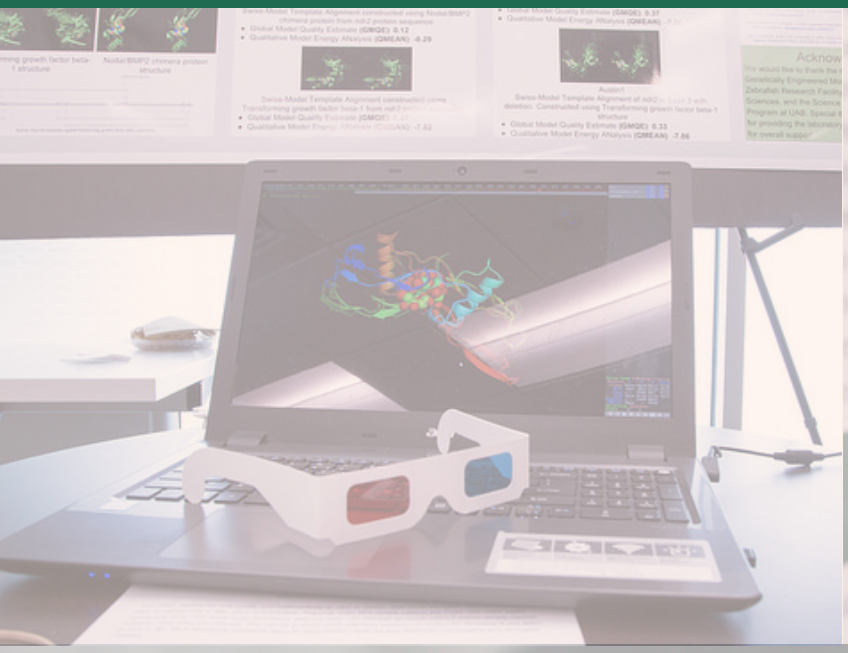
7-20-2017

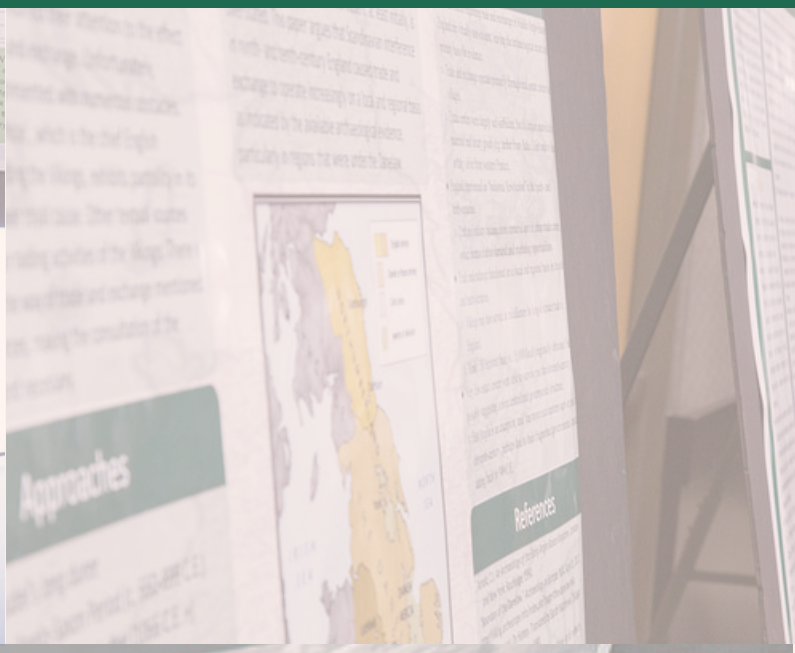
2017 UAB Summer Research Expo

University of Alabama at Birmingham

UAB SUMMER EXPO 2017

AN EXPOSITION OF UNDERGRADUATE RESEARCH





SCHEDULE OF EVENTS

ORAL & POSTER PRESENTATIONS

JULY 20TH, 2017 | 9:15-11:15AM

ANNUAL UAB SUMMER EXPO

An Exposition of Undergraduate Scholarship

Welcome

The University of Alabama at Birmingham and the Office of Service Learning and Undergraduate Research are proud to welcome you to the 9th Annual UAB EXPO: An Exposition of Undergraduate Scholarship. This year's EXPO promises to be the largest to date, with over 200 student presentations and approximately 500 student participants, represented by all academic disciplines. We have observed a significant growth expressed by the undergraduate student research with their creative and innovative ideals that have been under-represented in the past. Therefore, we are excited to showcase a vast diversity of student achievements who have put in their hard work and effort. By working with faculty, graduate students, peers, or individually, these aspiring and highly motivated students are an inspiration to the entire university. Our faculty continually seeks to encourage undergraduate students in quality research, discovery and creative endeavors that will define their academic experience. We would like to give a special thanks to all faculty members who have helped assist in mentoring student presenters, as well as, a hearty congratulations to all our student participants for their contribution and their impressive body of work presented today.

Through collaborative efforts of the EXPO Council, Undergraduate Research Ambassadors and Inquiro-Editorial Board, we would like to give a sincere thanks for their tireless efforts in planning and development.

We celebrate the established tradition of annually recognizing the research and creative accomplishments of our best and brightest undergraduate students.

Best Regards

Gareth Jones
Program Administrator for Service Learning and Undergraduate Research

Richard Nguyen & Charlotte Boles
UAB EXPO 2017 Directors

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EXPO Event Coordinators

Gareth Jones
Program Administor for Service Learning and Undergraduate Research

Amy Badham [3]
Director of Service Learning and Undergraduate Research

EXPO COUNCIL

Director - Richard Nguyen
EXPO Coordinator

Director - Charlotte Boles
EXPO Co-Coordinator

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Neha Udayakumar
Courtney Walker

Schedule of Events

ORAL & POSTER PRESENTATION

JULY 20TH 2017

TIME	ACTIVITY	LOCATION
8:30 AM - 9:15 AM	Student Registration & Poster Set-Up	Outside 3rd Floor Ballrooms
8:45 AM - 9:15 AM	Judge Registration	Outside 3rd Floor Ballrooms
9:15 AM - 11:15 AM	Poster Presentations & Judging	Hill Center 3rd Floor Ballroom
11:30 AM - 12:15 PM	Keynote Speaker	Hill Center Alumni Theater
12:15 PM - 12:30 PM	Award Ceremony	Hill Center Alumni Theater

KEYNOTE SPEAKER

Steven Yoder is an Assistant Professor and Honors Program Director in the Collat School of Business at the University of Alabama at Birmingham. He has been a mentor to countless students guiding them in their research and service learning experiences. He was the recipient of the Provost's Award for Faculty Excellence in Undergraduate Research in 2017.

He received his A.B. in Political Science from Duke University and his J.D. from the Northwestern University School of Law. His business background includes work with Of Counsel, Balch & Bingham LLP, AmSouth Bancorporation, Mellon Bank, and Reed Smith LLP. He has connected to the community by being the founding Chairman of the Vulcan Park Foundation, chairing the Cultural Alliance of Greater Birmingham, United Way of Central Alabama, EyeSight Foundation of Alabama, the Railroad Park Foundation, and was the recipient of the 2012 Odessa Woolfolk Community Service Award. His most recent publication is "Encouraging Self-Reflection by Business Honors Students: Reflective Writings, Films, and Self-Assessment," for Honors in Practice. He will be talking about how to leverage your undergraduate research experiences.

ORAL PRESENTATIONS

Author/s	Abstract Title	Room Number	Category
Travis Rush1, *S.J. Thompson1, J.N. Cochran1, P.V. Diggs1, M.J. Suto2, C.E. Augelli-Szafran2, R. Bostwick2, E. D. Roberson1	Targeting the Tau-Fyn Interaction for Ameliorating Amyloid Beta Induced Neurotoxicity	314	Oral
Gregory Ridgel	The effects of breast milk exosomes and hydrogen peroxide on intestinal oxidative stress and cytoprotection	314	Oral
Alex Wilson	Using Dramatic Role Play to Aid Student Progress	314	Oral
Waldrop MG, Garner EF, Stafman LL, Aye J, Stewart JE, Moore B, Friedman GK, Beierle EA	The Novel Rexinoid UAB30 Decreases Motility in Human Medulloblastoma Cells	314	Oral
Trung Huynh, Christopher Truong, Rajesh Gupta, Kathryn Schueler, Alan Attie, Sushant Bhatnagar	Synaptotagmin 9 Regulates Tomosyn-2 Protein Abundance to Affect Early Phase of Insulin Secretion	314	Oral

POSTER PRESENTATIONS

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3	Alex Kleinpeter; Chad Petit; Sally Falahat	The Effect of Mutation at Methionine 106 on the Structure and Function of the Non-Structural 1 (NS1) Protein of Influenza	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
4	Julia Burke, Katherine Savell, Kendra Brunner, Jeremy Day	CRISPR mediated upregulation of Reln and neuronal excitability	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
5	Julia Pham	Optical Imaging of Ameloblastoma with Fluorescently Labeled Anti-EGFR	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
6	Katherine E. Ankenbauer, Sumit Agarwal, Balabhadrapatruni V.S.K. Chakravarthi, Darshan S. Chandrashekar, Donald J. Buscbaum, Isam-Eldin A. Eltoum, Sooryanarayana Varambally	The role of PAICS in the tumorigenesis of pancreatic adenocarcinoma	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
7	Ashley Adamson, Ann Laszcyzk, Gwendalyn King	The effect of peripheral klotho on adult neurogenesis	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)

Poster Number	Author/s	Abstract Title	Category
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9	Michael D. Vivian, Svitlana V. Bach, Jeremy J. Day	Single-Cell RNA Sequencing to Dissect Activity-Dependent Transcriptional Responses in Neurons	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
10	"Christopher Truong1, Trung C. Huynh1, Rajesh Gupta1, Kathryn Schueler2, Alan D. Attie2, and Sushant Bhatnagar*1	Synaptotagmin 9 Regulates Tomosyn-2 Protein Abundance to Affect Early Phase of Insulin Secretion	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
11	Elizabeth P Rose Aundrea F Bartley, PhD Mark O Bevensee, PhD Lynn E Dobrunz, PhD	The Frequency-Dependent Effect of NBCe1 Transporters on Synaptic Transmission	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
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17	"Yilan Liu, Mingyuan Jian, Paul Wolkowicz, Judy Creighton	TRPC1 is a potential phosphorylation target of AMPK in pulmonary endothelial barrier function	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
18	Colton Houchin, Daian Chen, Bryan Becker, Jackson Colson, Allen W. Cowley, Aron Geurts, David M. Pollock, Jennifer S. Pollock	Dietary sodium effects on renal injury in salt-sensitive rats	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
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29	Brian Freeman	Increase in Alanine Availability Decreases Oxalate in Primary Hyperoxaluria Type 1	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
30	Josh Baty, Zhengrong Guan, Shali Zhang, Edward Inscho	Rho Kinase Inhibitor, Y-27632 Is Involved in L-type Calcium Channel Pathway	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)
31	Aaron Salisbury, Nancy Gallus, Katherine Savell, Jasmin Revanna, Kendra Bunner, Rhiana Simon, Jeremy Day	An Investigation of the Role of Enhancer RNAs in Activity Dependent Neuronal Gene Expression	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)

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37	Marco-Jose Rivero, Jingzhi Li, Wenjing Cao, Mohammad S. Abdelgawwad, and X. Long Zheng	Purification of von Willebrand Factor (VWF) from Human Plasma Using DNA Aptamer ARC1172 Affinity Medium	Biological and Life Sciences (Biology, Environmental Science, Gerontology, Natural Science, Neuroscience, Peace, Justice, and Ecology)

