induced macropinocytosis. Taken together, our results indicate that SLC6A14 blockade induces macropinocytosis suggesting that a combination therapy targeting SLC6A14 and macropinocytosis could lead to a better therapeutic outcome in PDAC as opposed to targeting SLC6A14 alone.

MS 3-4

VEENA AGUSALA, SAIF EL-NAWAA MD, MOHAMMAD ANSARI MD

A Rare Case of Myocardial Infarction with Non-Obstructive Coronary Artery (MINOCA) Presenting with Severe Refractory Cardiogenic Shock in a Young Woman

Up to 15% of women presenting with type I myocardial infarction have no coronary artery disease. MINOCA patients usually presents as NSTEMI, however a third of these cases present as STEMI. A previously healthy 41 year old woman, presented with two-week history of worsening heart failure symptoms. She was significantly volume-overloaded on exam, and developed worsening dyspnea during her hospital stay. Her EKG showed RBBB with acute new-onset ST elevation in septal leads. And labwork showed elevated and up trending high sensitivity troponin. Echocardiogram showed LVEF of < 20% and right ventricular dysfunction. Patient underwent right heart catheterization which showed cardiogenic shock, therefore an IABP was placed. Coronary angiogram showed no obstructive CAD. At the end of the procedure, she developed ventricular fibrillation, and was electrically cardioverted back to sinus rhythm. The patient presented with typical type I myocardial infarction , however the lack of CAD on angiogram made the diagnoses of MINOCA more likely.

VEENA AGUSALA, SAIF EL-NAWAA MD, MOHAMMAD ANSARI MD (CONTINUED)

Unfortunately, patient passed away shortly after the procedure despite continued resuscitation. We believe that the patient needed VA ECMO and further work up to determine the etiology of MINOCA, but in her case time was very limited and her late presentation to our facility may have been a factor in her poor outcome. MINOCA rarely presents with cardiogenic shock. Early diagnoses and rather faster work up may be needed to help better outcomes.

SARA AHMED*The Changing Perceptions of Anxiety Throughout History*

According to the DSM-V, anxiety disorders are characterized by excessive fear and worry regarding real or perceived threats that disturb the mind, often leading to behavioral changes and a decline in daily functioning. The heightened sense of apprehension that emerges from this category of disorders is recognized as more severe than a typical stress response. Throughout history, there has been a plethora of different perceptions about anxiety which were influenced by specific theories of what actually causes anxiety itself. For instance, mental health ailments during medieval times were believed to be caused by punishment from specific deities or demonic possession, and, thus, individuals who were thought to be afflicted were subjected to exorcism or other rituals. Over time, anxiety disorders were seen as a manifestation of behavior and cognition patterns based on fear, and treatment became focused on changing unhealthy behaviors and modes of thinking. The more recent developments of pharmaceutical medications emphasize deficits in central nervous system functioning that cause signs of anxiety. The progression of how anxiety is viewed throughout time has allowed us to modify and better adjust our approach in the management of symptoms.

KIRAN ALI, EMME BAYSDEN, JOHN NORBURY MD*QI Project: CAUTI Prevention at Trustpoint Rehabilitation Hospital*

This research project was created to decrease CAUTI rates of patients at the Trustpoint Rehabilitation hospital. Patients in a rehabilitation setting are typically in the facility for several weeks after a traumatic event or chronic illness relearning their new normals. CAUTI increase patient morbidity, mortality, length of stay, and increase hospital economic burden. This project will serve as a quality improvement project with tools such as providing education and implementing interventions to increase awareness of catheter presence. This intervention will decrease CAUTI with the following interventions: staff education, daily meetings to assess catheter usage, implementing signs outside hospital rooms of patients with indwelling catheter.

RAHUL ATODARIA, MS3, LUTFOR NESSA, MD, MPH, GENESIS PEREZ DEL NOGAL, MD, SAI SIVA MUNGARA, MD*A Rare Case of Spontaneous Renal Hematoma*

We present a case of spontaneous renal hematoma (SRH) in a patient with end-stage renal disease (ESRD) on hemodialysis. Although SRH is rare in hemodialysis patients, they are predisposed to developing SRH and have a high mortality and morbidity risk. Specifically, there are about 550 published cases of SRH from 1933 to 2016 with a mortality risk between 2.3-14% depending on the etiology. Furthermore, SRH has no "standard" presentation, which makes diagnosis of high-risk patients challenging.

RAHUL ATODARIA, MS3, LUTFOR NESSA, MD, MPH, GENESIS PEREZ DEL NOGAL, MD, SAI SIVA MUNGARA, MD (CONTINUED)

A 38-year-old African American male presented with nausea and diffuse abdominal pain after missing nine days of dialysis. Medical history included hypertension for 18 years and ESRD on hemodialysis for two years. Upon presentation, vital signs were normal. Physical exam was significant for dry mucous membranes, abdominal distention, generalized abdominal tenderness, and peripheral edema. Labs were significant for normocytic anemia, hyperkalemia, renal dysfunction, and anion gap metabolic acidosis. Patient was restarted on hemodialysis. CT scan abdomen/pelvis without contrast along with CT angiography were performed due to persistent abdominal pain, which revealed a poorly defined hemorrhage in the left kidney with infiltration of left perinephric fat and fluid in the left perinephric space. Our case highlights a rare occurrence of SRH in a high-risk patient group. We encourage physicians to remain cognizant of SRH in hemodialysis patients, given the uncommon occurrence as well as the high mortality and morbidity risk.

MARIA BATCHINSKY, BS, HABIB ABLA, MS, BRANDON COUCH, BS, ATHAR BATTOO, MD, ALAN PANG, MD, DEEPAK BHARADIA, MD, JOHN GRISWOLD, MD*Effects of Donor Site Regenerative Epidermal Suspension Use on Healing Time, Pain, and Scarring Outcomes*

ReCell®, a novel autologous regenerative epidermal suspension (RES™), can be harvested and applied to wounds to promote healing at a cellular level. This system aims to improve healing outcomes of patients with partial-thickness burns by replacing essential keratinocytes, melanocytes, and fibroblasts. RES™ is typically used on the burn wound itself, with marked outcomes in healing and proliferation and significantly less donor skin required. However, the use of RES™ on donor site re-epithelialization has not been extensively studied. The purpose of this study is to determine whether RES™ application to a donor site post-burn injury promotes quicker healing time, decreased pain level and improved scarring outcomes when compared to a control donor site on the same patient. Both sites underwent standard wound care. For six months post-op, photos of both donor sites were taken immediately after harvest, at the dressing takedowns, and at each postoperative follow-up visit. Digital photography as well as Silhouette star imaging were used to assess percent re-epithelialization and time to healing, while Stanford and Vancouver scar scales were used to assess pain and scarring, respectively. This study is currently ongoing, but this presentation will focus on the preliminary outcomes of two patients that completed the study through the final end point. RES™ and control sites had similar healing times, with both patients achieving nearly 100% re-epithelialization by visit 4. RES™ sites had variable pain scale scores when compared to control and an average of 1.5 points lower Vancouver scar rating in one patient at the end of follow up. Overall, results are preliminary and the study should be continued to assess outcomes of RES™ on donor site healing when compared to standard of care treatment.

JAXON T. BAUM; GRACIE R. BAUM; JUSTIN G. HARDER; DYLAN MALDONADO, MD; MICHELLE B. TARBOX, MD; BRENDAN J. MACKAY, MD*Critical Length Salvage Technique for Thumb: Nail and Nail Bed removal due to Squamous Cell Carcinoma and Verruca Vulgaris*

We present a case of concomitant verruca vulgaris and squamous cell carcinoma (SCC) in the nail matrix, nailbed, and surrounding area of a 75-year-old male patient's thumb. The lesion was first observed, biopsied and characterized by Dermatology. Due to the rarity of this neoplastic cooccurrence in the subungual region, there is not a specifically defined treatment algorithm. However, due to its malignant nature and possibility for metastasis, SCC must be removed. To resect with adequate margins in this case, amputation of part of the distal phalanx was indicated, thus the patient was referred to Orthopedics. Amputation of the distal thumb phalanx can lead to a 75% decrease in thumb function and a 30% decrease in overall hand function. Given the desire to maintain length and sensory function of the thumb, a unique treatment strategy was designed. The lesion, including a dorsal segment of the distal phalanx were removed en bloc with clean margins. Meanwhile, a flap was created to preserve local neurovascular bundles. The remaining portion of the distal phalanx bone and soft tissue were dorsally reflected and secured, creating a shorted distal phalanx. Demineralized bone matrix and acellular extracellular matrix were applied to aid in regeneration and healing of the bone and soft tissue, respectively. Following the procedure, the patient healed without infection or any other complications. At a 12-month post-operative appointment, the reconstructed thumb continued to be pain free and had no evidence of tumor recurrence. Additionally, the patient reported that his thumb retained near-normal function and maintained some sensitivity. This previously unpublished technique was successfully utilized to treat two intermingling neoplastic lesions, while maximizing critical salvage length of the digit. We believe this procedure has the possibility of being utilized for similar diagnosis to improve outcomes and better preserve pre-operative function, which phalanx amputation is indicated.

BEN BECKER, ANISH REDDY*Intermittent vs Continuous Androgen Deprivation Therapy for Metastatic Prostate Cancer: A Literature Review*

Prostate cancer (PCa) is the 2nd most common cancer among men and 4th most common cancer overall, affecting millions of men worldwide. The status quo for metastatic PCa treatment has been continuous androgen deprivation therapy (cADT). However, intermittent androgen deprivation therapy (iADT) has emerged as a promising intervention in the place of cADT. The possible favorable outcomes in morbidity and mortality along with decreased associated comorbidities are some of the reasons why this review of the literature is being conducted. To determine which protocol is more advantageous we will look at PCa-specific and PCa-non-specific deaths as our variables. Searches were conducted through the PubMed Central database. Articles included were those that were prospective randomized clinical trials (RCTs) in humans with either non-metastatic or metastatic PCa, English-only articles, articles published within the last 21 years, and ADT as either salvage or first-line treatment. Exclusion criteria were cohort studies, retrospective studies, not published in English, published earlier than 2002 and involved non-human subjects. With aid of statistical software, we employed random-effects models, evaluated log risk ratio and heterogeneity, conducted sensitivity analyses after removing heterogeneity outliers, and created funnel plots to determine publication bias. Twelve studies met the inclusion and exclusion criteria for this review.

BEN BECKER, ANISH REDDY (CONTINUED)

In the PCa-specific mortality cohort, cADT overall yielded more favorable outcomes, but the result was statistically insignificant (risk ratio 1.10 [0.85-1.42]). There was elevated heterogeneity of studies without notable bias. The non-PCa mortality cohort yielded data that favored iADT over cADT, but the data was insignificant (risk ratio 0.93 [0.77-1.13]). For this variable, there was also notable heterogeneity but there was notable bias in the data. Both of the studies provided statistical insignificance, which coincides with the null hypothesis for PCa-non-specific death, but not for PCa-specific deaths.

KAVYA BHARATHIDASAN MD, JOSEPH OTI-NIMOH MS, DUSHYANT PAWAR MD, WILLIAM BUTLER MD, ROBERT HORN MD, KENNETH NUGENT MD

Refractory Thrombotic Thrombocytopenia Purpura following a Near-Drowning Experience in a 19-year-old Patient

Thrombotic thrombocytopenia purpura (TTP) is a rare but serious life-threatening disease. Being able to efficiently diagnose and quickly initiate treatment for TTP is essential for patient outcomes to reduce mortality. In one study, 50% of deaths occurred within the first 24 hours before treatment initiation, implying the time sensitive nature of the disease. With appropriate treatment survival rates of over 90% is expected. We present the case of a 19-year-old female who had a near drowning episode in a freshwater lake about 2 weeks prior to admission. The aim of this case report is to discuss a rare presentation and treatment of the life-threatening disease process of TTP.