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82	"April Emanuel, Shelby Ferris, Chartisa Odum, Stephanie Pentecost, & Cathy Boardman	Diabetes: Donâ€™t Sugarcoat it!	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
83	Stephanie Diei	Racial and Gender differences on Smoking Cessation Aids Among Patients with Cancer	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
84	Courtney Eckl, Connor Grove, Kennedi Hill, Shannel Washington	Meeting the Psychosocial Needs of the Homeless through Recreation	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
85	Mayowa Otuada, Destiny Perry	The Mommy Manual	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
86	"Akshar Patel, Neel Patel, Amir Nejat, Nathaniel Lawson	Cutting efficiency of diamond burs for dental zirconia	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
87	Madison Files, Jasmine Gaitor	Vaccination Information for Medicaid Recipients	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
88	R. Mitchell Hungerpiller, Jr., Brittany A. Shelton, Deirdre Sawinski MD, Rhiannon D. Reed, Paul A. MacLennan, Margaux N. Mustian, Jayme E. Locke	Optimal Timing of Hepatitis C Treatment among HCV+ Kidney Transplant Candidates	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
89	Aundrea L. Harrison, Camille R. Schneider, Jessica Bahorski, Paula C. Chandler-Laney	Association of breast milk fat concentration with infant meal size, frequency, and weight change	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
90	Charles Faulk	How Does the Affordable Care Act Affect the Burnout Rates of Pediatric Physicians?	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)

Poster Number	Author/s	Abstract Title	Category
91	Nidhi Manu, Avantika Naidu BPTh, David A. Brown PT PhD	Session-to-session performance measures of stroke survivors performing two body-weight-support treadmill training protocols	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
92	Hanleigh James; Susan Davies, PhD; Lonnie Hannon III, PhD	How Do Structural Factors Influence the Sexual Risk Behavior of Young African American Males?	Health Sciences and Health Professions (Nursing, Public Heath, Optometry, Dentistry)
93	Cameron Hale, Dr. Robert Mohr, Tyler Whitaker	Modeling the Evolution Of Simple Organic Molecules In Interstellar Grains	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
94	Ashley Smith, Dr. Paul Baker	The Synthesis of BC5 via Low Pressure High Temperature CVD	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
95	Erasmo Canongo,Bipolb Barman, Ashlyn Burch, David J. Hilton	Broadband Terahertz generation and detection	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
96	Brandon L. Scoggins, Cheng-Chien Chen	Atomic Multiplet Theory for Transition-Metals and Rare-Earth Materials	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
97	Morgan Matthews	Optical properties of two-dimensional metallic and semiconducting nanostructures	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
98	Nicolas Merino, Aaron Alford, Sithira Ratnayaka	Theranostic Systems of Polymers and Tannic acid for Ultrasound Therapy Drug Release	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)

Poster Number	Author/s	Abstract Title	Category
99	Sabrina G. Siu, Eric H. Remington, Renato P. Camata	Solid-state Reaction Synthesis of Gd:BaZrO3 for the Production of Pulse Laser Deposited Thin Films for Fuel Cell Applications	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
100	Tyler Whitaker, Cameron Hale, Robert Mohr	Computational models of the evolution of pure oxygen ice grains	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
101	Rick Watkins, Ozarfar Garov, Sergey Mirov, Vladimir Fedorov	"Electrical Characterization of Aluminum-doped Zinc Sulfide and Zinc Selenide Semiconductor Crystals"	Physical and Applied Sciences (Chemistry, Physics, Mathematics, Computer and Information Sciences)
102	Jabrya Davis, Sherita Etheridge, MSN, CPNP, Meredith Holmes, Linsley Powers, Nick Rocha	Safety in the City	Service Learning (Research or service in conjunction with community partner)
103	"Tayler Mazingo, Lissette Ornelas, Jaci Speegle, Danielle Sullivan	Health and Wellness Promotion for Children	Service Learning (Research or service in conjunction with community partner)
104	Karli Duncan, Stephanie Eckerd, Hope Jacka, Quang Pham	Urban Kids and UABSON: First Aid Kit Education	Service Learning (Research or service in conjunction with community partner)
105	Cara Crumpton, Tristan Terrell, Robyn York	Educating the Population on the Importance of Safe Sex	Service Learning (Research or service in conjunction with community partner)
106	Aiyana Haydon-Dunnmore, Meredith Minyard, Kiran Mufti	The Bitter Truth Behind the Sweetness of Diabetes	Service Learning (Research or service in conjunction with community partner)
107	April Emanuel, Shelby Ferris, Chartisa Odum, Stephanie Pentecost	Diabetes: Don't Sugar Coat It	Service Learning (Research or service in conjunction with community partner)

Poster Number	Author/s	Abstract Title	Category
108	Jacob Cecil, Anna Phillips, and Krista Vinson	The Need for Nurses in Rural Health Communities	Service Learning (Research or service in conjunction with community partner)
109	Audra Beck, Armand Fernandez, & Dashia Moore-Harris	Substance Abuse Among Homeless Youth in Central AL	Service Learning (Research or service in conjunction with community partner)
110	Aaron Brown, Anna Flickinger, Kay Lynn Nguyen, Zack Sanford	Exceptional Teaching Strategies	Service Learning (Research or service in conjunction with community partner)
111	Hannah Eaton, Danielle Hamilton, Bailey Hendricks, Tatiyana Reynolds	Disease Disguised: STD Recognition and Prevention	Service Learning (Research or service in conjunction with community partner)
112	Bradley Hamm, Adriana Sullivan, Nicole Thomas	Diabetes Workshop	Service Learning (Research or service in conjunction with community partner)
113	Bhavik Patel and Caelainn Phillips	Learning to Manage Stress	Service Learning (Research or service in conjunction with community partner)
114	Kelsey Hobbs, Helen Kim, Addison Wiginton	Urgent Care: Worth the Wait?	Service Learning (Research or service in conjunction with community partner)
115	Chelsea Aaron, Anna Jacobs	Promoting safe medication disposal in community agencies	Service Learning (Research or service in conjunction with community partner)
116	John Hathaway, Trey Helton, Kollyn Kaiser, Adrienne Wilburn	Coping Mechanisms to Positively Mold the Community	Service Learning (Research or service in conjunction with community partner)
117	Taleeya Daniel, Ashley Gaines, and Claire Long	The Effectiveness of Mental Health Outreach ProgramsTelevision Teaching	Service Learning (Research or service in conjunction with community partner)
118	Dylan Byrnside, Beth Crumpler, Bria Dial, Autumn Hughes	Television Teaching	Service Learning (Research or service in conjunction with community partner)

Poster Number	Author/s	Abstract Title	Category
119	Kirsten Martinez, Erin Wisor	First Steps to Understanding STIs	Service Learning (Research or service in conjunction with community partner)
120	Grace Butler, Mallory Fields, Caitlyn Jones	Coping with Trauma: Creating a "Chill Zone"	Service Learning (Research or service in conjunction with community partner)
121	Ryan Doyle, Abigayle Hood, Jake Perkins, Tyla Smith	Getting Fit While You Sit: Implementing a Chair Yoga Class	Service Learning (Research or service in conjunction with community partner)
122	Kiana Dowdy, Kadie Morris, and Brownlee Smith	Encouraging Children to Establish Healthy Eating Patterns	Service Learning (Research or service in conjunction with community partner)
123	Anna Jones, Peyton Lewis, Lauren Lowery	Grooving Into a New Way of Life	Service Learning (Research or service in conjunction with community partner)
124	Daniel Attaway, Oâ€™Meika Robinson, Sara Beth Womack	Encore To-Go: Home-Based Activities for People with Dementia	Service Learning (Research or service in conjunction with community partner)
125	Zach McElroy, Chelsea Spann, Maggie Stuart	Improving Fine Motor Skills in Adults with Developmental Disabilities	Service Learning (Research or service in conjunction with community partner)
126	Taylor Donelson, Rachel Givins, Katelyn Leake	Sanitation, Safety, and Security in the Spring Gardens Community	Service Learning (Research or service in conjunction with community partner)
127	Marleigh F. Gracien, Samantha L. Kinter, Nicole L. Ogle, & Courtney B. Ryals	The Effects of Extreme Heat in the Birmingham Area	Service Learning (Research or service in conjunction with community partner)
128	Kelsey Brumbeloe, Ross Ham, Tamara Strawn	Check. Record. Review. Monitoring For A Better You!	Service Learning (Research or service in conjunction with community partner)
129	Jesslyn Burchfield, Breck Fowler, Charlie Mims, Brielle Wilkerson	Increasing Empathy and Education about Diabetes to Mentally Disabled Communities	Service Learning (Research or service in conjunction with community partner)

Poster Number	Author/s	Abstract Title	Category
130	Martinez, Kirsten. Wisor, Erin	First Steps to Understanding STIs	Service Learning (Research or service in conjunction with community partner)
131	Sheau Lam, Kayla Stanley	Managing Hypertension in the Work Environment	Service Learning (Research or service in conjunction with community partner)
132	Shelby Calhoun, Haley Charrier, Anna Williams	Contraception Education in Rural Bibb County	Service Learning (Research or service in conjunction with community partner)
133	Erin Arcuri, Maddy Collins, Karson Mink, Kendra Woodham	Say Cheese	Service Learning (Research or service in conjunction with community partner)
134	Kathryn Jones, Sarah Quick, Melissa Tate	"Blaze" Your Way Into the Sun!	Service Learning (Research or service in conjunction with community partner)
135	JaVarus Humphries, Tyler Bell, James Shikany, Despina Stavrinos	Older Adult Hypertension and Body Mass Index: The Role of Individual Differences in Executive Function	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
136	Natalie Conboy, Benjamin McManus, MA, Jeffrey T. Martin, Despina Stavrinos, PhD	Impact of Media Multitasking on After-Hours Work-Related Media Use and Sleep Quality	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
137	Grace Albright, Ben McManus, MA, Despina Stavrinos, PhD	Effect of Parenting Style and Teen Executive Functioning on Distracted Driving	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
138	Celeste Fernandez, Jessica H. Mirman, Despina Stavrinos	Comparing the Factor Structure of the Driving Habits Questionnaire in Older and Younger Drivers	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
139	LaKaylyn Washington, Tyler R. Bell, MA, & Despina Stavrinos, PhD	The Impact of Weather on Visual Inattention during Driving among Adolescents	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)

Poster Number	Author/s	Abstract Title	Category
140	Karan P. Patel, Despina Stavrinos, PhD, Haley J. Bishop, PhD, Jessica H. Mirman, PhD	Examining the Learning-to-drive Process among Teens with ADHD or Trouble Staying Focused	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
141	Mary Katherine Bridges, Tyler R. Bell, MA, & Despina Stavrinos, PhD	Effect of Adolescent Inattention and Impulsivity on Visual Attention during Simulated Driving	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
142	Brooke Bailey, Scarlett Ridley, Davic C. Schwebel	Are Working Memory and Processing Speed Associated with Child Pedestrian Safety?	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
143	Elizabeth S. Davis, Adam M. Goodman, Tyler R. Orem, Nathaniel G. Harnett, Muriah D. Wheelock, Sylvie Mrug, David C. Knight	Adolescent violence and its effects on emotional reactivity	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
144	Josiah J. Robinson, Jenni B. Rouse, Lindsay Stager, Kristin T. Avis, David C. Schwebel	Personality Predictors of Sleep Deprived Cognitive Performance on the Continuous Performance Test (CPT)	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
145	Canelo Gordon, Isabella R.; Rodriguez, Christina M.	Association between attention-deficit/ hyperactivity disorder symptoms and child abuse risk	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
146	Michael Liptrot II	Anticipated and Experienced Stigma in Healthcare Settings: A Mixed-Methods Approach	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
147	Alex Veerasammy, Catheryn A. Orihuela, Sylvie Mrug	Witnessing Community Violence and Sleep Problems in African American Adolescents	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
148	B. Patrick Grider, Destiny Erskine, Crystan Irwin, Trevor Martin	Examining the relationship between Religiosity, Substance-Abuse, Self-Esteem , and Risky-Sexual Behavior	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)