EASTON BREWER, MSIII, ALEXANDER ZAPATA, MSIV, SANA ERABTI, MSII, ZIYANG LI MSI, KELLY BENNETT MD, FIONA PRABHU MD

Alcohol Use and Self-Harm Screening at a Student-Run Free Clinic

Background: People of lower SES tend to suffer from more negative alcohol related consequences¹. Some negative alcohol related consequences include chronic diseases as well as more acute events like self-harm. Of note, alcohol use alone has been found to increase the risk of suicide by 65%². Our goal is to explore the population at The Free Clinic in Lubbock, TX and determine how often alcohol use and self-harm ideation is being assessed. Methods: A randomized retrospective chart review was performed using data collected from patient encounters that took place at the Lubbock Free Clinic from 1/1/21 – 11/30/22. Information collected included demographic data as well as scores from the Alcohol Use Disorders Identification Test (AUDIT) and the DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure (CCSM). Results: Data from 426 patient encounters was collected. Results showed that alcohol use was recorded via the AUDIT at a rate of 58.2%. The CCSM, which is used to screen for many mental health conditions including self-harm ideation, was completed at a rate of 45.5%. Conclusion: Data regarding alcohol use and self-harm ideation is being collected in a large portion of the encounters at the Free Clinic. However, steps should be taken to train the students on the significance of these screening tests and future efforts should be made to determine if the screening tests currently in use are adequate for their intended purposes in the free clinic setting.

EMILY BRUMFIELD, BS, HAZAEL HERNANDEZ, BS, BASAK BASBAYRAKTAR, MD*Acute Thiamine Deficiency Associated with Areflexia Mimicking Guillain-Barre Syndrome After Binge Drinking*

Guillain-Barre Syndrome (GBS) is a rare disorder characterized by autoimmune demyelinating polyneuropathy. GBS is typically associated with a post-infectious state, with about $\frac{2}{3}$ of patients experiencing upper respiratory or gastrointestinal infectious symptoms leading up to clinical manifestation. The condition is classically associated with ascending flaccid paralysis, paresthesias, and other neuropathies in moderate cases, and respiratory arrest in severe cases. Dry BeriBeri causing Ascending paralysis due to a thiamine (vitamin B1) deficiency presents with similar neuropathy with or without heart failure. Here we report a case of a 26-year-old female with a PMH of SVTs and chronic alcohol use who presented to the hospital with a 1.5-week history of flu like symptoms and three-day history of bilateral lower extremity weakness, paresthesia, and pain. She presented with weakness of lower extremity and unable to ambulate with sensory loss and absent deep tendon reflex in the lower extremities. There was high suspicion for GBS and she received a 5 day treatment of empiric IVIG and work up including investigations of CBC, CMP, CSF analysis, RPR, Vitamin B12, and MRI. Which returned negative, however, her AST/ALT were elevated with 2:1 ratio since admission. The patient was discharged home with a walker to follow up with neurology. She returned to PCP due to worsening of weakness, on a wheelchair and work up showing severe thiamine deficiency. She was re-admitted from the clinic and received thiamine IV route which improved her symptoms and she left hospital due to symptom resolution. This patient is scheduled for follow up in our clinic to reassess her condition and continue investigations. We propose that this case of a young patient with a history of chronic alcohol use highlights the importance of thiamine levels in the work up of GBS due to mimicry of thiamine deficiency from GBS.

LUIS CASTRO, MARIBEL CASTRO, RYAN DEAN MORGAN, JEANIE SHAWHART*Investigating the Effect of the COVID-19 Pandemic on Suspected Suicide Attempt Intoxications in Lubbock, Texas*

1. Background: COVID-19 is a devastating and highly infectious virus that has so far infected over 600 million people worldwide and is responsible for about 6.5 million deaths. One unexpected outcome of social distancing and quarantine laws was an uptick in mental illness cases and suicidal attempts. One of the most common means of suicide includes poisoning and drug intoxication. The aim of the current project is to investigate the effect of the COVID-19 pandemic on patterns of suspected suicide attempt intoxication phone calls from Lubbock, TX to the Texas Poison Center Network. 2. Methods: Phone call records originating from Lubbock, TX will be obtained from the TPCN between January 1st, 2018 – December 21st, 2021. Data will be filtered for suspected cases of suicidal attempt. Basic demographic information, method of intoxication, and outcome will be recorded, and data will be analyzed for any patterns such as changes in age and method of intoxication. 3. Conclusion/Results: Data was grouped to pre-pandemic reports (2018 and 2019) and pandemic reports (2020 and 2021). In the pre-pandemic period, a total of 757 calls were received to TPCN. Female callers accounted for 535 of total calls (70.3%) and 222 male callers (29.3%). During pandemic period, a total of 914 calls were received at TPCN. Female callers accounted for 629 of total calls (68.8%), 282 male callers (30.9%), and 3 unknown (0.3%). Overall, there was a 20.7% increase in calls. Preliminary analysis reveals that the increase of calls was evenly distributed among pre-pandemic distribution in gender and age group. Outcome categories also reported a proportional increase in cases.

LUIS F. CASTRO, CLARISSA PALACIOS, YAW ADU, MARIBEL CASTRO, KELLY BENNETT, FIONA PRABHU

Why do People go to the Free Clinic? Investigating reasons for patient visits before and during the COVID-19 Pandemic at a student-run Free Clinic

Background: The Free Clinic at Lubbock Impact is a student-run free clinic in Lubbock, Texas. It provides weekly primary care services to uninsured and underserved members of the community. Some of the most common reasons for visits include management of chronic conditions, screening and preventative medicine, mental health concerns, and reproductive care. The COVID-19 pandemic caused a significant shift in the healthcare needs of patients in the emergency and primary care setting. The aim of the current study is to evaluate reasons for patient visits to the Free Clinic before and during the COVID-19 Pandemic. Methods: This is a retrospective chart analysis. Data were categorized into time periods: pre-pandemic, the height of the pandemic, and post-pandemic height. Reasons for visits were divided into 45 main categories in accordance with the American Academy of Family Physicians' topics in primary care. Results and Discussion: A total of 914 patient visits were included in the present study (322 pre-pandemic, 186 at the height of the pandemic, and 406 at the post-pandemic height). Some patient visits included more than one chief complaint for a total of 1,111 chief complaints. Top 3 reasons for pre-pandemic visits: medications (40.75%), Health Maintenance & Counseling (10.54%), and Musculoskeletal Care (8.20%). Top 3 reasons for visits at the pandemic height: medications (70.71%), Health Maintenance & Counseling (4.55%), and Mental Health (3.03%). Top 3 reasons for visits during the post-pandemic height included: medications (23.12%), Health Maintenance & Counseling (17.59%), and Skin conditions (11.27%). In conclusion, the pandemic height saw a rise in mental health cases and medication-related visits.

ISABEL CASTRO-PIEDRAS, MELISSA C. MCHANN, HENRY L. BLANTON, HALEY DE SELLE, CANICE LEI DANCEL, JOSE-LUIS REDONDO, DEBORAH MOLEHIN, NADIA GERMAN, KEVIN PRUITT AND JOSÉE GUINDON

Chronic Administration of JWH-133 (Selective CB2 Agonist) Increases Ovarian Tumor Growth and Endocannabinoid Levels in SID Female Mice

Cannabinoid-based therapies are increasingly being used by cancer patients to treat chemotherapy-induced nausea and vomiting. Recently, cannabinoids have gained increased attention for their effects on cancer growth. Indeed, the effect of CB2 (JWH-015, JWH-133) agonists on breast cancer models have shown to reduce the size of breast cancer tumors. However, these studies assessing breast cancer progression were using CB2 agonist administered early into the cancer progression therefore assessing their effects on already established tumors is a critical need. In our study, we evaluate tumor growth using an ectopic xenograft ovarian (SKOV-3 and OVCAR-5) cancer model. The impact of chronic (30 days) administration of CB2 (JWH-133) agonist will be evaluated and started on 30 days of ectopic ovarian tumors. We will then evaluate and determine the mechanisms involved in ovarian cancer tumor growth by measuring levels of anandamide and 2-arachidonoyl glycerol as well as protein levels of CB1, CB2, ER α , ER β , GPER, TNF α , IL-1 β and IL-6 in ovarian and tumor tissues. Our results demonstrate a significant increase in ectopic ovarian tumor growth following chronic administration of JWH-133. Ovarian cancer tumor tissues chronically (30 days) treated with JWH-133 in comparison to vehicle treated groups showed an increase in endocannabinoid (AEA and 2-AG) and protein (CB2 and TNF α) levels with a decrease in GPER protein levels. Interestingly, our study emphasizes the importance of studying the impact of cannabinoid compounds on already established tumors to improve our understanding of cannabinoid-based therapies and, therefore better address clinical needs in cancer patients.

CARTER CHAPMAN, BS; JODI GOLDMAN, BS; NANDINI RAY, MBA; QUIN NEILSON, BS; COREY JONES, DO; FRANKLYN C. BABB, MD

Hospital readmission following outpatient treatment failure in a case of Darier disease complicated by herpes simplex virus-1 and -2 superinfection

Darier disease (DD), also known as keratosis follicularis, is a rare autosomal dominant disorder of keratinization caused by a mutation in the ATP2A2 gene affecting 1/30,000-1/100,000 individuals worldwide [1]. Due to the loss of cell-cell adhesion seen in DD, patients are at increased risk of several infectious complications, including bacterial, fungal, and viral superinfections [1-3]. These superinfections contribute greatly to the mortality and morbidity of DD. Although it is well-established that patients with DD are at increased risk of superinfections, there are currently no standardized guidelines detailing how to treat these life-threatening complications in this patient population. We describe a patient with DD who presented with HSV-1 and HSV-2 superinfection, also known as eczema herpeticum or Kaposi varicelliform eruption, that was treated with inpatient antiviral therapy and discharged after showing significant clinical improvement. However, after failing outpatient maintenance therapy, he was readmitted with worsening symptoms. We present this case with the goals of increasing awareness and recognition of DD, its complications, and the lack of evidence-based guidelines for therapy.

JACLYN COLE, DR. ALAN PANG, DR. MARK REEDY, AND DR. ROBYN RICHMOND

Case Report: Bevacizumab Induced Vaginal Cervical Avulsion

Bevacizumab is a common chemotherapy agent in epithelial ovarian cancer treatment. Although it can shrink the primary cancer and metastasis, it can cause adverse reactions such as increased risk for bleeding and poor wound healing. We present a cervical avulsion and hemorrhage in a patient with stage 4 recurrent ovarian cancer using Bevacizumab. Case Report: A 61-year-old woman with metastatic platinum-resistant ovarian malignancy, high grade serous carcinoma, received eleven cycles of Bevacizumab before formation of a rectovaginal fistula. She received two more cycles seven months after the rectovaginal fistula surgery before presenting to clinic with vaginal bleeding. Physical exam found an avulsion of the cervix from the apex of the vagina and uncontrolled bleeding. Hemostasis was achieved in the clinic and the patient was admitted to the hospital where continued bleeding was encountered. Interventional radiology was consulted which obtained hemostasis with bilateral uterine artery embolization. She stabilized after this intervention and was monitored in the surgical intensive care unit for one day. Bevacizumab can cause cervical avulsion in treatment of ovarian malignancy. Although this is a rare side effect, it can be deadly if not acted upon quickly.