Poster Number	Author/s	Abstract Title	Category
149	Kaitlyn Tarver	Revitalization or Eradication: Gentrification in the Avondale Birmingham Community	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
150	Lindsay Stager, Josiah Robinson, Marissa Swanson, & David C. Schwebel	Prevalence of Injury Hazards in the Daily Living Environments of Ugandan Children	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
151	Lindsay Stager, Jonathan Adams, and Sylvie Mrug	Pubertal Timing and Parenting as Predictors of Externalizing Problems in African American Adolescents	Social and Behavioral Sciences (Government, Justice Sciences, Psychology, Sociology)
152	Roishinique J. Johnson, Mina Y. Momeni, Nicole C. Riddle	Using Recombinant Proteins to Study HP1-Hhistone Interactions	Works in Progress
153	"Samantha Foster1, Sarah Glover1, Anil Kumar Challa2	Understanding the function of zebrafish robo3 isoforms using CRISPR-Cas9 generated mutations	Works in Progress
154	Kennedy Harris Anderson Butler Farah Lubin, PhD	Neat1 Expression and Related Epigenetic Marks are Regulated by Glutametergic Stimulation	Works in Progress
155	Cameron Harper	Examination of neural dynamics of verbal episodic memory performance in TLE using Magnetoephalography	Works in Progress
156	Lee,Walker and Santiago	Mesurements of Stoke and Cancer Patients	Works in Progress
157	Paige B. Jackson, C. Justin Bartlett, and Dr. S. Aaron Catledge	Injectable Electrospun Polymer Fibers with Cellulose Nanocrystals to Enhance Mechanical Properties in Calcium Sulfate/Phosphate Bone Cements	Works in Progress
158	Kayla Hazelwood	Growing Health- Swan Project	Works in Progress

Poster Number	Author/s	Abstract Title	Category
159	Miriam Bernard, Michael Seifert, and Roslyn B. Mannon	Early Intervention Improves Long-term Outcomes in Kidney Transplant Recipients with Subclinical Inflammation	Works in Progress
160	"Gabrielle Brow, David Rountree, Dr. Xiong Ding, Dr. Pengfei Wang	Synthesis of Gemcitabine Prodrug for Reduced Cytotoxicity	Works in Progress
161	Adetokunbo Ayokanmbi, Suranjana Dey, Farruk Lutful Kabir, William Harris	Role of MiRNA-145 on Pathophysiology of Cystic Fibrosis	Works in Progress
162	Anjali Kamath	Understanding 14-3-3 Phosphorylation and it's Role in Alpha Synuclein Solubility	Works in Progress
163	J. David Gear, Ryoichi Kawai	Analysis of ARF and GBF1 membrane dynamicsÂ using stochastic particle-based FRAP simulation	Works in Progress
164	Wynton Sims	The 10% Initiative--Increasing the Number of African-Americans Pursuing Careers in Science and Medicine	Works in Progress
165	E Kim, L Hageman, MPH, J Wu, BA, L Francisco, BS, E Ness, BA, M Parman, MPH1, M Kung, MA, A Bosworth, BA, P Vartanyan, BA, SJ Forman, MD, FACP, M Arora, MD, MS, SH Armenian, DO, MPH2, S Bhatia, MD, MPH	Long-term healthcare utilization by older survivors of hematopoietic cell transplant (HCT): A report from BMTSS-2	Works in Progress
166	Cameron LaFayette, Mackenzie L. Davenport, Kyle P. Feeley, Dr. Mick Edmonds	Utilizing CRISPR-Cas9 to Target Non-coding MicroRNA for Deletion	Works in Progress

Poster Number	Author/s	Abstract Title	Category
167	Trae Compton	Does increased access to care using telemedicine improve outcomes?	Works in Progress
168	Cristhian Gutierrez	High salt intake alters ETB receptor expression in visceral adipose	Works in Progress

2-Hemant Srivastava

ABT263 (Navitoclax) and the IPF-Treatment Drugs For a Healthier Aging

Cellular senescence, a permanent proliferative arrest of the cell cycle, is closely associated with aging. Clearing senescent cells may reduce vulnerability to disease and extend lifespan in humans. This project studied the effects of ABT263 (Navitoclax) and the current IPF treatment drugs (Nintedanib and Pirfenidone) on the aging and apoptosis of senescent human fetal lung fibroblasts. In the first experiment, the cells were exposed to various combinations and concentrations of drugs and analyzed for relative concentrations of senescence markers (p16 and pRb) and apoptotic proteins (Cleaved PARP and cleaved caspase 9) by western blots. As ABT263â€™s concentration was increased, cellular cultures seemed to have higher apoptotic rates of the senescent fibroblasts and underwent a healthier aging (both determined by qualitative analysis of western blot images). In the second experiment, the results indicated by Cleaved PARP concentrations showed all 6 treatment types caused significantly different rates of apoptosis, since the F-Test statistic, 3.373, was higher than the critical value, 3.11, with Î± = 0.05. Similarly, according to Cleaved Caspase 9 concentrations, all 6 treatment types caused significantly different rates of apoptosis, since the F-Test statistic, 4.620, was higher than the critical value, 3.11, with Î± = 0.05. The cells receiving the â€œABT263 and Nintedanibâ€ treatment or â€œABT263 onlyâ€ treatment had the highest apoptotic rates of all the treatments and underwent the healthiest aging of all the cellular cultures.

3-Alex Kleinpeter; Chad Petit; Sally Falahat

The Effect of Mutation at Methionine 106 on the Structure and Function of the Non-Structural 1 (NS1) Protein of Influenza

The Non-Structural protein 1 (NS1) has been characterized as an important factor to the virulence of influenza A viruses during infection. NS1 plays a major role in promoting viral replication and antagonizing the host cellâ€™s immune response by limiting the amount of interferon produced by the cell. The NS1 protein has a high affinity to the 30-kDa subunit of the cleavage and polyadenylation specificity factor (CPSF30), therefore inhibiting CPSF30 protein from processing cellular pre-mRNAs, which ultimately prevents the expression of interferon beta mRNA. The inhibition of the production of interferon beta prevents the signaling of the innate immune response, thus increasing the virulence of the influenza virus. Many studies show the importance amino acid Met-106 has on the affinity of NS1 to the CPSF30 binding site. However, there are specific strains of influenza that contain an isoleucine in place of methionine. Importantly, NS1s from these strains are unable to bind to CPSF30. Therefore, in order to understand the mechanism of NS1â€™s interaction with CPSF30, we will analyze the effects the mutation M106I has on the structure of NS1 through Nuclear Magnetic Resonance (NMR) spectroscopy. Using (1H-15N) Heteronuclear Single Quantum Coherence (HSQC), we have demonstrated that the M106I mutation in the NS1 of A/Brevig Mission/1918/1 (H1N1) affected its overall chemical environment, suggesting that M106I may alter the overall structure of NS1. Subsequently, we assigned 80% of the protein to identify the specific amino acids whose chemical environments were affected by this mutation. Finally, by performing size exclusion chromatography on the wild type and other NS1 mutants bound to CPSF30, we show that dimerization of NS1 could affect CPSF30 binding. Ultimately, understanding the role Met-106 has on the structure and function of NS1 can lead to the development and rational design of antiviral drugs that can target influenza.

4-Julia Burke, Katherine Savell, Kendra Brunner, Jeremy Day

CRISPR mediated upregulation of Reln and neuronal excitability

Reelin is an extracellular matrix protein involved in synaptic plasticity, long-term potentiation, and is particularly important during brain development. Previous studies have shown that upregulation of Reln mRNA can result in increased long-term memory and increased potentiation. Additionally, Reln dysfunction plays a role in many neuropsychiatric disorders including Alzheimerâ€™s, autism, and schizophrenia. However, the specific mechanisms by which Reelin impacts these processes is unknown. Previous strategies to upregulate Reln and other genes relied on genetic manipulations such as global overexpression or knockout. This project uses a CRISPR-dCas9 system to alter gene expression by recruiting transcriptional activators to understand how manipulating the endogenous Reln locus will impact gene expression and neuronal function. To target Reln, we designed a specific guide RNA (gRNA) targeting the Reln promoter, which allowed local recruitment of dCas9 fused to VPR, a potent transcriptional activator. We validated this approach via CRISPR plasmid nucleofection of rat C6 cells, which resulted in significant upreguation of Reln mRNA as compared to a control gRNA that did not target the Reln gene. To determine whether altering Reln levels affects physiological function of neurons, we plated cultured hippocampal neurons expressing CRISPR components onto multi-electrode arrays to enable high-throughput recording of neuronal activity. Ongoing studies will show if CRISPR is an effective way to control the Reln gene and impact neuronal firing rate. Further understanding of Reln expression and associated mechanisms could shed new light into potential treatments for cognitive symptoms of neurological disorders.

5-Julia Pham

Optical Imaging of Ameloblastoma with Fluorescently Labeled Anti-EGFR

"Introduction: Ameloblastomas are odontogenic epithelial derived tumors that overexpress epidermal growth factor receptors (EGFR). Ameloblastomas primarily occur in the posterior mandible, and are proliferative and locally aggressive.Â Following surgical resection, tumors may recur if not all the tumor is excised.Â Cetuximab-IRDye800 is a fluorescently labeled anti-EGFR antibody that may be used to detect ameloblastoma tumor cells in pre-clinical models.

Objective: The objective is to analyze the tumor-to-background ratios (TBR) produced by cetuximab and IgG for detection of ameloblastoma tumors in pre-clinical mouse models. Methods: Patient-derived xenografts (PDX) of ameloblastoma were implanted subcutaneously into the flanks of immunocompromised mice and were imaged following tail vein injection of cetuximab-IRDye800 or IgG-IRDye800. Sections of tumor were processed and paraffin embedded, and used for H&E Staining.

Results: PDX tumor imaging revealed the tumor-to-background ratios (TBRs) produced by cetuximab were significantly higher than those produced by IgG by day 7 and remained significantly higher through day 14 for AB-20. For AB-33, the TBR produced by cetuximab were significantly higher compared to the IgG-treated animals. Following skin flap removal to represent a pre-resection state, TBRs increased with cetuximab and were significantly higher than the IgG control, confirming that cetuximab-IRDye800 successfully binds to the ameloblastoma tumor in vivo. H&E staining and imaging of excised tumors revealed the presence of ameloblastoma tumor and cetuximab-IRDye800 binding.

Conclusions: Fluorescently labeled anti-EGFR demonstrates specificity and sensitivity for ameloblastoma cells and tumor xenografts. This will give surgeons technology to more confidently remove ameloblastomas by accurately assessing tumor margins to improve long-term local tumor control and reduce recurrence in this patient population.
"

6-Katherine E. Ankenbauer, Sumit Agarwal, Balabhadrapatruni V.S.K. Chakravarthi, Darshan S. Chandrashekar, Donald J. Buscbaum, Isam-Eldin A. Eltoum, Sooryanarayana Varambally

The role of PAICS in the tumorigenesis of pancreatic adenocarcinoma

Cellular senescence, a permanent proliferative arrest of the cell cycle, is closely associated with aging. Clearing senescent cells may reduce vulnerability to disease and extend lifespan in humans. This project studied the effects of ABT263 (Navitoclax) and the current IPF treatment drugs (Nintedanib and Pirfenidone) on the aging and apoptosis of senescent human fetal lung fibroblasts. In the first experiment, the cells were exposed to various combinations and concentrations of drugs and analyzed for relative concentrations of senescence markers (p16 and pRb) and apoptotic proteins (Cleaved PARP and cleaved caspase 9) by western blots. As ABT263â€™s concentration was increased, cellular cultures seemed to have higher apoptotic rates of the senescent fibroblasts and underwent a healthier aging (both determined by qualitative analysis of western blot images). In the second experiment, the results indicated by Cleaved PARP concentrations showed all 6 treatment types caused significantly different rates of apoptosis, since the F-Test statistic, 3.373, was higher than the critical value, 3.11, with Î± = 0.05. Similarly, according to Cleaved Caspase 9 concentrations, all 6 treatment types caused significantly different rates of apoptosis, since the F-Test statistic, 4.620, was higher than the critical value, 3.11, with Î± = 0.05. The cells receiving the â€œABT263 and Nintedanibâ€ treatment or â€œABT263 onlyâ€ treatment had the highest apoptotic rates of all the treatments and underwent the healthiest aging of all the cellular cultures.