BRANDON COUCH, MARIA BATCHINSKY, ALAN PANG, MD, IRFAN WARRAICH, MD, MICHAEL MELKUS, PHD, SEUNGMAN KIM, PHD, DEEPAK BHARADIA, MD, AND JOHN GRISWOLD, MD

Improvement of Cell Viability in Temporary Storage of Split Thickness Skin Grafts

Introduction: Autologous split thickness skin grafts (STSGs) are the preferred donor tissue for restoration of large tissue deficits. Although grafting should follow donor harvest, various factors necessitate tissue storage, traditionally in saline solution (SS) at 4°C. However, STSGs often expire before grafting. Patients then require further procedures or die due to inadequate skin coverage. This study sought to determine an effective storage media for prolongation of graft viability. Methods: Following patient consent, excess tissue >1cm² was collected after grafting. Tissue was stored at 4°C in RPMI, DMEM, and SS with penicillin/streptomycin. Samples were evaluated at 2,

BRANDON COUCH, MARIA BATCHINSKY, ALAN PANG, MD, IRFAN WARRAICH, MD, MICHAEL MELKUS, PHD, SEUNGMAN KIM, PHD, DEEPAK BHARADIA, MD, AND JOHN GRISWOLD, MD (CONTINUED)

5, 7, and 14 days. Cell viability was measured by Trypan blue dye exclusion test yielding percentage of viable keratinocytes (PVK). Pathology assessed tissue integrity by epidermal-dermal junction, keratinocyte halos, and collagen organization. Results: From 155 sets, mean PVK values at day 2, 5, 7, and 14: SS (57.38, 36.96, 38.38, 27.50), RPMI (69.46, 69.92, 70.33, 62.67), DMEM (63.17, 53.50, 54.83, 37.92). RPMI preserved PVK better than SS at days 5, 7, and 14 ($p = 0.001$ for each day). DMEM preserved PVK better than SS when comparing all days ($p = 0.011$). RPMI preserved PVK greater than DMEM with statistical significance at day 14 ($p = 0.017$). Tissue integrity scores at day 2, 5, 7, and 14: SS (0.69, 1.0, 1.38, 2.0), RPMI (0.54, 0.92, 0.85, 1.54), DMEM (0.77, 0.92, 0.77, 1.15). Culture media preserved tissue integrity greater than SS, but no statistically significant differences were found. Conclusion: RPMI preserved cell viability better than DMEM and SS. This suggests that RPMI may prolong tissue storage for successful grafting. This method could benefit patients by reducing future donor site area or eliminating repetitious procedures. Successful tissue storage will save patients' lives, especially those of large surface area burns who lack sufficient donor sites.

BRIGID CRUSER, DR. REGINA BARONIA

Social Media and Non-Suicidal Self-Injury

Non-suicidal self-injury (NSSI) refers to the act of injuring one's own body without intent to commit suicide. Common methods include cutting, punching, scratching, or biting oneself. Although NSSI is marked by the absence of intent to die, it is still an important risk factor for suicide (Wilkinson et al. 2011) as well as an indicator of marked psychological distress (Knock et al. 2006). It has a lifetime prevalence between 17 and 60% (Brown et al. 2017) and so it is an important topic to understand and be comfortable talking about with patients. The purpose of this review is to summarize the recent literature focusing on the impact of social media on non-suicidal self-injury (NSSI) and suicidality. We expected increased social media use to be linked to higher rates of self-harm and suicidality. A literature search was performed which yielded 69 relevant citations, after duplicates were excluded, 27 citations were determined to include unique data for review and discussion. Out of the 27 articles, 15 showed evidence that social media increased the risk of self-harm or suicidality, 6 found no impact, 3 found that it decreased the risk, and 3 showed evidence that social media had both positive as well as negative effects on the risk of NSSI and suicidality. Notably, 7 of the studies noted that a number of those who self-harmed and used self-harm spaces on social media did so in search of community. However, due to a paucity of evidence as well as some contradictory studies, more research needs to be done on this topic.

BAYLI DAVIS, ALAN PANG, JOHN GRISWOLD

Direct Thermal Inhalation Injury in a Burn Patient: A Case Study

Inhalation lung injury is typically not thermal in nature; direct thermal injury primarily occurs at the level of and proximal to the larynx, with upper airway structures (e.g. glottis) protecting the lower airways and lung parenchyma from direct thermal damage. The lower airways and lung parenchyma typically become injured due to the cytotoxic effects of chemicals inhaled in smoke. This paper documents a rare case in which a patient demonstrated evidence of direct thermal injury to the lower airways. A 26-year-old Caucasian male presented to the emergency room with 66% total body surface area (TBSA) thermal burns and grade 4 inhalation injury after a structure fire. Instead of visualizing the typical carbonaceous deposits in the bronchi, a common finding in

BAYLI DAVIS, ALAN PANG, JOHN GRISWOLD (CONTINUED)

inhalation injury, initial bronchoscopy revealed bronchial mucosa carpeted with hundreds of bulla. In addition to numerous surgeries and intravenous antibiotics, his external wounds were treated with local wound care and standard antimicrobial dressings. Despite his intubation requirements, significant fluid resuscitation requirements, pneumonia development, bacteremia, positive wound cultures, as well his Baux score modified for inhalation injury, which predicted his chance of mortality at 100%, the patient survived. He even did so without developing acute respiratory distress syndrome. This, together with the fact that at least partial resolution of his injury was noted on subsequent bronchoscopy on hospital day 2, suggests that the applicability of the revised Baux depends on the precise mechanism of injury to the lung parenchyma. It may be necessary to propose a separate prognostic scale for burn patients with non-traditional mechanisms of inhalation injury.

ZOE DAVIS MS-3, CHRISTOPHER NEEL M.D., CHUCK GILES PH.D., REGINA BARONIA M.D., NATALIE SCANLON PH.D., BRYCE CRAGG M.D.

Lubbock Alcohol Sales and University Medical Center Medical Intensive Care Unit Admissions for Alcohol Withdrawal Seizures

Alcohol withdrawal seizures are a common result of the discontinuation of alcohol use after a period of chronic consumption. Alcohol withdrawal seizures are one of the many symptoms that are a manifestation of alcohol withdrawal syndrome. Communities that have permitted the sale of alcohol have a higher incidence of alcohol abuse and chronic use as compared with communities that restrict the sale of alcoholic beverages. The goal of this study was to determine the relation between permission of sales of alcoholic beverages in a community and the admission rate at a community hospital Medical Intensive Care Unit (MICU) for alcohol related seizures. No statistically significant difference was found between the number of MICU admissions for alcohol withdrawal seizures one year prior to the allowance of alcohol sales in the City of Lubbock, Texas compared to one year after.

JODI GOLDMAN, BS; VISHWA RAJ, MD; TERRENCE PUGH, MD; CYNTHIA TIONGCO; AND JOHN NORBURY, MD

A Cross-Sectional Survey to Understand the Perception of Cancer Rehabilitation Amongst Healthcare Providers in a Rural Community

Objective: Cancer survivors often present with complex medical impairments leading to functional limitations. As there is no cancer-specific rehabilitation physician in the community of interest, the purpose of the current study is to understand the perception of cancer rehabilitation amongst healthcare providers affiliated with a community medical school that serves a largely rural population. Design: An electronic survey was administered to volunteer participants at an academic physician practice, academic medical center, faith-based medical center, and acute inpatient rehabilitation facility (IRF). Results: Thirty-eight healthcare providers and learners in various specialties and levels of training completed the survey. A majority of respondents were female (74%), Caucasian (74%), and had less than 5 years of healthcare experience (45%). The cohort consisted of medical students (45%), physical therapists (21%), occupational therapists (11%), registered nurses (11%), resident physicians (7%), and case managers/social workers (5%) all of whom acknowledged that they care for patients with cancer. Eighty-nine percent of respondents agreed that rehabilitation providers should receive some level of training for treating patients

JODI GOLDMAN, BS; VISHWA RAJ, MD; TERRENCE PUGH, MD; CYNTHIA TIONGCO; AND JOHN NORBURY, MD (CONTINUED)

with cancer, 95% agreed that it is necessary for these patients to receive screening on functional impairment, 84% agreed that oncologists should include rehabilitation as part of the treatment discussion, and 92% agreed that a rehabilitation healthcare provider should be included as part of the oncology treatment team. However, 63% agreed that there are currently barriers to providing these patients with inpatient rehabilitation services, including their complex medical needs. Lastly, 95% agreed that rehabilitation care could provide a smoother return to society, yet 63% believed this patient population is currently underserved by rehabilitation services. Conclusion: Healthcare providers in this study acknowledge that incorporating rehabilitation services into cancer care may positively impact quality of life for patients with cancer. Yet, structural barriers and medical complexity potentially hinder collaborative efforts amongst oncology and rehabilitation.

CALEB HAWKES MBA, ALEX WILKINS MD*Pleural Empyema in 65-Year-Old Male Patient Admitted with COVID-19*

The coronavirus disease 2019 (COVID-19) pandemic presented new challenges to the field of medicine due to a previously unknown course of disease and its attributing symptoms. According to the CDC, as of Dec 21, 2022, over 649 million cases and 6.6 million deaths have been reported globally. On a world scale, all have been affected in some way by the fallout of this new disease. Opportunistic and secondary infections are one of the biggest challenges with COVID-19, with much more significant mortality rates in those with additional comorbidities than with those who were healthy before contracting COVID-19. COVID-19 involves multiple systems. Secondary bacterial pneumonia in particular is associated with severe complications in the care of patients with COVID-19 in hospitals. Pleural disease in COVID-19 needs careful and prompt diagnosis with early intervention. In this report we present a 65-year-old male admitted with COVID-19 and discuss the clinical course and treatment options for post-COVID pleural empyema.

DAN HAYWARD, GRACIE BAUM, JAXON BAUM, BRENDAN MACKAY

Gunshot Wounds: Ballistics, Pathology, and Treatment Recommendations, with a Focus on Retained Bullets

As the epidemic of gunshot injuries and firearm fatalities continues to proliferate in the United States, knowledge regarding gunshot wound (GSW) injury and management is increasingly relevant to health-care providers. Unfortunately, existing guidelines are largely outdated, written in a time that high-velocity weapons and deforming bullets were chiefly restricted to military use. Advances in firearm technology and increased accessibility of military grade firearms to civilians has exacerbated the nature of domestic GSW injury and complicated clinical decision-making, as these weapons are associated with increased tissue damage and often result in retained bullets. Currently, there is a lack of literature addressing recent advances in the field of projectile-related trauma, specifically injuries with retained bullets. This review aims to aggregate the available yet dispersed findings regarding ballistics, GSW etiology, and treatment, particularly for cases involving retained projectiles.

HAZAEEL HERNANDEZ, DR. STEPHEN USALA MD/PHD, TTUHSC AMARILLO

Pituitary ACTH-secreting Macroadenoma in the Context of Adrenal Insufficiency

Cortisol (hydrocortisone) is a vital hormone controlled by the hypothalamic-pituitary-adrenal (HPA) axis. The hypothalamus produces CRH promoting release of ACTH from the anterior pituitary which then stimulates the adrenal cortex to produce the main glucocorticoid, cortisol. Primary adrenal insufficiency (Addison's disease) is defined as adrenal glandular disease with failure of the glands to secrete sufficient cortisol for physiological processes, most commonly due to autoimmune adrenalitis. Autoregulation of the HPA axis in adrenal insufficiency typically induces ACTH release and serum elevation, a diagnostic marker of Addison's. Another pathological cause of ACTH elevation is an ACTH-secreting pituitary adenoma. In contrast to Addison's, this pathophysiology increases adrenal stimulation and production of cortisol causing a condition called Cushing's disease. The description of coexisting Addison's disease (elevated ACTH without adrenal function) and an ACTH-secreting pituitary adenoma is extremely limited in the literature. Moreover, the mechanism of how a sequence of events transpires in this clinical circumstance is unelucidated. Here, we report a case of a 36-year-old woman with a one-year history of 30 pound weight gain who presented to our endocrinology clinic with an elevated ACTH of 126 pg/mL and MRI demonstrating a 3.6 cm x 3.0 cm x 3.1cm pituitary mass. She did not have stigmata characteristic of hypercortisolism. Prior to surgery, she was definitively found to be adrenally insufficient on cosyntropin stimulation with cortisol levels at 0 min, 30 min, and 60 min of 10.3 µg/dl, 12.6 µg/dl and 15.3 µg/dl, respectively. Hydrocortisone therapy was initiated, and the patient underwent transsphenoidal adenomectomy. Surgical pathology with immunocytochemistry confirmed ACTH-producing pituitary cells. We propose that this rare presentation of adrenal insufficiency and ACTH-producing pituitary macroadenoma may have been akin to Nelson syndrome, a condition characterized by pituitary tumor progression or formation after bilateral adrenalectomies.