7-Ashley Adamson, Ann Laszcyzk, Gwendalyn King

The effect of peripheral klotho on adult neurogenesis

"Klotho is an age-regulating protein made by the kidney and the brain. When klotho is absent, mice develop rapid onset cognitive impairment and conversely, when klotho is overexpressed, mice and humans show cognitive enhancement. We have recently shown that these effects are, at least in part, the result of klothoâ€™s regulation of adult neurogenesis. Mice over-expressing klotho show persistent, enhanced neurogenesis long after it is typically age-downregulated. To date, all studies of klothoâ€™s effects on the brain have utilized global manipulation of klotho expression and since klotho has pleiotropic effects, it remains to be determined whether klotho action elevating peripheral health indirectly causes neurogenic effects. Heterochronic parabiosis is sufficient to enhance neurogenesis of old mice suggesting that peripheral health can powerfully effect neurogenesis. As such, we used parabiosis to determine whether elevating klotho only in the periphery is sufficient to enhance neurogenesis of wild-type mice. Following 2 months of parabiotic association, we compared wild-type:wild-type, overexpressor:overexpressor, and wild-type:overexpressor brain pairs. Using immunohistochemistry, we quantified doublecortin (immature neurons) and Ki67 (proliferating progenitors), which were the most robust markers of altered neurogenesis we measured using global models of klotho manipulation. These experiments will enable better understanding of the role of klotho in the body and how itâ€™s elevation in blood circulation affects cognitive function.
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8-Alexa K. Wade, Yanping Liu, Ph.D., Maigen M. Bethea, and Chad S. Hunter, Ph.D

Ring Finger 20 and 40 (Rnf20/40) Interact with Key Î²-cell Transcription Factors to Regulate Postnatal Gene Expression

Diabetes mellitus is characterized by a loss of Î²-cell mass and function. Future therapies aim to restore Î²-cells via regeneration and transplantation. To optimize these strategies, we must increase understanding of transcriptional mechanisms regulating Î²-cell development and function. Specifically, our lab found that the LIM-homeodomain transcription factor, Islet-1 (Isl1), and single stranded DNA binding protein 3 (SSBP3) coregulator control key Î²-cell genes, and are necessary for postnatal Î²-cell function. To identify functional interactions of this complex, an SSBP3 reverse-crosslinked immunoprecipitation (ReCLIP) was performed, followed by mass spectroscopy. We identified Ring finger 20 (Rnf20), an E3 ubiquitin ligase, as an interactor. Notably, Rnf20 and its heterodimeric partner, Rnf40, were identified in our previous Isl1 ReCLIP. Rnf20/40 regulate transcription by mono-ubiquitinating histone H2B (H2Bub1), a precursor to active histone 3 lysine 4 trimethylation marks. However, nothing was known of Rnf20/40 in Î²-cells. We hypothesize that they regulate genes similar to Isl1 and SSBP3. Immunofluorescence analysis revealed that Rnf20 and Rnf40 are expressed throughout mouse pancreas tissue and that Rnf40 co-localizes with Isl1 in islets. Co-IP experiments confirmed the interaction between Isl1 and Rnf20/40 in Î²-cells. siRNA-mediated knockdown of Rnf20 and/or Rnf40 reduced H2Bub1 marks. These experiments also uncovered potential target genes, including glucose transporter Glut2, Î²-cell transcription factor MafA, and mitochondrial uncoupling protein UCP2. Chromatin immunoprecipitation revealed that Rnf20 occupies the proximal Glut2 promoter. We also found that glucose-stimulated insulin secretion was impaired in Rnf20/40-deficient cells. Taken together, these data suggest novel roles for Rnf20/40 in regulating Î²-cell gene expression and function.

9-Michael D. Vivian, Svitlana V. Bach, Jeremy J. Day

Single-Cell RNA Sequencing to Dissect Activity-Dependent Transcriptional Responses in Neurons

The central nervous system is comprised of hundreds of unique cell types, and functional heterogeneity in these populations is broadly implicated in neurodevelopment, cognitive function, and disease states. Until recently, attempts to characterize diverse neuronal populations on the single-cell level suffered from low throughput and limited genetic specificity. Single-cell RNA sequencing (scRNA-seq) is a revolutionary approach that allows transcriptome quantification from individual cells in a population. While a number of competing scRNA-seq technologies have recently been developed (including the Fluidigm C1 platform, the Chromium 10X system, and Fluorescence Activated Cell Sorting), there is limited information on which approach works best for sequencing individual neurons in the brain. One of the potential techniques that could prove to be more useful in the nervous system is Drop-seq, a highly parallel microfluidics approach in which individual cells are trapped in nanoliter-sized oil droplets containing â€œbarcodedâ€ beads, allowing for parallel quantification of transcripts from thousands of cells. In addition, this approach is more cost-effective than other current technologies. Here, we used Drop-seq in a species mixing experiment with Human Embryonic Kidney cells and mouse embryonic fibroblast cells to ascertain the specificity and capture rate of this approach. Future studies will employ Drop-seq to analyze cortical neurons grown in vitro to assess single-cell transcription before and after neuronal activation. This approach may provide a high-throughput, economical way to assess RNA expression across thousands of single neurons, which would greatly enhance our understanding of the complexity of neuronal populations within the brain."

"10-Christopher Truong1, Trung C. Huynh1, Rajesh Gupta1, Kathryn Schueler2, Alan D. Attie2, and Sushant Bhatnagar*1

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Synaptotagmin 9 Regulates Tomosyn-2 Protein Abundance to Affect Early Phase of Insulin Secretion

"Previously we positionally cloned tomosyn-2 gene underlying a diabetes susceptible locus in an F2 mouse cross. We reported that mice congenic to tomosyn-2 were hyperglycemic, hypoinsulinemic, and have reduced insulin secretion from pancreatic islets. Tomosyn-2 binds to syntaxin1A; however, it is not yet established whether this binding limits the formation of the SNARE complex at the plasma membrane and exocytosis. Our preliminary data show that in addition to syntaxin1A, tomosyn-2 binds and co-fractionates with synaptotagmin-9 (Syt9) in sucrose density gradient under conditions of high glucose and elevated calcium concentrations. Syt9 protein is a calcium sensor and is known to regulate the formation of the SNARE complex. However, its role in regulating insulin secretion is not yet well characterized. We observed a significant increase in in vivo insulin secretion at 5 min and 15 min post glucose challenge in 10-week old male Syt9-/- vs. control mice. Moreover, Syt9-/- mice were glucose tolerant and show no difference in insulin sensitivity, suggesting that Syt9 regulates early phase of insulin secretion from beta cells. Interestingly, islets of Syt9-/- vs. control mice have reduced tomosyn-2 protein abundance by 50% without altering the levels of other key t- or v-SNARE proteins. Altogether, these results indicate that the reduction in tomosyn-2 protein abundance leads to an increase in insulin secretion observed at early time points in Syt9-/- mice. The results presented here point to an as-of-yet-undescribed role of Syt9 in chaperoning or localizing tomosyn-2 protein from cytosol to the SNARE complex to regulate insulin secretion. Herein, unpublished data describe a critical role of tomosyn-2 in regulating early phase of insulin secretion modulated by Syt9 protein.

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"11-Elizabeth P Rose ,Aundrea F Bartley, PhD ,Mark O Bevensee, PhD Lynn E Dobrunz, PhD"

The Frequency-Dependent Effect of NBCe1 Transporters on Synaptic Transmission

Changes in pH are a vital component of neuronal activity in the brain, and these changes can be regulated by many modulators including Na-Coupled Bicarbonate Transporters (NCBTs). NBCe1 is a type of NBCT that transports Na+ and HCO3 across the membrane of astrocytes. This transporter is important for brain function because it is the primary regulator of pH in the brain. NBCe1 transporters facilitate both extracellular and intracellular changes in pH, which will affect many cellular processes, including synaptic transmission. Mutated NBCe1 transporters have been shown to cause problems with learning and memory, suggesting that these transporters are necessary for normal synaptic transmission and plasticity. The goal of this research is to determine the effects of blocking NBCe1 on synaptic transmission in the hippocampus, a part of the brain important for learning and memory. The lab conducted preliminary electrophysiological field recording experiments in the stratum radiatum layer of the CA1 region of the hippocampus in response to Schaffer Collateral stimulation. The current goal is to confirm the pilot data and expand upon the underlying mechanisms involved in the process. Pilot experiments showed that addition of the NBCe1 antagonist, S0859, causes synaptic responses to increase during low frequency stimulation. In contrast, the initial data showed the opposite effect of S0859 on the responses to high frequency stimulation, suggesting the results are frequency-dependent. Further experiments will help to unravel this surprising result and provide more information about the role of NBCe1 transporters in synaptic transmission, synaptic plasticity, and pH regulated neuronal activity.

12"

Novel marine compound reduces cell proliferation and demonstrates anticancer properties in thyroid cancer cells

Effective treatments are desperately needed against aggressive thyroid cancers including anaplastic and poorly differentiated thyroid cancers. Complete resection of the tumor by surgery is seldom at best. Natural products remain one of the best sources for drug leads, and they have made a significant impact on FDA approved anticancer agents. Recently, we screened novel natural compounds for their anticancer properties and selected the most potent compounds, DHN-II-84 and DHN-III-14 derived from marine sponges. The purpose of this study was to test their therapeutic efficacy on metastatic follicular and anaplastic thyroid cancer cells lines.

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"13-Sarah Pope, Allison F. Manuel, Linda Overstreet-Wadiche
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Interneuron Regulation of Adult Neurogenesis in the Dentate Gyrus

"The dentate gyrus is part of the hippocampal formation and is one of only two regions where adult neurogenesis occurs. Manipulations of dentate adult neurogenesis suggest that newly generated neurons have a role in preventing interference between similar memories, a function that has long been associated with the dentate gyrus. The birth and integration of new neurons into the existing neural circuit is regulated by GABA, which acts as a trophic factor and is the signaling molecule used by inhibitory interneurons. The dentate contains a heterogeneous population of GABAergic interneurons that could potentially regulate neurogenesis. One type of interneuron called ivy/neurogliaform cells, which express neuronal nitric oxide synthase (nNOS), innervates newborn neurons. In our project, we explored how nNOS interneurons contribute to neurogenesis in the dentate gyrus. First, we characterized the physiology and morphology of nNOS-expressing dentate interneurons using transgenic mice that express fluorescent markers. Using in vivo optogenetics, we then activated nNOS interneurons and did immunohistochemistry to determine changes in neurogenesis by staining for the proliferation protein Ki-67, for GFP to identify newborn neuron morphology, and the immediate early gene cFos to visualize cells activated by light. These results will help determine the contribution of nNOS-expressing interneurons to proliferation and maturation of adult born dentate neurons.

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14-Jessie Chan, Mandy K. Biles, Sara A. Sims, and Kristina M. Visscher, PhD

Using Diffusion MRI to measure changes in Structural Connectivity of the Visual System following Experience using Peripheral Vision

People can learn how to use their visual systems in different ways necessary for processing various visual stimuli from the outside environment. Although people typically use central vision for attention-demanding visual tasks, we can learn how to use peripheral vision for similar tasks. Recent studies had shown that various mechanisms of neural plasticity modify the brainâ€™s visual system both structurally and functionally in response to visual experiences such as training. In this research, a set of experiments will address how the brain changes as a result of experience using peripheral vision either after visual perceptual learning or central vision loss due to macular degeneration. First, we will characterize the differences in diffusion imaging measures between various brain representations of central and peripheral vision in a group of over 800 healthy young adults. Diffusion MRI will specifically give a baseline measure of how brain representations for central and peripheral vision are different based on structural metrics. We also train both healthy adult participants and participants with macular degeneration to use their peripheral vision during several visual perceptual learning tasks. We are interested in understanding how more experience using peripheral vision changes the structure and connectivity of brain areas involved in peripheral vision. As a result, we hypothesize that training peripheral vision will lead to stronger white matter integrity and structural brain connectivity necessary for peripheral vision processing. Finding macro-level changes in diffusion measures will therefore improve our understanding of visual plasticity in remediating vision for people with vision disorders.

15-Ryan Roque

Assessing the effect of growth hormone regulation on dystrophin regulation in sapje (DMD model) Danio rerio

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A specific group of genetic diseases known to alter muscular pathways found in humans are called muscular dystrophies. Duchenne Muscular Dystrophy is one of the more common of the muscular dystrophies, and is caused by a mutation of the gene that codes for the dystrophin protein. Disrupted translation of dystrophin allows for tears in the muscle fibers to procure proteases further inducing muscle degradation. The replacement of myocytes with adipose and fibrotic tissue eventually lead to muscle failure in organs such as the heart, liver and lungs amounting to death. Previous studies have shown that administration of IGF-1 in dystrophic mice have improved the disease by inducing a myofiber shift from slow-twitch to fast-twitch muscles . The role of growth hormone signaling in human neuromuscular diseases has yet to be identified. The goal of this project is to investigate the growth hormone pathwayâ€™s effect on the sapje (DMD model) of Danio rerio by crossing the model with a growth hormone knockout model of the species vizzini. The potential findings of this study has tremendous medical potential, possible data could defend the ability of pharmacological modulators of growth hormone signaling to rescue muscle wasting in human neuromuscular disease . "

16-Paul de Montaudouin, Patrick Ernst, Ningning Xu, Kerry Tang, Kah Yong Goh, Li He, Lufang Zhou

Custom Built Microscope System for Simultaneous Viewing of Action Potential and Calcium Transient

The goal of this research is focused on how a magnetic field can remotely stimulate modified cardiomyocyte cells. This is done by observing the calcium transient and action potential under the effects of a magnetic field. In order to see the calcium transient, which is the influx and outflux of calcium through the calcium channels, we used a fluorescent dye named Fluo-4-AM. This dye binds to calcium and is excited by a blue LED light, therefore, emitting green light which can be seen by a camera. For detection of action potentials, we used a fluorescent dye called di-4-ANBDQBS. When excited by a red LED, the dye emits a near IR fluorescence which creates an image that can be seen in a camera. In order to view both of these images simultaneously, we used a microscope system that emits light out of the side of the microscope rather than into an eyepiece. This light then went through a dichroic mirror which separated the light based on wavelengths, therefore, separating the green emission and near infrared into separate cameras. We thus get a separate image representation of the calcium transient and action potential under the effects of a magnetic field.

"17-Yilan Liu, Mingyuan Jian, Paul Wolkowicz, Judy Creighton

"TRPC1 is a potential phosphorylation target of AMPK in pulmonary endothelial barrier function

"Background: A single layer of endothelial cells (ECs) creates a barrier that controls the movement of fluid and molecule between the blood and the interstitium. This barrier damage causes edema and respiratory dysfunction. Activating EC adenosine monophosphate-activated protein kinase (AMPK) helps resolve lung injury. EC Ca2+ entry mediates lung injury. Transient receptor potential canonical type 1 (TRPC1) is a nonspecific Ca2+ channel. Furthermore, TRPC1 contains an AMPK phosphorylation site at S24, etc. Thus, we hypothesize that AMPK targets TRPC1 to maintain the integrity of pulmonary gas exchange barrier. Methods: Immunocytochemistry and immunohistochemistry were used to test the distribution of AMPK and TRPC1 in the lung. The pharmacological reagents used were 5-aminoimidazole-4-carboxamide ribonucleotide (AICAR), an AMPK activator, and lipopolysaccharide (LPS), an endotoxin from gram-negative bacteria that causes cell damage. Electric cell impedance sensing (ECIS) technology assessed EC barrier integrity in wild-type and TRPC1 knockdown ECs: control, LPS, AICAR, and LPS+AICAR. Intraperitoneal injection of LPS to wild-type and TRPC1 knockout mice evaluated the relation between TRPC1 and AMPK activation in lung injury using wet to dry ratio. Results: AMPK and TRPC1 were located in the pulmonary tissue and microvascular Ecs of rat and human lungs. LPS decreased EC monolayer resistance while AICAR reversed this decrease. LPS-induced lung injury was attenuated with AICAR treatment measured by wet-to-dry ratios. However, AICAR had no effect on EC resistance or lung edema in TRPC1 eliminated cells or mice, respectively. Conclusions: AMPK requires TRPC1 to maintain the integrity of pulmonary gas exchange barrier.
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18-Colton Houchin, Daian Chen, Bryan Becker, Jackson Colson, Allen W. Cowley, Aron Geurts, David M. Pollock, Jennifer S. Pollock

Dietary sodium effects on renal injury in salt-sensitive rats

Salt-sensitive individuals are more prone to developing hypertension and salt-induced renal damage. The aim of this study is to determine how high salt affects diurnal excretion of renal injury markers in four different salt-sensitive rat models: Dahl salt-sensitive (SS) rats, NADPH oxidase p67phox knockout in SS (SS.p67phox-/-), introgression of chromosome 13 from Brown-Norway rats into SS (SS.BN13), and introgression of 16Mbp section of BN13 (SS.BN-(D13Rat151-D13Rat197)) in SS (SS.Line26). Male, 12-14 week old rats were maintained on normal salt (0.4% NaCl) and fed high salt (4% NaCl) diet for 7 days (Dyets, AIN-76A). 12hr urines were collected during the active (lights-off, ZT12-24) and inactive (lights-on, ZT0-12) phases via metabolic cages on days 6-7 of high salt. On high salt, proteinuria was higher in SS.Line26 compared to SS.BN13 during active phase (99Â±11mg/12hr vs. 41Â±5mg/12hr, p=0.006) and albuminuria was also higher in SS.Line26 than SS.BN13 (97Â±25mg/12hr vs. 21Â±3.7mg/12hr, p=0.004). SS.p67phox-/- had lower proteinuria than SS and SS.Line26 during active phase (SS.p67phox-/-: 8Â±2mg/12hr; SS: 79Â±16mg/12h; SS.Line26: 99Â±11mg/12hr, p<0.0001) and lower albuminuria (SS.p67phox-/-: 7Â±3mg/12hr; SS: 78Â±14mg/12hr; SS.Line26: 97Â±25mg/12hr, p<0.005). During the active phase on high salt, KIM1 excretion was higher in SS than SS.BN13 (31.8 Â± 5.6Âµg/12h vs. 8.8Â±2Âµg/12h, p=0.02), and nephrinuria was higher in SS.Line26 than SS (166Â±15.7ng/12hr vs.116Â±7.1ng/12hr, p=0.03). SS.p67phox knockout and SS.BN13 rats had minimal renal damage on high salt diet. Taken together, these results suggest that renal damage in SS rats are attributed to proximal tubule injury, whereas renal damage in SS.Line26 rats is due to increased glomerular injury.

19-Guan-En Graham, Faraz A. Sultan, Katherine E. Savell, Jeremy J. Day"

The Role of Gadd45b in Striatal Gene Regulation and Reward Learning

Methylation of cytosine nucleobases in DNA is an epigenetic modification that is a potent regulator of gene expression in diverse biological systems. In the brain, DNA methylation changes play an important role in synaptic plasticity and memory formation. Growth, arrest, and DNA-damage inducible protein 45b (Gadd45b) is a key factor in DNA demethylation, and loss of Gadd45b has been shown to influence behavioural memory. Additionally, previous studies have revealed that active DNA demethylation occurs with learning at key memory-linked genes in the brain regions that control motivated behaviour. However, the mechanism through which DNA is demethylated and how it regulates reward circuitry within the brain is unknown. Here, we examined the role of Gadd45b in dopamine-dependent epigenetic regulation using CRISPR/Cas9 knockout methods. Neuronal culture systems and pharmacological tools were used to observe effects of the deletion of Gadd45b on gene expression of downstream targets. Embryonic rat striatal cultures were depolarized with dopamine or SKF-38393 (an agonist at Drd1 dopamine receptors) while cortical cultures were stimulated with potassium chloride (KCl) depolarization. Neuronal stimulation induced expression of immediate early genes (IEGs), including Gadd45b. Although Gadd45b knockout in cortical neurons blocked the induction of genes induced by KCl, Gadd45b knockout in striatal neurons did not have any effect on baseline gene expression or dopamine-dependent IEG expression. The results demonstrate that Gadd45b is an IEG regulated by neuronal depolarization and dopamine which supports its potential role in reward learning. Future studies will examine the mechanistic interactions between Gadd45b and DNA methylation in more detail.

20-Daniela Garcia-Perez, Rylie Hightower, Matthew Alexander

Understanding the Phenotypic Variability in Zebrafish Models of Limb-Girdle Muscular Dystrophy

Muscular dystrophies are a group of diseases characterized by muscle degeneration. One of these muscular dystrophies, Limb Girdle muscular dystrophy, is a group of dystrophies that affect hip and shoulder muscles. Different mutations in the FKRP gene result in different severities of this disease. FKRP protein works by modifying the membrane protein Î±- dystroglycan through O-mannosylation, thus allowing Î±- dystroglycan to latch the myofiber cytoskeleton to the extracellular matrix, allowing for the stabilization of muscle fibers. Zebrafish are an ideal model for studying muscular dystrophies because of their transparent embryos and ability to quickly produce offspring. We have generated human FKRP pathogenic mutations in zebrafish, thus allowing us to observe zebrafish development. This technique enables us to understand the consequences of the different severities of individual FKRP mutations. Zebrafish were injected with a wildtype human FKRP gene (hFKRP), hFKRP with a mild mutation (L276I), and hFKRP with a severe mutation (C318Y). Using heat shock promoter to express these proteins, the Prestwick drug library was then used to screen for beneficial effects in the developmental phenotype of each mutant. We compared phenotypic variability of each mutation and demonstrated that a mutation in C318Y caused greater severity. Using the drug screen, therapeutic compounds that decrease abnormalities will be identified. Any abnormal phenotypic characteristics were accounted for and rated from minor, moderate, to severe. These drug groups will be further tested in order to pinpoint which specific drug was effective and could lead to new therapies.

21-Oluwanifemi Akinduro, Mikita Patel MD, Vidhush Yarlagadda MD, Dean Assimos MD, Ross Holmes PhD, and Tanecia Mitchell PhD

Calcium Oxalate Crystals Induce Mitochondrial Dysfunction and Stimulate Cytokine Release in a Human Monocyte Cell Line

"Background: Kidney stone disease is a chronic condition caused by the accumulation of crystalline material within the kidney. Monocytes/macrophages rely heavily on mitochondrial function to mitigate inflammation. They also play an important role in clearing crystals during stone formation. We have previously determined that patients with calcium oxalate (CaOx) kidney stones have decreased monocyte mitochondrial function compared to healthy subjects. The purpose of this study was to assess whether CaOx crystals alter monocyte viability, mitochondrial function, and cytokine levels in THP-1 cells, a human monocyte derived cell line.

Methods: THP-1 cells were treated with increasing concentrations of CaOx crystals (50, 100, 200, 500, 1000 Âµg/ml) for 24 hours. Cell viability was determined using Trypan Blue. Mitochondrial function was measured using a Seahorse XF Analyzer. Cytokine levels (IL-alpha, IL-6, IL-8, IL-16, MCP-1, MIF, TNF-alpha, and TNF-beta) were tested using a multiplex immunoassay kit from Meso Scale Discovery.

Results: CaOx crystals caused a concentration dependent decrease in cell viability and mitochondrial function. Furthermore, CaOx crystals caused a concentration dependent increase in IL-8, MCP-1, and TNF-alpha cytokine levels compared to control cells. However, lower concentrations of CaOx crystals decreased IL-1alpha, IL-6, IL-16, MIF, and TNF-beta cytokine levels.