JAIN, NEIL, BS; RAMSEY, JASON, MD

Investigating Long Term Outcomes of Knee Cartilage Restoration Procedures: A Case Series

Background: Damage to the articular and meniscal cartilage cushioning the knee joint are common findings often seen with age related degeneration or sudden twisting/turning mechanisms in injuries. Pain, reduced range of motion, and locking are all examples of symptoms

JAIN, NEIL, BS; RAMSEY, JASON, MD (CONTINUED)

that may result. To restore quality of life and function, generations of cartilage restoration procedures have evolved over the past few decades. This study examined patient cases done by a local Orthopedic Surgeon to assess results of different surgical methods (ACI, MACI, OATS) for knee cartilage restoration. Methods: Patients with a minimum of 5 years since their last procedure had their postoperative changes examined using subjective reporting and reimaging from the period of January 1, 2022 to December 31, 2022. Imaging findings were correlated with history to correlate outcomes in each surgical technique. Results: Patients receiving either the ACI or MACI procedures had minimal postoperative changes on imaging with correlating subjective reports of full range of motion, ADLs, and minimal continued knee pain. The OATS patient reported continued swelling, knee catching, mild stiffness, and severe pain with squatting or twisting motions. Conclusion: Patients receiving cartilage restoration using a harvest technique rather than autologous transplantation reported better long-term outcomes postoperatively.

CAEZAAN KESHVANI MS, JONATHAN KOPEL PHD, DANIEL VINSON MD, JAMES LEE MD, KENN FREEDMAN MD PHD

Two Muscle Surgical Treatment of a Compensatory Head Tilt in an Adult with Acquired Downbeat Nystagmus – A Case Report

Background: Kestenbaum-Anderson like operations have proven beneficial in treatment of compensatory head tilt in patients with infantile nystagmus. However, their use in acquired vertical nystagmus in adults with head tilt has rarely been reported. Methods: Presented here is a case of acquired downbeat nystagmus with a significant head tilt that responded to a simple two muscle surgery involving the superior recti, followed by a brief review of the literature. Results: A 52-year-old woman with three years of acquired downbeat nystagmus and persistent downward head tilt. Though her symptoms failed to respond to medical therapy, both her nystagmus and head tilt were alleviated by bilateral superior rectus muscle recessions. Conclusion: This case highlights that cyclo-vertical muscle surgery ought to be considered a viable option in those patients with acquired vertical nystagmus and a compensatory head posture that are refractory to medical intervention. Additionally, it appears that four-muscle vertical muscle recessions (two muscles per eye) may not be necessary to dampen vertical nystagmus since good results can be obtained with a single muscle tenotomy bilaterally.

VISHAAL KONDOOR, DR. ERROL ANDERSON

Cemented Veins: A Unique Complication of Balloon Kyphoplasty

Our case follows an 80-year-old man with longstanding history of osteoporosis, coronary artery atherosclerosis, atypical atrial flutter, and essential hypertension. Imaging revealed a pathologic compression fracture of the L1 vertebrae without myelopathy. Informed consent was obtained to perform a spinal balloon kyphoplasty. Patient was appropriately sedated and placed in prone position. Using posterolateral transpedicular approach, bilateral 10 French metallic cannulae were advanced under fluoroscopic visualization into the L1 vertebral body. Metallic drill was advanced through the L1 vertebral body marrow space prior to inflation of bilateral 20 mm high pressure balloons. Under direct fluoroscopic visualization, 12 mL of Xpede methylmethacrylate cement was injected into the L1 marrow space, resulting in excellent cement distribution and substantial reduction of the compressive deformity of the superior L1 endplate.

VISHAAL KONDOOR, DR. ERROL ANDERSON (CONTINUED)

However, sudden segment embolization was noted in the paravertebral venous plexus with extension into the suprarenal inferior vena cava. A consequent cement “stalagmite” was visualized in the suprarenal inferior vena cava. Re-access was gained through the right common femoral vein using a 21-gauge micropuncture needle under real-time ultrasound guidance. Two 20 mm gooseneck snares were utilized to capture the cement embolus. Cement embolus was mobilized by graded traction leading to detachment of the embolus from the L1 vertebral body. Under fluoroscopic visualization, hairpin loop-shaped cement embolus was then pulled into the right external iliac vein. At that point, the embolus spontaneously fractured into 2 pieces, a proximal J-shaped piece and a distal tadpole-shaped piece. The embolus was removed in its entirety. Cement stalk was measured to be approximately 4.5mm in diameter and 6cm in rostrocaudal dimension. The patient suffered no complications and made an appropriate recovery. Large cement embolisms occur infrequently in the clinical practice, we believe this case can provide further insight into the breadth of complications during a spinal balloon kyphoplasty.

JONATHAN KOPEL, NANCY BECK, MHD HASAN ALMEKDASH, AND SURENDRA VARMA

Trends in Transgender Healthcare Curricula in Graduate Medical Education

Background: Recent studies have indicated deficiencies in resident and medical student knowledge concerning the healthcare needs of transgender patients. However, there has not been an updated survey examining transgender healthcare training as reported by medical residency directors. **Objective:** Assess whether Accreditation Council for Graduate Medical Education (ACGME)-accredited residency programs in the United States and Canada are providing education regarding the unique healthcare needs of transgender patients. **Methods:** We performed a prospective survey of residency program for all family medicine, internal medicine, obstetrics and gynecology, pediatrics, psychiatry, and urology ACGME-accredited residencies in the United States and Canada to assess residency education regarding transgender issues. **Results:** Among the residency programs, transgender education was taught periodically throughout the curriculum (52.5%), in discrete modules (34.4%), or not taught at all (10.6%). However, 60% of residency program directors reported that their program lacked any clinical rotation in which residents directly work with transgender patients. Among the various methods for feedback on mastering transgender health issues, only 14.1% used patient evaluations from transgender patients. The most common areas of omission reported by residency directors regarding transgender health care for resident training included: chronic disease risks, body image, drug use, unhealthy relationships, and coming out. the most common interventions suggested by residency directors to improve transgender specific medicine include: 1) curricular material focusing on transgender-related health/health disparities; 2) Clinical faculty willing and able to teach transgender-related curricular content; 3) More time in the curriculum to be able to teach transgender-related content; and 4) More evidence-based research regarding transgender health/health disparities **Conclusion:** Overall, there remains a need for a more robust transgender medical training in residency programs. Further input from transgender patients related to resident performance and including clinical rotations for transgender care may improve physician competence in caring for this patient population.

JOCELIN LOEWEN, BAYLEY RICHARDSON, DR. NATHAN HANSEN*Penetrating neck injury due to non-lethal bean bag munition*

There have been a variety of “less-lethal” weapons created in the last few decades in hopes to provide law enforcement officers the ability to subdue a subject as opposed to causing penetrating wounds. Included in these is the bean bag gun. Although intended to be non-lethal, many reports have shown this weapon can cause significant harm and in some cases, even death. We report a case of subclavian artery injury and vocal cord paralysis following a penetrating neck injury from a bean bag round. A 55-year-old male shot with beanbag bullets was brought to the emergency department intubated after being in respiratory distress during EMS transport. Initial CTA showed possible subclavian artery injury. After removal of the beanbag, this was confirmed during an intraoperative angiogram and thus a stent was placed. After six days of intubation due to soft tissue swelling in the neck, a tracheostomy was performed. However, after placement, the patient reported significant dysphagia. Following an esophagram and a speech pathology consult, a PEG tube was placed. ENT was also consulted and revealed left vocal cord paralysis. After several weeks, the patient was decannulated and discharged home with tube feeds through PEG tube due to continued dysphagia and instructed to follow up in clinic. This report illuminates the underestimated possibility of unintentional severe and permanent injury induced by the use of non-lethal weapons such as the beanbag gun.

SHAKIRA MELTAN (MS3), DR. FAYE ARMSTRONG-PAAP MD.*Case report: Gallstone ileus in elderly patient with history of cholecystectomy*

Gallstone ileus is one of the rarest causes of bowel obstruction caused by dislodging a gallstone into the small bowel. Gallstone ileus is commonly caused by a cholecystoenteric fistula between the gallbladder wall and duodenum, which allows the passage of stone. Symptoms of gallstone ileus are very similar to bowel obstruction, such as abdominal pain and distension, nausea, vomiting, and constipation. Gallstone ileus accounts for 1%–4% of all patients with bowel obstruction. However, its incidence increases with age, and it can account for up to 25% of elderly patients with bowel obstruction. Unlike small bowel obstruction, symptoms of gallstone ileus can be intermittent. Due to the intermittent nature of pain, physicians may fail to identify the cause. Therefore, gallstone ileus carries a high morbidity and mortality rate. Gender plays an important role in this condition, as it is 3.5 times more common in females. The most common site of gallstone ileus is the distal or terminal ileum. A handful of cases report gallstone ileus in patients without a gallbladder. In this case report, an elderly patient with a history of cholecystectomy 30 years prior presented with gallstone ileus. One hypothesis for the cause of these gallstones is that the common bile duct forms the stones. The second hypothesis, although less likely, indicates the possibility that this stone originated from the patient's gallbladder. These stones grew slowly over many years after being inserted into the common bile duct during a cholecystectomy. This is the fourth documented instance of gallstone ileus in a patient who has undergone a cholecystectomy. The mortality rate for gallstone ileus, whether it has or does not have a cholecystoenteric fistula, can reach up to 27%. However, no fistula was found in our case.

CARINA WATSON, YAW ADU, MICHELLE ONUOHA, FIONA PRABHU MD, KELLY BENNETT MD*The Value of Implementing Ophthalmology Nights For Underserved Patient Populations*

Chronic diseases are more prevalent in underserved communities, which can lead to negative impairments on visual acuity. This highlights the need for consistent ophthalmologic care for individuals in these areas. In order to address this issue, this study aimed to identify the value that

CARINA WATSON, YAW ADU, MICHELLE ONUOHA, FIONA PRABHU MD, KELLY BENNETT MD

Ophthalmology Nights (OpNs) provide to patients at the Free Clinic at Lubbock Impact. The study was a retrospective chart review of 133 patients who participated in OpNs. A cost analysis was then performed by comparing procedures with their associated Medicare reimbursement rates. The services included funduscopy, new intermediate or complete exams, and established intermediate or complete exams, with Medicare codes 92250, 92002, 92004, 92012, and 92014, respectively. Refractions, another service provided, were not covered under Medicare, but the reimbursement rates from the ophthalmologist's employer, University Medical Center (UMC), were used. From October 2016 to July 2022, there were 54 OpNs with 133 patients seen, having a mean age of 50.1 years old and 60.4% of patients being female. There were 23 patients (17.2%) with diabetes only, 17 patients (12.7%) with hypertension only, and 24 (17.9%) patients with both. The estimated total value given to patients pro bono was \$26,595.16 at a rate of about \$200 per patient per visit. This study demonstrates the need for free OpNs in underserved communities. By offering this specialty night, clinics can provide their patients with visual care that they otherwise would not be able to access due to the high cost of ophthalmologic appointments and procedures. The results of this study indicate that free OpNs have the potential to greatly benefit underserved populations by providing them with essential ophthalmologic care.