Conclusions: In summary, CaOx crystals decreased cell viability and mitochondrial function and stimulated cytokine release. These findings suggest that CaOx crystals may be associated with mitochondrial dysfunction and inflammation in kidney stone disease. Future studies will address the relationship between mitochondrial function and inflammatory responses in CaOx treated cells and monocytes from healthy subjects and patients.
"

22-Devon Padilla

Defining Cell Consequences of Mecp2 Deletion on Neuronal Morphology

"The methyl-CpG binding protein 2 (MECP2) gene is located on the X chromosome. Mutations in this gene cause a neurodevelopmental disorder called Rett syndrome (RTT), an autism spectrum disorder that affects 1 in 10,000 female births. Because the gene is located on the X chromosome, random inactivation causes the brain of heterozygous MeCP2 female mice to be a mosaic of both wild type Mecp2 positive and mutant Mecp2 negative cells. This study used genetically modified mice containing a MeCP2-GFP fusion protein that allows cells expressing MeCP2 to be identified by the GFP florescence. A recent study mapped the distribution of GFP positive and GFP negative cells in the brain of female mice and revealed that there is a homogenous distribution of GFP positive and GFP negative cells in both female wildtype (WT) mice and Mecp2 heterozygous (Het), suggesting that the X-chromosome inactivation (XCI) is non-clonal. Further research revealed that XCI is slightly skewed towards non-mutant neurons in female Mecp2 Het mice, with approximately 60% of CA1 and CA3 pyramidal neurons expressing MeCP2-GFP.

This study further characterizes the distribution of excitatory and inhibitory neurons in the hippocampus and medial prefrontal cortex in Mecp2 Het mice. Immunohistochemistry (IHC) staining with fluorescent markers was used to identify excitatory and inhibitory neurons for quantitative analysis. The analysis will define consequences of Mecp2 deletion on excitatory and inhibitory neuronal morphology in the brain of female Mecp2 heterozygous mice. This will provide useful outcome measures for future studies of treatment in mouse models of RTT.
"

"23-Melodie F. Hunter, Jianzhong Liu, Monica J. Lewis, Douglas R. Hurst "

SIN3A is a Key Regulator of Breast Cancer Metastasis

"Metastasis occurs when cancer cells travel to and grow in distant parts of the body, away from the original site of the tumor. The study of metastasis is critical because most cancer deaths are caused by metastasis and there is a lack of treatment options for patients with metastatic disease. SIN3 chromatin modification complexes have been demonstrated to play important roles regulating breast cancer metastasis and are being pursued as targets for therapy. There are two paralogs of SIN3 (SIN3A and SIN3B) that have different functions in regulating the process of breast cancer metastasis. Based on our previous work that shows an increase in cancer cell invasion and metastasis when SIN3A is decreased with shRNA and evidence for lower levels of SIN3A expression in triple negative breast cancers, we hypothesize that SIN3A is a metastasis suppressor. To test this, SIN3A was ectopically expressed in order for us to observe if higher levels of SIN3A inhibit metastatic growth. A retrovirus was used to transduce metastatic breast cancer cell lines. In vitro assays of metastatic potential including migration, invasion, and 3D growth assays were utilized. These studies will further distinguish the divergent functions between the two SIN3 paralogs so that we can better understand how to effectively target these complexes for cancer therapy. The results from this study will be especially useful for patients with triple negative breast cancer for which few targeted therapies exist.
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24-Nicole Gallups, Rebecca Hauser, Katelyn McInerney, and Farah Lubin, PhD

Chromatin Remodeling during Epileptogenesis

Epilepsy is a neurological disorder affecting approximately 1% of the population. Temporal lobe epilepsy is one of the most common forms of focal epilepsies, with seizures originating from the temporal lobe of the brain and frequently the hippocampus. In the current pharmaceutical market, there are estimated 20 anti-epileptic drugs available; however 60% of patients with temporal lobe epilepsy are resistant to them. Recently, research has demonstrated that epigenetic mechanisms are linked to transcriptional regulation of genes during epilepsy development. Despite our understanding, the role of epigenetic mechanisms in epileptogenesis is still poorly defined. Histone methylation is a unique epigenetic mechanism in that it can either enhance or repress gene transcription. Dimethylation of lysine 9 of histone H3 (H3K9me2) is a well-documented repressive histone mark, but is under studied in the context of epilepsy. To determine the role of H3K9me2 in epileptogenesis, hippocampal tissue was collected from C57bl/6 mice 24 hours after status epilepticus (SE) induced by intranasal administration of the glutamate analogue, kainic acid. Immunohistochemistry (IHC) was performed on coronal brain sections to determine region specific H3K9me2 alterations in the hippocampus 24 hours post SE. Thus far, our preliminary data suggest that global H3K9me2 levels is downregulated in the hippocampus of epileptic rats and is involved in the development of epilepsy. Future studies will include analysis of H3K9me2 at epileptic associated genes within the epileptic hippocampus using chromatin immunoprecipitation (ChIP).

25-Josue F. Deslauriers, Kelsey M. Greathouse, Benjamin Boros, Benjamin W. Henderson, Erik G. Gentry, Jeremy H. Herskowitz

The effects of ROCK 1 Reduction on Dendritic Spine Morphology

Synaptic connections are the sites through which all communication in a neuron occurs. Most excitatory synapses occur at actin rich protrusions on dendrites referred to as dendritic spines. The structure of dendritic spines is dynamic, and in many ways the strength and type of connection of the synapse is believed to be correlated to the morphology of the associated spine. Rho-associated coiled-coil containing protein kinase (ROCK) of which two isoforms exist (ROCK1 and ROCK2) is a regulator of the actin cytoskeleton of cells within the body. Pharmacological ROCK inhibitors are approved for use and are being used to treat diseases such as spinal cord injury, stroke, and glaucoma. However, the effects of these medications in the brain is not completely understood. In this project an assessment on the effects of ROCK 1 reduction on dendritic spine morphology was performed. Prefrontal cortex brain slices of ROCK 1 knockdown mice were prepared and stained with Lucifer yellow and imaged with a confocal microscope following a previously established protocol. Using 3D spine analysis we generated data that shows a trending increase in both general spine density and thin spine density relative to controls. These findings support the hypothesis that inhibition of ROCK 1 may lead to increased spine density and thus implicates ROCK 1 as a potential therapeutic target for treatment of various neurological disorders.

26-Skyler Hendrix, Karina Yoon, Aubrey Miller, Kelly Kreitzburg, Joseph Feduska

ICAM2 Inhibits Colony Formation and Cell Growth of MYCN-Expressing Neuroblastoma Cells

"Introduction: Neuroblastomas are one of the leading causes of death in children, and survival rate is a mere 40% upon diagnosis. Though not a new disease by any stretch, the mechanisms by which the malignant tumors develop and metastasize remain unknown. Intercellular Adhesion Molecule-2 (ICAM2), however, has been shown to be involved in mechanisms that decrease metastasis of neuroblastoma cells, resulting in less invasive/proliferative cells. This research strives to examine if these trends remain true while in the presence of the known oncogene MYCN, which is correlated to metastatic cases and poor prognoses.

Objectives: These experiments examine if ICAM2 will decrease neuroblastoma cell growth and colony formation, even in the presence of MYCN.

Methods: In order to test the effects of ICAM2 expression on cell growth and invasiveness in the presence of MYCN, the cell lines SKNAS (control, without MYCN expression), and IMR32 (MYCN-expressing) were used. Cell growth was calculated over 120 hours, and invasiveness was tested by performing an anchorage-independent colony growth assay in agarose gel.

Results: At the conclusion of colony growth, cell doubling, and western blot data, ICAM2 expression was shown to exert an inhibitory effect on the proliferative rates and invasiveness of neuroblastoma cells, even in the presence of MYCN amplification.

Conclusion: Despite increased expression of the MYCN oncogene, this research showed that ICAM2 expression plays a pivotal role in the metastatic potential of neuroblastoma cells. With further research, components of this cellular pathway could serve as potential pharmaceutical targets.
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"27-Juhi Shah, Sara E. Deas, Miguel Melendez-Ferro, Kyle Brawner, and Colin A. Martin

The Effects of Gestational Psychological Stress on Mouse Intestinal Morphology

"Introduction:
Stress-free conditions are essential for fetal development. Gestational stress is known to cause developmental delays, but its effect of stress during pregnancy on neonatal intestinal integrity is unknown. The purpose of this study was to determine the effect of maternal psychological stress during pregnancy on the offspringâ€™s intestinal villus height and crypt depth.

Methods:
To induce psychological stress, pregnant dams (n=7) were subjected to 1 hour of restraint stress. 2-week and 8-week-old C57/B6 stressed mice and controls were selected. The distal small intestines of 2-week and 8-week-old C57/B6 stressed mice and controls were harvested to create paraffin sections that were cut, mounted on a slide, and stained with hematoxylin and eosin, and cover slipped to measure the villus height and crypt depth. A nonparametric T-test was used to determine statistically significant differences.

Results:
The baseline intestinal measurements in the 2-week-old mice (A= 127.8 micrometers villus height, A= 35.4 micrometers crypt depth) and 8-week-old mice (A= 175 micrometers villus height, A=63 micrometers crypt depth) were analyzed. The p value was <0.05 compared to stressed adult mice (p= <0.0001) crypt depth and (p= <0.06) villus height. Control mice had lower villus height (M = 173.50, SD = 3.048) and higher crypt depth (M = 63.95, SD = 1.2) than stressed mice (M = 188.3, SD = 10.67; M = 53.65, SD = 2.1)
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Conclusion:
Here we establish the baseline characteristics of villus height and crypt depth in these harvested mice and show that mice after gestational stress have shorter crypts.

28-Tanya Zubov, Jennifer Valcin, Assata Pyatt, Telisha Swain, Karen Gamble, and Shannon Bailey

Effect of time-restricted alcohol feeding on select clock and metabolic genes in the liver and hippocampus

"Alcohol damages the multiple organs in the body. The circadian clock is important for maintaining diurnal rhythms in metabolism and health, whereas, disrupted clocks cause disease. The effect time-restricted alcohol feeding has on liver and brain is not known. Our goal is to examine the impact time-restricted alcohol feeding has on clock genes in liver and hippocampus. We hypothesize that there are time-of-day differences in how alcohol alters the clock and metabolism.

Mice were housed under a 12:12 h L:D cycle and were fed control or alcohol diets. Mice were maintained under two time-restricted feeding models: Dark-phase time-restricted feeding (ZT 12 â€“ 24) or light-phase time-restricted feeding (ZT 0 â€“ 12). At the end of the feeding protocol, liver and hippocampus were collected and mRNA levels of clock and metabolic genes were measured.

We observed alcohol and time-of-day differences in expression of several genes. Alcohol increases and decreases Bmal1 and Per2 levels in liver and hippocampus, respectively. Pgc1a levels in liver were higher in night-fed mice vs. day-fed mice, with no difference in hippocampus. Sirt1 levels were similar in all groups, whereas Prkaa1 levels were increased and decreased in livers of night and day-fed alcohol mice, respectively. Alcohol decreased Prkaa1 in the hippocampus.

The results from this study are the first to report the effect of time-restricted alcohol consumption on clock gene expression. These studies demonstrate that there are time-of-day differences in how alcohol affects the clock. Our findings will advance understanding of the mechanisms responsible for alcohol-induced tissue injury.

"ntial pharmaceutical targets.

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29-Brian Freeman

Increase in Alanine Availability Decreases Oxalate in Primary Hyperoxaluria Type 1

"Background: Primary Hyperoxaluria (PH) is a family of inborn disorders involving glyoxylate metabolism that causes excessive endogenous oxalate synthesis which can lead to kidney stone formation. There are limited therapeutic options to treat PH. PH type 1 is the most severe and common form. It is characterized by the enzymatic deficiency of alanine:glyoxylate amino transferase (AGT) in glycolate metabolism. In glyoxylate metabolism, glycolate oxidase converts nontoxic glycolate into glyoxylate, a toxic metabolite. AGT converts glyoxylate and alanine to glycine and pyruvate. When AGT is enzymatically deficient, glyoxylate can be converted to oxalate. We hypothesize that increasing availability of alanine will increase enzymatic efficiency of AGT normal and pathological variants, reducing oxalate synthesis.