ALEXANDER PARK, DR. ANINDYA SAMANTA & DR. KELLY MITCHELL

Encounters at an Ophthalmology Student Run Free Clinic during the COVID 19 pandemic

Student run free clinics (SRFC) offer an important service to underserved populations. COVID-19 pandemic resulted in potential decreased care of this population. This study was a retrospective chart review from the ophthalmology SRFC in Lubbock, Texas that analyzed patient encounters six months prior to closure due to COVID and six months after the re-opening. The results included a decline in the number of patients seen (47.3%) post-COVID when compared to pre-COVID (38 vs. 20). There was a decline in the number of encounters with active diseases (90.5%, 21 pre-COVID vs. 2 post-COVID). Analysis showed that pre-COVID, 21 patients with active diseases had worse vision (-0.33 logMAR, $p=0.034$ right eye; -0.27 logMAR, $p=0.048$ left eye) than the 17 patients who presented for routine screening. In the post-COVID group, there were no patients that had multiple visits within the six-month period, in contrast to 5 follow up visits that were recorded in the pre-COVID group. Since reopening of the SRFC, there has been a sharp decline in patients coming in with active visual disease. This compromises an already vulnerable underserved population.

ADDIE PEDERSON BA, MARVELYN IWEH MPH, KAITLYN SANTINEAU BA, TRAVIS COLE MA MS KENN FREEDMAN MD, AND COBY RAY MD

Patient's Perceptions of Importance of Discontinuing Antithrombotic Medication Prior to Oculoplastics Surgery

Antithrombotic medications include antiplatelet drugs and anticoagulant drugs, both of which impair the body's ability to form blood clots. These medications are often prescribed for patients at risk for stroke and/or heart attack, as both conditions occur due to a disruption of blood flow. While there are prescription antithrombotic medications, many common over the counter (OTC) medications and supplements have antithrombotic properties as well. Normally, these medications would be stopped before a major surgery. However, in oculo-plastic procedures, there is usually a low risk of serious, uncontrollable bleeding events.

ADDIE PEDERSON BA, MARVELYN IWEH MPH, KAITLYN SANTINEAU BA, TRAVIS COLE MA MS KENN FREEDMAN MD, AND COBY RAY MD (CONTINUED)

There is no widely accepted framework in the literature to help ophthalmologist make a decision about their patient's continued use of antithrombotic agents in a surgical setting. This study aims to analyze patients' perspective on this decision-making process. We want to gain insight on the patients understanding in three broad categories; their understanding of how their medications, supplements, and OTC drugs work, their understating of the risks these agents pose in a surgical setting, and their preferences for the continued use of the agents, if they were to have an oculo-plastic surgery. For antithrombotic medications, no clear preference for stopping or continuing the agent during surgery was found. For antithrombotic supplements and OTC's, patients preferred to stop the agents prior to surgery, suggesting that patients are less concerned about the risks of halting an OTC and/or supplement with antithrombotic properties than a medication. Therefore, surgeons who wish to be conservative with antithrombotic usage can request that patients halt their OTCs and supplements prior to oculo-plastic surgery. It is our hope that with an understanding the patient's point of view, surgeons will be equipped to have multifaceted conversations with their patients surrounding their medications, systemic health, and oculo-plastic surgery.

MALVIKA RAMESH BS, TEXAS TECH UNIVERSITY SCHOOL OF MEDICINE LANDON HOPE MD, TEXAS TECH UNIVERSITY SCHOOL OF MEDICINE CLAY COCKRELL MD, COCKRELL PATHOLOGY RICHARD HOPE MD, TEXAS TECH UNIVERSITY DEPT OF DERMATOLOGY

Late Onset Pseudolymphomatous Reaction to Blue Tattoo Pigment Precipitated by Covid Vaccination

Tattoos can lead to a variety of cutaneous conditions such as allergic or contact dermatitis, lichenoid dermatitis, pseudolymphomatous reactions and granulomatous responses such as foreign body granulomas that may have a sarcoidal histology simulating sarcoidosis.[1] Pseudolymphomatous reactions are less common and may clinically and histologically resemble cutaneous lymphomas.[1,2] Pseudolymphomatous reactions may develop in response to injections, Borrelia infections and arthropod bites.[2] Diagnosis of cutaneous pseudolymphoma is usually based on clinicopathologic correlation coupled with skin biopsy and ancillary tests such as immunoperoxidase stains and genetic testing when necessary. Treatment is generally successful with application of topical corticosteroid preparation or injection of intralesional corticosteroids and in some cases, surgical excision.[2,3] Here, we describe the case of a 61-year-old male who presented with 3-4 mm papules contained within the blue region of a multicolored tattoo on his upper right arm that had been present for several years. The reaction developed shortly following a Covid vaccination.

NANDINI RAY, NANDINI NAIR, MD

Anticoagulation and intracranial hemorrhage in the left ventricular assist device population

While left ventricular assist devices (LVADs) are a therapeutic option for patients with chronic heart failure, their use is associated with a risk for bleeding complications and thromboembolic events such as intracranial hemorrhage (ICH). Because anticoagulation can cause hematoma growth or neurologic deterioration, optimizing anticoagulation and reversal regimens are key to improving patient care and outcomes. This was a single-center retrospective analysis of 39 patients with LVADs implanted from January 1, 2016, to January 31, 2022 at University Medical

NANDINI RAY, NANDINI NAIR, MD (CONTINUED)

Center in Lubbock, Texas to compare two groups with and without ICH once an anticoagulation reversal algorithm of decreasing the internal normalized ratio (INR) and not bridging with enoxaparin was instituted. Of this population, four patients died due to complications from ICH following the implementation of the anticoagulation reversal protocol. There was a significant difference in the INRs between patients without ICH (M = 1.68, SD = 0.20) and with ICH (M = 1.98, SD = 0.23); $t(39) = -2.85$, $p = 0.0071$. ICH can be prevented at lower INR ranges without major consequences. Supportive care through reversal of anticoagulation remains important in the acute management of ICH.

AKHILA REDDY, BA, JEREMY PURSER, MD, BAILEY NELSON, MD, BRENT PAULGER, MD, CLOYCE STETSON, MD

Sebaceous carcinoma of the wrist in an elderly woman: a case report

Sebaceous carcinoma is an aggressive cutaneous malignancy arising from sebaceous glands. Relative to skin malignancies such as basal and squamous cell carcinoma, sebaceous carcinoma is rare, with an estimated incidence of 1-2 cases per 1,000,000 person-years. Sebaceous carcinomas most commonly occur in the ocular area and head and neck region, corresponding to the density of sebaceous glands. Extraocular locations of sebaceous carcinomas are rare and not well described. We report a case of an 89 year-old Caucasian female with sebaceous carcinoma of the right wrist. She initially presented with a 1.2 centimeter friable nodule on the right wrist. Initial shave biopsy and subsequent pathologic evaluation revealed a basaloid neoplasm with sebaceous differentiation, atypia, and frequent mitoses. The presented case reviews common clinical features and pertinent histopathology of ocular and extraocular sebaceous carcinoma, as well as a literature review of diagnosis, prognosis, and treatment.

BAYLEY RICHARDSON, LEIGH HICKHAM, NARESH SAH, TASMIN OMY, CHINNADURAI MANI, KOMARAI AH PALLE, MARK REEDY

Mebendazole for the Treatment of Vaginal Trichomoniasis: A Pilot Study

Objective. *Trichomonas vaginalis* is one of the most common sexually transmitted diseases worldwide. In the United States, metronidazole is the only effective treatment available. Certain individuals are infected with metronidazole-resistant strains of *trichomonas* are intolerant to metronidazole, leaving the patient without therapeutic options. The specific aim of this study was to determine if mebendazole could be used effectively to treat vaginal trichomoniasis, thus providing an alternative therapy. **Methods.** Our study was approved by our institutional IRB and consents were obtained from five non-pregnant patients. Samples were obtained from positive wet mounts in the clinical setting. Presence of infection was confirmed with urine and vaginal cultures *Trichomonas vaginalis*. Subjects were treated with mebendazole 200 mg orally for three days after documenting symptoms. Seven to ten days after completion of the medication, a follow-up examination was performed with documentation of any symptomatic improvement as well as a repeated wet mount, vaginal and urine cultures. Stand therapy of metronidazole was provided to sexual partner(s) and to patients with persistent infection after mebendazole therapy.

**BAYLEY RICHARDSON, LEIGH HICKHAM, NARESH SAH, TASMIN OMY, CHINNADURAI MANI,
KOMARAI AH PALLE, MARK REEDY (CONTINUED)**

Results. After five patients failed to respond to the oral dosing of mebendazole, the pilot study was discontinued to investigate alternatives, specifically the route of delivery to improve exposure of the trichomonads to the mebendazole. Conclusion. A three-day oral course of mebendazole is not a reliable therapy for vaginal trichomoniasis. Mebendazole has a significant in-vitro activity against *Trichomonas vaginalis*; however, the poor absorption of the drug is a major concern. An intra-vaginal suppository would provide an alternative route of delivery by local exposure of the drug to the infection upon dissolution of the suppository.

SHAYAN SARRAMI, DEEPAK BHARADIA*Surgical treatments available for Apert syndrome*

Apert syndrome is an autosomal dominant FGFR2 Mutation on chromosome 10 leading to diffuse early epiphyseal fusion. The developmental defects include multiple craniofacial abnormalities, syndactyly of the extremities, and mental status variability. Plastic surgeons have long been a part of the treatment team dealing with the physical malformations of this syndrome. Over the years, treatment algorithms have been developed and edited to achieve the best practices. Fusion of the metopic and lambdoid sutures are associated with emergent increase of intracranial pressure and must be treated within the first 3 months of age. In other situations, posterior vault distraction can be postponed a few months and syndactyly treatment can be considered earlier on depending on the Upton grading scale. Our project will cover these surgical options for Apert syndrome and the current algorithm of treatment.

JOSEPH SILVAGGIO, MS3*Unexplained Recurrent Small Bowel Obstruction*

Carcinoid tumors are rare neuroendocrine tumors that usually arise in the GI tract or lung and can present with symptoms of carcinoid syndrome or mass effect such as bowel obstruction. A 65-year-old female presented to the emergency department with complaints of diarrhea, nausea, vomiting, and difficulty eating. The patient denied fever or chills. She had no past medical history or surgical history. Initial small bowel series showed contrast in the colon and the patient was later discharged home with antibiotics and PPI. She presented six days later with the same complaints, so a CT abdomen/pelvis was obtained which demonstrated mechanical obstruction of the distal small bowel. An NG tube was placed with suction and symptoms persisted for several days. Labs included an elevated CA125 level of 50 units/mL (reference: 0-35). Due to the recurrent obstruction, lack of previous abdominal surgery, and elevated CA125 the patient was taken to the OR on hospital day five for exploratory laparotomy. Intraoperative findings were significant for dilated loops of small bowel, a transition point in the distal ileum with an intraluminal mass, distal appendiceal mass, and an abnormal appearing right ovary. The small bowel mesentery and appendiceal stalk had evidence of desmoid reaction. Approximately 20cm of ileum was resected, appendectomy, and right salpingo-oophorectomy. The patient was discharged on postoperative day four after return of bowel function. The specimen pathology results showed neuroendocrine tumor of small bowel origin with metastasis to the appendix, ovary, and 5 local lymph nodes. A serum serotonin was obtained which was elevated at 1,401 ng/mL (reference: 56-244). The patient was set up with an outpatient oncology appointment for follow-up. This case shows an uncharacteristic presentation of small bowel obstruction. Neuroendocrine tumors can easily be missed without a high index of suspicion and appropriate lab tests and surgical intervention.

SIMMONE SPIELMANN, EMILY BRUMFIELD, DR. IZI OBOKHARE, MD*IMPACT OF LIPOSOMAL BUPIVACAINE TAP BLOCKS ON PATIENT OUTCOMES IN MINIMALLY INVASIVE COLORECTAL SURGERY*

Background and Objectives: As part of enhanced recovery after surgery protocols, there has been an increased interest in the optimization of analgesic techniques. This study compares the efficacy of liposomal bupivacaine transverse abdominis plane (TAP) blocks to traditional TAP blocks in their outcomes in minimally invasive colorectal surgery patients. Traditional methods such as epidural anesthesia present an unfavorable side effect profile, while TAP blocks with conventional anesthetics have a short half-life and sub-optimal pain control. Liposomal bupivacaine (Exparel) is a longer-acting slow-release anesthetic that has shown promise in pain control following colorectal surgery, particularly in the field of minimally invasive procedures. **Methods:** A retrospective study was done using patients who had undergone minimally invasive (MIS) colorectal surgery, to study the effect of perioperative liposomal bupivacaine TAP block on postoperative outcomes. The parameters studied include length of stay, opioid consumption, and post-operative pain score. Patients aged 18 to 89 who were admitted for surgery between January 1, 2017 and September 20, 2019 were recruited in the study, and there were a total of 241 patients retrospectively included. The control group consisted of patients who underwent MIS colorectal surgery without receiving liposomal bupivacaine TAP block and received a different local anesthetic instead. **Results:** Liposomal bupivacaine TAP blocks in our study population showed statistically significant decreases in both length of stay and in the need for adjunct use of non-steroidal anti-inflammatory (NSAID) drugs for additional post-operative analgesia. The mean length of stay in the control group was 4.79 days, while in the liposomal bupivacaine group it was 4.14 days with a p-value of 0.011. The data additionally showed that 77% of patients in the control group required NSAIDs for pain control, as contrasted to only 45% of the Exparel, with a p-value of <0.001. While the Exparel also had decreased opioid and acetaminophen use, this requires a larger study population and additional investigation as it did not reach a level of statistical significance in our study. Pain scores and post-operative complication rates were similar between the two groups. **Conclusion:** This study shows that liposomal bupivacaine TAP blocks significantly improved several post-operative outcomes in minimally invasive colorectal surgeries. These Exparel TAP blocks not only decreased the average length of stay for patients, but also decreased their need for additional analgesics. Future research could continue to investigate the potential benefits in additional parameters such as Acetaminophen and Opioid use post-operatively.

ALEX SUTTER, DYLAN LANDIS, FABIANA FERNANDEZ, KENNETH NUGENT*The effect of metformin on glucose metabolism in patients receiving glucocorticoids*

Glucocorticoids have powerful anti-inflammatory and immunomodulatory effects, but chronic use of these drugs can cause hyperglycemia, type 2 diabetes mellitus, hepatic steatosis, obesity, and other complications due to their metabolic actions. Metformin is a widely used drug for the treatment of type 2 diabetes mellitus with a known ability to lower blood glucose levels. This review focuses on metformin's actions on glucose metabolism and its potential use as a drug to limit the metabolic side effects of glucocorticoid treatment. Available data suggest that metformin inhibits complex I of the mitochondrial electron transport chain, crucial gluconeogenic enzymes, and fatty acid synthesis that leads to a significant improvement in glucose tolerance and maintenance of insulin sensitivity during glucocorticoid treatment. Three small randomized control trials have demonstrated that metformin can limit changes in glucose metabolism during treatment with prednisone. These studies reveal a promising potential for metformin use as a therapeutic agent to reduce glucocorticoid-induced hyperglycemia and improve patient outcomes.

ALEX ZAPATA, SANA ERABTI, ZIYANG “SUE” LI, EASTON BREWE

Retrospective analysis of substance use disorder screening and documentation for the uninsured patients served by the TTUHSC Staffed Free Clinic at Lubbock Impact

The Free Clinic at Lubbock Impact (FC) serves local uninsured patients and uses the Alcohol Use Disorders Identification Test (AUDIT) and the Drug Abuse Screening Test (DAST) tools to detect potential SUDs. Counseling and social work are currently employed to address SUDs, but no medication-assisted treatments (MAT) for alcohol and opiates SUDs are used by FC. This study evaluated completion rates of these screening tools via randomized retrospective chart analysis. Consult notes were analyzed to determine if the assessment & plan section addressed recommendations for managing a substance use disorder, and if screenings indicative of potential SUD were directly addressed in patient charts. Only 42% of DAST forms and 61% of AUDIT forms were completed. Only 4% of consult notes documented that a SUD was discussed, managed, or noted as a concern at all. The National Center for Drug Abuse reports 60% of Americans abuse drugs, including alcohol and tobacco, and there is no reason to suggest the 4% prevalence in our clinic is accurate. FC has discontinued use of the AUDIT and DAST screening tools and replaced them with the AUDIT-C and Substance Use Brief Screening (SUBS). This change will decrease patient burden from completing 2 pages with 25 questions to 1 page with 7 questions in screening for SUDs. Form completion will be reevaluated in the coming months with hope of more accurate data gathering on our patients. Other initiatives managed by TTUHSC including a possible new addiction medicine elective, expansion of existing addiction medicine education programs, a new addiction focused club, and more will push to increase student clinician documentation pertaining to addiction and SUDs. Ultimately, this part of our needs assessment will help guide the potential for bringing MAT to FC to address opioid and alcohol use disorders, in addition to our current smoking cessation program.

POST-DOCTORAL

NICO ANTENUCCI, GUANGCHEN JI, TAKAKI KIRITOSHI, EDITA NAVRATILOVA, FRANK PORRECA AND VOLKER NEUGEBAUER

Chemogenetic manipulation of amygdala kappa opioid receptor neurons modulates neuropathic pain behaviors

The amygdala is an important neural substrate for the emotional-affective dimension of pain. The central nucleus (CeA) serves major amygdala output functions and receives highly processed nociceptive and affect-related information from the lateral-basolateral network (LA-BLA). The CeA contains mostly gamma-aminobutyric acid neurons, some of which also co-express neuropeptides such as corticotropin-releasing factor (CRF) and dynorphin, an endogenous agonist of kappa opioid receptors (KORs). The dynorphin/KOR system in the amygdala has emerged as a critical player in aversive-affective behaviors in stress- or injury-induced pain conditions, but the underlying synaptic and cellular mechanisms remain to be determined. Here we used chemogenetic manipulation of CeA-KOR neurons to determine their contribution to pain behaviors under control conditions and in a neuropathic pain model.

RACHEL L. BABCOCK, MINGXIAO V. YANG, KATHRYN L. FURR, DALIA MARTINEZ-MARIN, MONICA SHARMA, AND KEVIN PRUITT

DVL1 regulation of HLA genes in triple negative breast cancer

Dishevelled 1 (DVL1) is most well-known for its cytoplasmic role as a protein that regulates Wnt/ β -catenin signaling, affecting cell proliferation, differentiation, and migration. Early investigation revealed that DVL1 plays a role in development, and more recently, DVL1 mutations were linked with congenital disorder. Very recently, we reported that DVL1 is enriched in triple negative breast cancer (TNBC) and promotes tumor growth. Although DVL is critical for Wnt signaling, surprisingly little is known about how it is regulated and the significance of its nuclear translocation. Our group discovered DVL1 localizes to the nucleus, yet the specific genes regulated by DVL1 and the transcription factors that bind with and mediate DVL1-directed gene expression remain poorly understood. Analysis of our chromatin immunoprecipitation-sequencing dataset for novel DVL1 target genes in TNBC models revealed DVL1 enrichment at important immune genes such as major histocompatibility complex class I (MHC-I) and MHC-II, compared to input controls. Assays using DVL1 loss and gain of function TNBC cells revealed differences in HLA-DPA1 and HLA-DRA gene expression (MHC-II), as well as modest changes in HLA-A and HLA-E (MHC-I). Furthermore, our data identified TFAP2A and FOXO1 as putative nuclear binding factors of DVL1, based on in silico screens and in vitro co-immunoprecipitation assays indicating binding with DVL1 in the nucleus. Collectively, our data propose a preliminary model by which DVL1 regulates MHC-II and MHC-I gene expression in TNBC cells, and also interacts with TFAP2A and FOXO1 in the nucleus. Whether and how TFAP2A and FOXO1 mediate DVL1-directed regulation of MHC gene expression in TNBC cells will be tested in future mechanistic studies. While several conceptual breakthroughs describing the nuclear role of β -catenin regulation have been made, the nuclear role of DVL1 has remained a mystery but our studies provide critical new insight.

KONERU B , BURROW T , MCCOY K , NANCE J , NARANJO A , ZHANG F , IRWIN M , PARK J , REYNOLDS

CP

Improved outcome for patients with alternative lengthening of telomeres (ALT) neuroblastoma randomized to tandem myeloablative therapy on COG ANBL0532

Background: High-risk neuroblastoma (HRNB) patients with alternative lengthening of telomeres (ALT) tumors (~23% of patients) have lower overall survival (OS) compared to other HRNB patients. HRNB patients enrolled in COG ANBL0532 randomized to tandem autologous stem cell transplant (ASCT) had a superior event-free survival (EFS) compared to those randomized to single ASCT. We sought to determine if ALT HRNB patients on ANBL0532 benefited from tandem ASCT. Methods: We determined the presence of telomere maintenance mechanisms (TMM) in 204 primary tumors from ANBL0532 patients. Telomere maintenance mechanism was defined as per Cancer Res 80:2663, 2020; patients designated as TERT+ had high TERT mRNA expressing tumors and as ALT if tumors were positive for the telomeric DNA C-circle assay (CCA) or ultrabright telomere foci (UTF). Due to non-proportional hazards, survival comparisons were performed using the Improved Two-Stage Procedure (J Stat Comput Simul. 2017; 87:1877). Results: TMM status was: ALT n=48 (23.5%), TERT+ n=140 (68.6%), TMM negative n=16 (7.8%). Patients with TERT+ tumors more frequently progressed early, but 8-year OS was superior for TERT+ compared to ALT (58.1 \pm 4.6% vs 41.6 \pm 8.2%; p=0.0007), while 8-year OS for TMM negative was 67.7 \pm 12.2%.

KONERU B , BURROW T , MCCOY K , NANCE J , NARANJO A , ZHANG F , IRWIN M , PARK J , REYNOLDS CP (CONTINUED)

The 8-year OS for TERT+ patients randomized to single (n=67) vs tandem (n=59) ASCT was 56.9±6.7% vs 71.8±6.5% (p=0.32) and for ALT patients randomized to single (n=20) vs tandem (n=19) ASCT was 26.9±11.5% vs 61.1±13.5% (p=0.011). For patients on ANBL0532 who received dinutuximab post-consolidation therapy, the 8-year OS for TERT+ patients who underwent single (n=52) vs tandem (n=43) ASCT was 53.5±7.6% vs 75.8±7.8% (p=0.10) while for ALT patients who underwent single (n=13) vs tandem (n=10) ASCT it was 23.1±14.3% vs 77.8±16.4% (p=0.022). Conclusions: This is the first study of TMM for neuroblastoma patients treated on a single prospective clinical trial. As previously reported, patients with ALT HRNB have inferior OS relative to TERT+ HRNB. As expected, TMM negative HRNB patients had apparently higher OS than ALT or TERT+ but small numbers preclude formal analyses. OS was significantly improved in ALT HRNB by tandem ASCT. These data support use of tandem myeloablative therapy for patients with ALT neuroblastoma until effective targeted therapies become available.