Methods: Four transfected Chinese hamster ovary (CHO) cell lines were used for experimentation: CHO.GO, CHO.AGT-MA, CHO.AGT-MI, and CHO.AGT170, a pathogenic variant. Untransfected cells were used as a control. Cells were treated with alanine (0-10 mM) and glycolate (0â€“75 mM) for 24 hours. Indirect toxicity from glyoxylate was measured using Cell Counting Kit 8 to determine the enzymatic efficiency of AGT. Extracellular oxalate levels were measured using ion chromatography/mass spectroscopy.

Results: Enzymatic efficiency of AGT in all variants was improved with increased availability of alanine. Extracellular oxalate levels were significantly lower in AGT variants with increased levels of alanine.

Conclusion: Increasing alanine availability in AGT normal and pathogenic variants increases enzymatic efficiency and decreases oxalate synthesis. The increase in pathological AGT enzymatic efficiency warrants future investigation in PH mouse models to confirm the results of this study.

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30-Josh Baty, Zhengrong Guan, Shali Zhang, Edward Inscho

Rho Kinase Inhibitor, Y-27632 Is Involved in L-type Calcium Channel Pathway

Voltage-dependent L-type calcium channels (L-VDCC) and the rho/rho kinase pathway are two predominate intracellular pathways that regulate afferent arteriolar tone and reactivity. Traditionally, these two pathways have been thought to act independently; however, recent evidence suggests these pathways are convergent. We hypothesized that the rho kinase inhibitor, Y-27632 influences L-VDCC signaling. We estimated changes in intracellular calcium concentration using Fura-2-AM fluorescence spectroscopy (ratio F340/380) during KCl-depolarization in cultured A7r5 cells. The effect of Y-27632 on KCl-depolarization was assessed in afferent arterioles using in vitro blood-perfused juxtamedullary rat nephron preparation. In A7r5 cells, administration of 90mM KCl increased Fura-2 fluorescence by 0.16Â±0.01 ratio units (n=63, p<0.05). Y-27632 significantly decreased KCl-mediated elevation of [Ca2+]i by 44-50% regardless of the concentrations applied (1, 5 and 10ÂµM, p<0.05 vs KCl alone), indicating that Y-27632 decreases L-VDCC function. In afferent arterioles, the baseline diameter averaged 14.6Â±2.0 Âµm in the control group (n=4). Superfusion of 30, 60, and 90mM KCl significantly reduced the diameter to 96Â±10, 57Â±4 and 41Â±3% of the baseline, respectively (p<0.05). Interestingly, addition of Y-27632 increased the starting diameter by 13Â±6, 51Â±10, and 70Â±12% for 1, 5, and 10ÂµM, respectively (n=3-4/each, p<0.05). The KCl-induced vasoconstriction with 1ÂµM Y-27632 (n=4) was similar to control, but markedly attenuated with 5 and 10ÂµM Y-27632, with diameters averaging 96Â±3, 82Â±7, 72Â±6%, and 97Â±0.5, 93Â±2, 88Â±5% of the baseline diameter, respectively (p<0.05 vs KCl alone). These studies indicate that the rho kinase inhibitor, Y-27632 partially inhibits L-VDCC function and participates in L-VDCC signaling.
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31-Aaron Salisbury, Nancy Gallus, Katherine Savell, Jasmin Revanna, Kendra Bunner, Rhiana Simon, Jeremy Day

An Investigation of the Role of Enhancer RNAs in Activity Dependent Neuronal Gene Expression

"Enhancers are DNA elements that interact with promoters to regulate gene expression, transcription factor binding, and cellular function. Recently, research has shown that many regulatory sites, including enhancers, are bidirectionally transcribed by RNA polymerase II, resulting in non-coding RNAs such as enhancer RNA (eRNA). In addition, while there is evidence that eRNAs play a role in gene expression through direct interactions with transcription factors and epigenetic modifiers, their possible role in activity-dependent neuronal function has yet to be elucidated.

In this study, cortical neuronal cell culture systems were used to examine the regulation and localization of eRNAs arising from enhancers for the immediate early gene Fos, a gene that codes for a transcription factor implicated in neuroplasticity and cognitive processes. To examine localization of eRNA transcripts at the single cell level, single molecule fluorescent in situ hybridization (smFISH) was employed, using probes for Gapdh mRNA, Fos mRNA and two Fos eRNAs. This technique revealed nuclear localization of eRNAs and activity dependent induction of Fos mRNA. In addition, RT-qPCR confirmed activity dependent induction of eRNA transcripts.

CRISPR-dCas9 based paradigms were used in C6 cells, a rat glial tumor cell line, to target eRNA transcripts to different sites in the genome (CRISPR-Display), and activate enhancers using transcriptional activators (CRISPRa). These experiments investigate the effects of modulated eRNA levels and locations on mRNA expression. Overall, our findings indicate that eRNAs can directly alter gene expression, suggesting dynamic eRNA expression as an important regulatory mechanism in the central nervous system."

32-Marco-Jose Rivero, Jingzhi Li, Wenjing Cao, Mohammad S. Abdelgawwad, and X. Long Zheng

Purification of von Willebrand Factor (VWF) from Human Plasma Using DNA Aptamer ARC1172 Affinity Medium

Von Willebrand factor (VWF) is a large, multimeric glycoprotein that plays an essential role in hemostasis. VWF dysfunction can lead to von Willebrandâ€™s disease or thrombotic thrombocytopenic purpura. Current methods of obtaining VWF from plasma remain costly and time-consuming. Recent studies have shown that DNA aptamer ARC1172 binds the A1 domain of VWF with high affinity and stability. In the present work, we employ VWF-ARC1172 binding in the development of a novel, single-step method of vWF purification. Cryoprecipitate from normal human plasma was supplemented with ristocetin and loaded onto a column packed with streptavidin agarose and biotinylated ARC1172. After washing steps, the column mixture was treated with restriction enzymes DNase I and EcoR I, and eluted with physiological buffer. EcoR I and DNase I were removed by centrifugal filtration using a 100-kDa cut-off membrane. The resultant VWF displayed high purity, appearing as a single band on SDS-PAGE gel visualized by Coommassie blue staining. However, Western blots, while confirming the presence of VWF, revealed a significant loss of larger VWF multimers. The purified VWF also demonstrated a diminished ability to adhere platelets under shear flow. These results indicate that further refinements (e.g. protease inhibitor and EDTA) are warranted to ensure that VWF retains its structure and function following purification."

33-Taylor Davis, Farah Lubin

A Long-Term Study of Methionine Supplementation on Brain-Derived Neurotrophic Factor DNA Methylation in Temporal Lobe Epilepsy in Rats

"Temporal lobe epilepsy (TLE) is a common acquired form of adult epilepsy that affects around 50 million people in the wordâ€™s population. Untreated epilepsy has a substantial negative impact on health because it increases in severity with age. Temporal lobe epilepsy is associated with overexpression of brain-derived neurotrophic factor (BDNF) in the rat hippocampus. About 30% of patients with TLE are resistant to current drug treatments but an alternative treatment may be DNA methylation (DNAme) of neurotrophic genes. DNAme reduces gene expression, especially neurotrophin factor (NTF) genes like Bdnf which contributes to the maintenance of mature neurons and differentiation of new neurons and synapses. Transgenic mice that overexpress BDNF have increased seizure severity and excessive amounts of BDNF in the rat brain hippocampus causes hyperexcitability. Methionine (Met) supplementation via intraperitoneal injection can supply the methyls used for DNAme and a single dose reduces the expression of BDNF through increasing Bdnf DNAme in the epileptic hippocampus of rats. To look further into the effects of supplemental methionine on BDNF levels regarding TLE, epileptic and non-epileptic rats are being treated with Met for 5 days to determine how long-term methionine treatment could affect hippocampal BDNF levels. We expect to see an increase in Bdnf DNAme resulting in a decrease in BDNF concentrations in the epileptic rat hippocampus after being treated with Met when compared to control epileptic rats.
"

34-Gunnar Eastep, Jiri Vlach, Ruba Ghanam, Carol Carter, Jamil Saad

Electrostatic Interactions Drive RSV Matrix Localization

"Retroviral replication depends upon targeting of the viral structural protein Gag at the inner leaflet of the plasma membrane (PM), leading to the assembly and budding of immature virus particles. The N-terminal matrix (MA) domain of Gag interacts with the PM through a combination of hydrophobic, electrostatic and lipid-specific signals which vary in their contributions among retroviruses. It is well established that a highly basic region (HBR) is a conserved MA feature and is essential for Gag binding to PM through non-specific electrostatic interactions. Additionally, it has been demonstrated that PM targeting of HIV Gag depends on specific interactions of the MA domain with PI(4,5)P2 present in the inner leaflet of PM. While it has been shown that the binding of avian sarcoma virus (ASV) Gag to lipid bilayers is enhanced by PI(4,5)P2, the role of this lipid in ASV Gag localization to the PM remains controversial. Using nuclear magnetic resonance and a recently developed liposome binding assay we seek to understand the strength, specificity and structural aspects of ASV MA interaction with PI(4,5)P2, including possible roles of other PM components. Our results are consistent with an electrostatic model of binding where increasing total negative charge of phospholipids increases the strength of the interaction with RSV MA. However, still more work is required to find a way of liposome preparation that would assure good reproducibility of the binding experiments.

"

35-Kush M. Patel, Michael J. Teale, Ph.D., and Mark O. Bevensee, Ph.D.

Assessing the Role of TMD12 in Ion Translocation of the Na/Bicarbonate Cotransporter, NBCe1

" The Na/bicarbonate cotransporter NBCe1 regulates pH and facilitates solute reabsorption/secretion in tissues, including bicarbonate reabsorption in the kidney. Currently, there is little structural information about NBCe1. We have generated homology models of NBCe1 that reveal how specific transmembrane domains, including TMD12, interact to translocate ions. The purpose of this project is to validate TMD12â€™s role in ion translocation. Cysteine-scanning mutagenesis with sulfhydryl reagents (i.e., MTSEA) was used to determine if specific residues of TMD12 are involved in ion translocation. Individual residues were replaced by cysteine, and the mutant proteins were expressed in Xenopus oocytes and studied functionally using voltage-clamping techniques to measure NBCe1 current. Experiments were performed to determine the activity of mutant proteins and their sensitivity to MTSEA. MTSEA inhibition of NBCe1 function implicates those mutated residues lining the translocation path.
Results from experiments designed to examine the five most cytosolic residues of TMD12 are consistent with TMD12 contributing to the ion translocation path and oriented in our modeled position. M868C facing the path gave a functional and modestly sensitive NBCe1 to MTSEA; A871C angled away from the path generated an NBCe1 with inconsistent sensitivity to MTSEA. G869C and S872 facing the path produced nonfunctional constructs, implicating those residues being critical for ion translocation.
These data help identify specific residues and the orientation of TMD12 that contributes to the ion translocation pathway of NBCe1. Overall, this study will help advance our structure-function understanding of this protein, as well as the development of specific transport inhibitors/stimulators to treat disease states.
"

36-Elizabeth M. Dyer, Ashley E. Landuyt, Barbara J. Klocke, and Craig L. Maynard

Understanding the Role and Relationship of IL10 and ICOSL in Inflammatory Bowel Diseases

Inflammatory Bowel Diseases (IBD) are multifactorial diseases involving chronic inflammation of the digestive tract. Genome-wide association studies (GWAS) have identified almost 200 genes that can impact susceptibility to IBD. We examined the possible collaboration between 2 IBD susceptibility genes, the inducible co-stimulator ligand (ICOSL) and interleukin-10 (IL10), in preventing intestinal inflammation. Previous studies have shown that ICOSL co-stimulation promotes elevated expression of IL10. However, our lab has found that ICOSL signaling is not required for induction of Il10 by intestinal CD4 T cells. In fact, genetic deletion of ICOS, the receptor for ICOSL, results in increased IL-10 expression throughout life. In this study, we analyzed whether co-inactivation of the ICOSL and IL-10 pathways in mice results in accelerated development of intestinal inflammation. Mice that are either wild type or deficient for ICOSL were injected, or not, with an antibody that prevents binding of IL-10 to the IL-10 receptor (IL-10R). To monitor the development and progression of inflammation, the mice were weighed and the concentration of lipocalin-2 (Lcn-2) in feces was monitored every 5 days. Immunological analysis of gut CD4 T cells was performed at the end of the study. ICOSL-deficient mice injected with IL-10R blocking antibody had elevated levels of fecal Lcn-2 and demonstrated enhanced weight loss relative to the other groups. Also, lamina propria CD4 T cells produced elevated levels of IL-17 and IFNÎ³. Collectively, our data suggest that deficiencies in both ICOSL and IL-10 predispose to rapid onset of intestinal inflammation in mice.