SEHAR, UJALA; RAWAT, PRIYANKA; CHOUDHURY, MOUMITA; CULBERSON, JOHN; KHAN, HAFIZ; MALHOTRA, KEYA; BASU, TANISHA; REDDY, P. HEMACHANDRA

Caregiving Practices in the Hispanic population and Urgent Need for Developing Interventions for Hispanic Family Caregivers

Background and purpose: Alzheimer's disease (AD) and Alzheimer's disease-related dementias (ADRD) are primary public health concerns in the United States and around the globe. Increasing evidence suggests that Hispanics are the fastest-growing ethnic population in the USA. Further, Hispanics develop clinical symptoms of AD/ADRD and other comorbidities, at least seven years earlier than non-Hispanic Whites. Currently, AD/ADRD individuals are taken care of by family caregivers, which puts a tremendous burden on caregivers who are usually older themselves. Family caregivers provide all-day care for individuals with long-term illnesses, such as AD/ADRD, while managing their health. Our study aims to assess the status of Hispanic caregivers and their burden in rural West Texas. Methods: The current study collected information about family caregivers of AD/ADRD patients and assessed caregivers' essential activities of daily-living and their physiological, mental, behavioral, and social health. Our study also focused on effective interventions for family caregivers that includes educational and psychotherapeutic components. It critically assessed the innovative methods and validations to support Hispanic family caregivers in rural West Texas. Results and discussion: Our initial findings showed that family-centred caregiving is very common in the Hispanic culture due to their ethnocentric beliefs that also tend to delay seeking diagnosis and treatment. The demands of caregiving can harm the caregiver's physical and mental health that might affect the patients as well as long-term outcomes. Many ties that distinguish Hispanic families are beyond the scope of the present surveys/metrics, and techniques. It is critical for AD/ADRD patients and their families to find prospective sources of unpaid care, comprehensive metrics, and procedures to assess these families' needs, including the kinds of links that make up these families. Conclusion: To address the unmet needs of Hispanic family caregivers, we propose to develop culturally appropriate innovative methods involving educational and psychotherapeutic components and validation tools.

VICTORIA C. YOUNG, MARILINA DE SAUTU, IRENE C. MANGIALAVORI, PABLO ARTIGAS

Functional Analysis of Plasma Membrane Ca²⁺ ATPase 3 and its Primary Aldosteronism-Associated Mutations

Primary aldosteronism (PA) is the most common form of secondary hypertension and can lead to higher rates of cardiovascular complications and death than essential hypertension. Aldosterone-producing adenomas (APAs) are the most frequent cause of PA. Most APAs have mutations in plasma membrane ion-transport proteins with 0.6%-9% carrying a mutation in the Plasma Membrane Ca²⁺ ATPase 3 (PMCA3). We have developed a *Xenopus* oocyte expression system to measure the function of PMCA3 wildtype (PMCA3-WT) and an APA associated deletion mutant (PMCA3-L425_V426del) with minimal endogenous contamination. We measured ATPase activity at 37 °C in plasma membrane preparations from oocytes expressing PMCA3. Ca²⁺-dependent ATPase was observed in preparations from oocytes expressing PMCA3-WT, with a [Ca²⁺] dependence well described with a rectangular hyperbola ($K_{0.5} = 25.6 \pm 5.1$ mM) (triplicates from three independent membrane preparations). In contrast, membrane preparations from PMCA3-L425_V426del expressing oocytes lacked Ca²⁺-dependent ATPase activity, indicating loss of enzymatic activity in the mutant. We used two-electrode voltage clamp electrophysiology to evaluate the presence of PMCA3-variant mediated currents. At resting intracellular [Ca²⁺], PMCA3-WT injected oocytes had currents indistinguishable from those in uninjected oocytes, at all voltages. When bathed by extracellular 125 mM Na⁺, PMCA3-L425_V426del injected oocytes presented inward currents at negative membrane potentials and outward currents at positive ones, consistent with induction of an aberrant channel-like current. The currents were outwardly directed upon substitution of external Na⁺ with N-methyl D-glucamine⁺ and were insensitive to changes in extracellular [Ca²⁺]. These results indicate that PMCA3-L425_V426del causes hyperaldosteronism due to the concomitant loss of active Ca²⁺ transport and induction of a depolarizing Na⁺-mediated current. Current experiments are evaluating the ATPase and physiological characteristics of other PA-associated PMCA3 mutations. Funded by NSF-MCB 2003251.

public health

LUIS F. CASTRO, YAW ADU, MARIBEL CASTRO, KELLY BENNETT, FIONA PRABHU

Investigating Level of Food Security in a Sample of Uninsured Patients in West Texas

1. Purpose/Background: Preventative medicine in primary care involves educating patients on healthy food choices and adequate physical activity. These recommendations often revolve around the notion that the patient will have sufficient access to fresh and healthy foods. This is true of patients that suffer from diabetes mellitus, hypertension, and obesity. However, these recommendations are meaningless for those that struggle with food insecurity. The aim of this project is to study the level of food security and glycemic or blood pressure control in patients at The Free Clinic at Lubbock Impact. 2. Methods: One hundred patients with hypertension, diabetes mellitus or both will be identified during patient registration. Those that meet the inclusion criteria will be provided with a 10-item survey by the Economic Research Service, USDA to measure food security levels. The latest HbA1C and blood pressure readings will also be recorded. 3. Results: This is a preliminary analysis of 82 responses.

LUIS F. CASTRO, YAW ADU, MARIBEL CASTRO, KELLY BENNETT, FIONA PRABHU (CONTINUED)

Overall, 47 (57.3%) identified as female, and 35 (42.7%) identified as male. Demographic analysis reveals Hispanics made up the largest ethnic group (47.6%) followed by Caucasians (31.7%), African American (10.9%), Other (6.1%), and Asians (3.7%). Most patients suffered from Hypertension alone (57.3%) followed by Both (31.7%), and lastly Diabetes alone (10.9%). Analysis of food security levels revealed High Food Security in 25.6% of patients, Marginal Food Security (29.3%), Low Food Security (13.4%), and Very Low Food Security (31.7%). 4. Conclusions: This preliminary analysis demonstrates that almost half of all patients (45.1%) experience either low or very low food security levels. The relationship between food security levels and hypertensive and glycemic control is still pending. However, the results of the current study will inform future social work interventions for patients with low food security and help educate medical students about lifestyle recommendations for Free Clinic patients.

LUIS CASTRO, ROHAN PENDSE, RYAN MORGAN, COURTNEY QUEEN

Drive-Thru Clinics a New Model of Healthcare and Future Directions - A Lubbock, Texas Case Report

When the SARS-CoV-19 pandemic began, daily life was profoundly affected for everyone. Lockdowns were put into place, one could not leave their home without a mask, and even when the lockdowns ended most people remained working from home. One of the most profound effects of SARS-CoV-19 was the effect it had on the healthcare system. Before SARS-CoV-19 tests became readily available to the public, to get tested one had to drive to their local doctor's office, urgent care, or emergency department for a test. Drive-thru testing was innovative because it prevented the spread of disease in close-quarter waiting rooms at physician offices or emergency rooms. This is how the idea of University Medical Center (UMC) newest family medicine drive-thru clinic was created. In summary, the drive-thru clinic improves patient accessibility for the elderly and disabled, reduces disease spread, and has implications in the realm of public health and rural health.

HAILEY KREUSEL

Developing a training curriculum for community health workers (CHWs) on Heart Disease Prevention

The purpose of this project is to develop a curriculum to educate community health workers (CHWs) on heart disease prevention measures and interventions. Community health workers are on the front lines of delivering public health information and guidance to communities. The curriculum applies the methods of living a healthier lifestyle to help prevent heart disease. Continuing Education Units (CEUs) for CHWs are used to expand and improve the delivery of healthcare service delivery among communities. A pre and post test will be administered to help analyze the efficiency of the curriculum and will refine it as such upon completion.

LAWAL S, OLUMAKINWA O, ST. JOHN J

Creating picture-centric education materials for use and maintenance of composting latrines

Background. Volunteers with Olive Branch Ministries International (OBMI) built a composting latrine in a rural village (La Campina) outside of Piura, Peru in July 2022. This pilot project resulted from needs identified in 2019 from a community health needs assessment conducted by TTUHSC students and faculty during a TTUSHC Office of Global trip in collaboration with OBMI.

LAWAL S, OLUMAKINWA O, ST. JOHN J (CONTINUED)

The 2022 pilot project involved the creation, testing, and delivery of health education materials in Spanish by local university students with community members, visits by OBMI staff three months post-construction yielded little use of the latrine. When visiting with the community, they shared their fear of using/taking care of the latrine incorrectly. Further dialogue led to the discovery of low community literacy levels. To increase understanding and utilization of the latrine, two MPH students worked with OBMI to develop picture-centric educational materials to train community members how to properly use and maintain the latrine. Research Question. How can community members be trained in the proper use and maintenance of composting latrines using few words and a majority of pictures? Methods. Students applied health behavior and health communication theories to the creation of picture-centric educational materials. Additionally, students worked with local Peruvian partners and community members through engagement of community based participatory research (CBPR) to create, test, refine, and finalize educational materials. Results. Health education materials included visual diagrams with minimal words designed to effectively communicate information to people with lower literacy levels. The effectiveness of the materials was evaluated through community feedback. Conclusions/Future Directions. The main project goal was to improve utilization of the composting latrine through creating picture-centric health education materials that increase understanding and proper usage of composting latrines. The education materials address a real-world problem and have the potential to improve the living conditions of the focus community.

DUNG LE, STEPHANIE B. MORENO, DR. JULIE ST-JOHN, AND DR. LISA GITTNER

Women's Thriving in a Blue Zone

There are 5 blue zones in the world; blue zones are environments that have the longest life expectancy and best self-rated quality of life. The blue zone in Costa Rica is Nicoya located in the peninsula of the country and includes 0.4% of the total population. The blue zone in Costa Rica is defined by male life expectancy which is approximately seven times higher than the global average. The current study described females to gauge the extent of women thriving in a blue zone. Thriving is the ability for women to reach their full potential and flourish. In this analysis we adapted the WHO structure of a functional public health system as a basis to categorize themes related to the inclusion of women in the entire scope of a country's educational, employment systems, environmental, governmental, healthcare, and society. Costa Rica was compared to composites of North America and South America on factors related to women's thriving. Data was collected from numerous databases, which were cleaned and compiled into an excel spreadsheet. Relational grid maps by country and continent for each theme category were generated using SPSS 29. The data was then grouped into themes: demographics, climate, comorbidity, livelihood, maternity, early life, education, violence, politics, social support, and mental health categories. Preliminary analysis shows Costa Rica is different from both North and South America in the categories for thriving. The indicators for women are lower than what was expected for a blue zone and there was indication the blue zone contributed to the women's thriving in Costa Rica.

STEPHANIE MORENO-BUNCH, DUNG LE, DR. JULIE ST-JOHN, AND DR. LISA GITTNER

Women's thriving in the Americas

Within the Americas we see various factors that create environments conducive or detrimental to women's thriving. Thriving is the ability for women to reach their full potential and flourish. In this analysis we adapted the WHO structure of a functional public health system as a basis to categorize themes related to the inclusion of women in the entire scope of a country's

STEPHANIE MORENO-BUNCH, DUNG LE, DR. JULIE ST-JOHN, AND DR. LISA GITTNER (CONTINUED)

educational, employment, environmental, governmental, healthcare, and societal systems. Six countries spanning the Americas were chosen for the study (Brazil, Canada, Chile, Mexico, Uruguay, and the United States). Inclusion criteria were heterogeneous populations, stable governments, stable educational system, and similar healthcare options. Data was collected from numerous databases, cleaned and compiled into an excel spreadsheet. The data was then grouped into theme categories: demographics, climate, comorbidity, early life, education, economic, livelihood, maternity, violence, politics, social support, and mental health. Relational grid maps by country and continent for each theme category were generated using SPSS 29. Variables in each theme were ranked by the countries best to worst outcomes for each indicator. Preliminary analysis highlights differences between countries on factors contributing to women thriving. For example, depending upon the country, midwifery was linked to different outcomes (teen births and C-Sections versus births attended by healthcare providers and infant mortality) However, female literacy was linked to very similar outcomes in all the countries. The linkages will be displayed and discussed. Our analysis reveals both positive policies and also lack of support for women across global indices, which can be used for policy changes.

CHANDLER W. NOLTE, BARBARAH MARTINEZ, JULIE ST. JOHN

Results of Community Outreach and Engagement Efforts for the Prevention and Intervention of Sexually Transmittable Infections in Fort Bend County, TX

Background: Fort Bend County, a rural county in the 6/5S Texas Department of State Health Services (DSHS) Region, has had an increased average incidence of Sexually Transmittable Infections (STIs) in the past ten years—posing a public health concern for county residents. With an average incidence of 422.2 cases/100,000, efforts to mitigate rising STI incidence and prevalence in the county and surrounding areas have been an increased focus of healthcare providers. However, due to factors such as a patient-to-physician ratio of 1,160:1, barriers to care have limited access to testing and treatment due to long physician wait times, lack of resources for the uninsured, high cost of treatment due to inadequate insurance, and ease of access to culturally conscious resources. Research question: Can an education and screening program effectively reduce STI rates in a rural Southeast Texas county? Methods: To provide adequate intervention and prevention measures for STIs, the Fort Bend County Department of Health and Human Services (FBCHHS) developed an HIV/STI division to provide STI testing and treatment. An integral component of mobilizing prevention and intervention resources relied on the active response of community members through community outreach and engagement initiated in January 2023. Utilizing community resources and platforms allowed intervention staff to begin testing services and treatment, with connection to care as necessary. Results: This initiative produced community education resources and optimized the utilization of county health services related to testing and treatment. Productivity was measured on a service utilization rate against the utilization of the previous FY quarter. The expected program result is to increase utilization of county health resources by 15%. The presentation will report on current program data and results. Conclusion/Future directions: The intervention has the potential to promote positive risk reduction among county residents and to decrease STI incidence.

OLUMAKINWA OLAYEMI, LAWAL SUNDAY, JULIE ST-JOHN

Applying findings from survey data to the creation of health education materials in a rural Peruvian community

Background. In 2019, the TTUHSC Office of Global Health partnered with Olive Branch Ministries International (OBMI) to take a team of interprofessional students to four small villages outside Piura, Peru in July 2022. Students conducted a community needs assessment—(survey n=100) to inform future interventions—including the need to address lack of proper sanitation systems. In July 2022, OBMI lead a trip to these villages where volunteers and local university students conducted another needs survey (n=125) and constructed a composting latrine to improve sanitation based on results from the 2019 survey. Volunteers delivered evidence-based health education on latrine use and maintenance. During a three-month follow-up visit, local OBMI staff visited community members and discovered they were not using the latrine due to fear of not using and taking care of the latrine properly. This visit also revealed a low literacy level among community members. This lack of latrine use identified the need to develop health education materials that fit the needs and characteristics of the local community. Research question: Why are community members not using and maintaining the composting latrines built? Methods. MPH students analyzed survey data (IRB exempt study protocol # A23-4217) using descriptive and inferential statistics with STATA software to inform the development of health education materials tailored to the communities specific needs based on the survey results and findings. Results. The study applied survey results from the following categories to inform content in the health education materials: demographics; maternal health; child health; community health and hygiene; water contamination, and solid waste disposal. The presentation will outline how the analysis informed content and format of the health education materials. Conclusions/Future Directions. The purpose of the project remained to increase utilization of the composting latrine through applying findings from the survey to development culturally appropriate health education materials.

SCHOOL OF NURSING

ANDREW ADAMS AND MANDI MACHEN BSN, RN

Mood Management in Adolescents with Bipolar Disorder

Evidence-Based Practice – PICOT Question: In adolescents with bipolar disorder (BD) (P) how does physical activity (e.g., long distance running, walking, cycling) along with medication therapy (I) compared to medication therapy alone (C) influence depression (O) over 6 months (T)?

ANNE FEELER BSN, RN, CCRN, TCRN, NE-BC AND ANGELA PETERSON BSN, RN, GEN, TCRN*Homelessness: The Heart of the Matter*

Adults experiencing homelessness have social determinants that impact morbidity and mortality. Advanced nursing leaders must create and lead team-based, interdisciplinary care for the target population via mobile medical units and community outreach. Healthcare worker self-assessment and reflection is necessary to minimize unconscious bias toward this vulnerable population.

BROOKE TRAVERS AND KATY BAKER*Heart Failure and Transitional Care*

Evidence-Based Practice – PICOT Question: In patients with chronic heart failure (P), how does utilizing transitional care (I) compared with not utilizing transitional care (C) affect the outcome of hospital readmission rates (O) over a 30 day period (T). Transitional care is a debated topic in the area of care related to heart failure. There are many approaches to the discharge of these patients, and we aimed to determine if transitional care would be worth the investment for future patients. We will discuss our PICOT question, foreground questions, and background questions.

CAROLINE OVERMAN BSN, RN AND CRYSTAL JOHNS BSN, RN*Take Home Naloxone for Patients with Opioid Use Disorder*

Evidence-Based Practice – PICOT Question: Among families and peers of individuals dealing with addiction to opioids (P) how does providing overdose education with naloxone distribution (I), compared with not providing education with naloxone distribution (C) affect proficiency in naloxone administration and aftercare (O) within 12 months (T)? The aim of this evidence synthesis poster is to present the findings found in the literature related to the need for education and if it is effective in the administration and aftercare of overdoses and preventing loss of life.

CHELSEA POTTS BSN, RN AND SHAHN LAYMANCE BSN, RN*Use of Mobile Applications for Medication Adherence in Diabetes*

Evidence-Based Practice – PICOT Question: In adult patients with type 2 diabetes (P), how do monthly clinic visits combined with the use of mobile technology (I), compared with monthly clinic visits along (C), affect HgA1c (O) within six months (T)? Can mobile applications have a positive effect on medication compliance in type 2 diabetes? This poster explores four peer-reviewed studies.

EMILY HARDY BSN, RN AND BRITTANY JO JORDAN BSN, RN*Electronic Cigarettes and Pulmonary Function*

Evidence-Based Practice – PICOT Question: Are young adults (P) who have primarily used electronic cigarettes (I) compared with those who have primarily used traditional cigarettes (C) at increased risk for impaired pulmonary function (O) after three months of use? (T)

EMILY OCHOA BSN, RN, CCRN AND ERIN HAYWARD BSN, RN, CCRN*The Diabetic Population Experiencing Homelessness*

It is important for the master's prepared nurse to preserve the health of the socioeconomically disadvantaged diabetic population. Agreed upon amongst the stakeholders and policy expert, there are resources readily available for this vulnerable population. Community outreach is the area of most need for this population. As masters prepared nurses, knowledge of SDOH found in our communities is essential to provide quality care. Utilization and networking of local stakeholders and policy makers are easy resources available to healthcare providers in order to improve health in our local communities.

JESSICA AGUILAR BSN, RN AND AMY VALENTA BSN, RN*Support Groups as Adjunctive Education for Pediatric Cancer Patients & Families*

Evidence-Based Practice – PICOT Question: In pediatric cancer patients (P), how does patient support groups (I) compared with basic education (C) affect patient and family coping (O) within the first 6 months of diagnosis (T)? The immediate impact of a new onset pediatric cancer diagnosis can be challenging to deliver and requires a unique skill set of empathy coupled with compassion. Due to the weight of this diagnosis, a significant barrier exists between the education given and the education comprehended. A large gap was identified in the method of education style, requiring out-of-the-box, forward-thinking. New, innovative ways of incorporating evidence-based education practices are desperately needed, especially in the pediatric cancer population. One of the innovative ways to provide education to this population is through support groups.

KARI FENNELL AND AMANDA GRAY*Risk for EVALI—E-cigarettes/Vaping or Smoking Tobacco?*

Evidence-Based Practice - PICOT Question: In young adults ages 18-21 (P), does the use of e-cigarettes/vaping (I), compared to smoking tobacco (C) increase the risk of EVALI (e-cigarette or vaping product associated lung injury) (O) development within the first month of use (T)?

KELLY FINNEY BSN, RN AND STACI RAMOS BSN, RN*Substance Use Disorders and the Homeless Population*

Individuals who experience substance use disorders and homelessness need our help to better their quality of life. In order to accomplish this, changes must be implemented to provide shelter and support for this population. Support services could include mobile care clinics, mental health response teams, programs that provide shelter and Narcan regardless of compliance with treatment, and long-term social support networks. Furthermore, master's prepared nurses have the ability to foster positive change in populations through their voices and advocacy within the community.

MCKENZIE NEES (SHE/HER) BSN, RN AND MARGARET SALAZAR (SHE/HER) BSN, RN*Addressing Health Disparities Among Transgender Youth – Primary Prevention of Suicide and Homelessness Amongst Transgender Youth*

Evidence Based Program: Providing gender affirming care for transgender youth in the medical setting can prevent suicide and homelessness. There are many ways for health care professionals from many different realms to provide gender affirming care. This can start with front desk staff, medical assistants, nurses, pharmacists, x-ray technicians, medical doctors, nurse practitioners, and physician assistants. Providing gender affirming care may include utilizing proper pronouns and chosen name, creating a safe and welcoming environment, encouraging family affirmation and acceptance, referrals to different medical, mental health, and support services, and community advocacy.

SAMANTHA LOREDO BSN, RN, CCRN AND ENA OSMANOVIC BSN, RN, CEN*Disparities in Obstetric Care: The Effects on Black Women*

Black women and their unborn children are more likely to suffer from adverse health outcomes, including death. Education for healthcare workers and prevention programs aimed at decreasing the deaths of Black women and their unborn children need to be brought to the attention of everyone involved in their care.

TAYLER HAVARD BSN, RN AND MARISSA V. HERRERA BSN, RN*Breast Cancer Screenings: A Fundamental Healthcare Right For All*

Despite the outstanding amount of breast cancer research conducted every year in the United States, the prevalence of breast cancer is still extremely high. It is important for health care professionals to continue to strive for continued improvement to better the health outcomes of this population. Breast cancer screenings should be readily available to all, regardless of one's socioeconomic status. As a healthcare community, it is crucial we create and improve resources to better serve each community; including those that fall within the underserved and underprivileged populations.

VALERYE BECKHAM BSN, RN AND BRIANDA PATINO BSN, RN

Management of Obstructive Sleep Apnea in Obese Population

Evidence-Based Practice – PICOT Question: In patients who are obese, how does bariatric surgery compare with CPAP use or traditional weight loss, affect quality of sleep within two years after surgery? Obstructive sleep apnea (OSA) is a medical condition that affects many Americans. One of the biggest contributing factors to this condition is obesity. This condition requires proper management to achieve quality sleep outcomes.



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