37-Marco-Jose Rivero, Jingzhi Li, Wenjing Cao, Mohammad S. Abdelgawwad, and X. Long Zheng

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Von Willebrand factor (VWF) is a large, multimeric glycoprotein that plays an essential role in hemostasis. VWF dysfunction can lead to von Willebrandâ€™s disease or thrombotic thrombocytopenic purpura. Current methods of obtaining VWF from plasma remain costly and time-consuming. Recent studies have shown that DNA aptamer ARC1172 binds the A1 domain of VWF with high affinity and stability. In the present work, we employ VWF-ARC1172 binding in the development of a novel, single-step method of vWF purification. Cryoprecipitate from normal human plasma was supplemented with ristocetin and loaded onto a column packed with streptavidin agarose and biotinylated ARC1172. After washing steps, the column mixture was treated with restriction enzymes DNase I and EcoR I, and eluted with physiological buffer. EcoR I and DNase I were removed by centrifugal filtration using a 100-kDa cut-off membrane. The resultant VWF displayed high purity, appearing as a single band on SDS-PAGE gel visualized by Coomassie blue staining. However, Western blots, while confirming the presence of VWF, revealed a significant loss of larger VWF multimers. The purified VWF also demonstrated a diminished ability to adhere platelets under shear flow. These results indicate that further refinements (e.g. protease inhibitor and EDTA) are warranted to ensure that VWF retains its structure and function following purification.

38-Amanda Horowitz, Karis Ederer, Shannon Bailey, and Maria De Luca

A novel link between Syndecan and glycogen metabolism mediated by the AMP-activated protein kinase

"Syndecans are transmembrane proteoglycans involved in multiple physiological processes, including the cellular response to heparin-binding growth factors, neuronal development, and inflammation. Previously, we showed that knocking down the expression of the Sdc gene in the fat body (insect equivalent of mammalian adipose tissue) led to higher levels of glycogen in the fly Drosophila melanogaster. To determine whether Sdc is necessary in the regulation of glycogen levels, in this study we first overexpressed Sdc in the fat body. As in mammals, Drosophila AMP-activated protein kinase (AMPK) is a central sensor of cellular energy status that is activated by AMP under lowered intracellularÂ ATP levels. To determine whether Sdc affects glycogen levels via AMPK, we next quantified AMPK Thr172 phosphorylation, a site that is required for the activation of AMPK, in fat body-specific Sdc knockdown flies and controls. Additionally, we fed these flies on 5-aminoimidazole-4-carboxamide 1-Î²-D-ribofuranoside (AICAR), a well-known activator of AMPK, to determine whether glycogen levels would be modified by the drug administration. We used the GAL4-UAS approach to alter the expression of the Sdc gene, specifically in the fat body. We observed a statistically significant reduction in glycogen levels between flies with Sdc overexpressed in the fat body relative to controls (p=0.028). Additionally, we observed a 46% decrease in AMPK phosphorylation in fat body-specific Sdc knockdown flies compared to controls (p <0.001). Finally, feeding fat body-specific Sdc knockdown flies with AICAR significantly reduced glycogen levels. These results suggest that Syndecan might affect glycogen metabolism via the energy-sensing kinase AMPK.
"

39-Ogechukwu Otiji, Ganesh Halade

Role of Arachidonate 5-Lipoxygenase in Angiogenesis Post-Myocardial Infarction in Mice

"Role of Arachidonate 5-Lipoxygenase in Angiogenesis Post-Myocardial Infarction in Mice
Mentee: Ogechukwu Otiji (PARAdiGM program)
Mentor: Ganesh V. Halade PhD
Introduction: Myocardial infarction (MI) also known as a heart attack is characterized by the lack of oxygen supply to the heart muscle which leads to necrosis of the infarcted heart muscle. The formation of new blood vessels from preexisting ones, a process also known as angiogenesis play a vital role in preventing as well as healing the damage caused by MI. Angiogenesis expedites healing of damaged heart muscle by allowing reperfusion to the infarcted area or area at risk, increasing and restoring blood flow to the damaged area and preventing hypoxia. The 5-lipoxygenase enzyme has been closely linked to angiogenesis and cell proliferation, but its specific role in dithering heart failure after myocardial infarction is not well known. 5-Lox catalyzes the oxygenation of arachidonic acid which ultimately forms the bioactive compound leukotrienes. Leukotrieneâ€™s main function is in the pathogenesis of inflammation.
Objective: The study will test the hypothesis that the arachidonate 5-lipoxygenase, will facilitate angiogenesis, and its contribution in preventing and resolving heart failure pathology post MI.
Method: To measure angiogenesis, we analyzed 3-4 marked areas on the left ventricle using histological analysis. Dr. Halade lab provided the samples for histology after myocardial infarction surgery to mice.
Results: the infarcted area as well as the non-infarct area were examined under a microscope at 40X magnification.
Conclusion: GLS-1 increases post-MI in infarcted area of LV.
"

"40-Amir Khayat Kahale, Griffin Thompson, Lan He, Hernan Grenett, Takamitsu Saigusa and P. Darwin Bell.

The Effect of Acute Exposure to Low-Dose of Domoic-Acid in Mouse Kidney

"Domoic Acid (DA) is a bio-toxin produced by algae (Pseudo-nitzschia) and can accumulate in shellfish and mammals. DA is an analog of glutamate, activates ionotropic receptors, and has pathological effects on the nervous system and the kidney. High-doses of DA can cause acute kidney injury, but low-dose exposure to DA in the kidney is not well characterized.
We investigated how acute exposure to low levels of DA affects kidney gene expression in female mice. Our recent studies suggest that females, as opposed to males, may be more sensitive to DA. Mice were injected IP with 0.05 mg/kg DA and kidneys were harvested after 15, 30, and 60 min. Total kidney RNA was isolated for RNA-sequence analysis. Since organic anion transporter (OAT) may help in the renal elimination of DA through tubular secretion; we investigated the expression of kidney OAT-1, OAT-2, and OAT-3 by qPCR in both sex mice.
RNA-seq analyses showed that DA treatment affected 41 differentially-expressed-genes (DEG) at the three time intervals. Some of these genes are involved in lipid metabolism, terminal cellular oxidation, and plasma membrane transport. Our qPCR results demonstrate different gene expression of OATs mRNA of male and female mice suggesting that male mice may be more efficient at renal excretion of DA.
These data reveal that low dose DA can alter renal gene expression thereby leading to kidney damage. Differences in OAT expression may be responsible for increased DA damage in females due to increased retention of DA.
"

41-Danielle Kem, Sidhanth Chandra, Hunter Scott, Valentina Krendelchtchikova,Vedad Delic, Andrew West

23 nm diameter pre formed alpha synuclein fibrils are more effective at inducing Parkinsonâ€™s disease pathology in Sprague Dawley rats

"BackgroundÂ
The alpha-synuclein (Î±-syn)Â fibril model of Parkinsonâ€™sÂ diseaseÂ (PD) is used to induce PDÂ like pathology in rats in order toÂ study PDÂ andÂ test drug candidates. In this model, sonicated Î±-syn fibrils are injected into the substantia nigra pars compacta (SNpc) region of the brain. These fibrils are taken up by neurons where they corrupt the endogenous Î±-syn causing them to aggregate into inclusions called Lewy bodies (LB). Inclusion formation is accompanied by progressive loss of dopaminergic neurons, and SNpc denervation of the striatum.

ObjectiveÂ
We are determining if 23nm Î±-synuclein fibril fragments are more effective at seeding PD pathology than 49nm fragments. The optimized model will be used to test PD drugs.Â Â
Â
MethodsÂ
40Âµm rat brains sections containing the SNpc and striatum were collected. These slices were then stained and used to quantify the loss of dopaminergic neurons, quantify LB aggregation inÂ the SNpcÂ and striatum, and quantify denervation ofÂ the striatum byÂ dopaminergic neuronsÂ residing inÂ the SNpc.

Results
There was a remarkable 50 fold increase in the number of inclusions in the striatum of the 23nm injected rats over the striatum of rats injected with 49nm PFFs, while the number of inclusions in the SNpc and the TH+ fiber density of the striatum remained the same in both groups of rats. Both showed 40% loss of dopaminergic neurons in the SNpc but variability was halved in the 23nm cohort.

Conclusions
The 23nm Î±-synuclein fibrils were more effective in seeding PD pathology than the 49nm fibrils.
"

42-Audrey Weber "

Defining Î±-synuclein conformers responsible for PD phenotypes

A hallmark of Parkinsonâ€™s disease (PD) is inclusions called Lewy bodies that are primarily formed from Î±-synuclein. A recent study showed exposing neurons to preformed fibrils (PFF) formed from recombinant Î±-synuclein seed recruitment of endogenous synuclein to inclusions leading to neuron death. The conformation of fibrils causing inclusions and neuron death are currently unknown. To understand this, several Î±-syn conformers were prepared (1. Monomers 2. Oligomers 3. Long fibrils 4. Short fibrils 5. Mixture of oligomers and short fibrils) and injected into the striatum of mice. After injection, behavioral tests were used to evaluate motor function for three and six-months. Perfusions were performed followed by immunohistochemistry performed using an antibody to p-Î±-syn to analyze inclusions in Substantia nigra pars compacta (SNPc), amygdala, striatum, and motor cortex. Dopamine neuron death in the SNPc was analyzed using immunohistochemistry for Tyrosine Hydroxylase (TH) for both cohorts. Unbiased stereological estimation for number of inclusions and TH cells will be conducted. Finally, a method was optimized for enhanced seeding of inclusions by generating fibril sonicating by adding these seeds to monomer to make more competent seeds. By analyzing exposure to preparations using confocal imaging, inclusions could be counted to determine seeding potency. The analysis of Lewy body inclusions and dopamine neuron death allowed for Î±-syn conformer definition and isolation to determine toxicity and/or production of seed inclusions and the potency of preparation methods.

43-Cristhian Gutierrez Huerta, Ana Sogorovic, B.S., and Joshua S Speed, PhD

Increased ETB receptor signaling in adipocytes may promote obesity and insulin resistance

A correlation between salt intake and obesity has been observed in numerous human populations; however mechanisms linking dietary salt and adiposity are lacking. High dietary salt is a stimulus for the production of Endothelin-1 (ET-1) in the vasculature and renal system. Previous in vitro studies indicate that ET-1 plays a key role in lipid metabolism by the adipocyte. Activation of the ETA receptor promotes lipolysis while the ETB receptor inhibits lipolysis. We hypothesized that increased in ET-1 in response to high salt intake promotes adipose deposition and contributes to the development of obesity. The goal of the current study was to determine the relative distribution of ET-1 receptor subtypes in various sites of adipose deposition, and determine if high salt intake impacts relative distribution. Mice were fed normal (NS, 0.49% NaCl) or high (HS, 4% NaCl) salt diet and ETA and ETB receptor gene expression was measured in epididymal and subcutaneous. Our results indicate that ETB receptor expression is 17-fold higher than ETA expression in epidydimal fat of mice fed NS. Interestingly, HS fed mice had only a 6-fold difference (ETB/ETA) in ET-1 receptor expression. In contrast, subcutaneous adipose had 6.7 fold higher ETB to ETA expression, and HS had no effect on this ratio (6.7-fold ETB/ETA). These data indicate that ETB receptors are the dominant ET-1 receptor on adipose and ETB receptor expression on visceral fat is sensitive to changes in salt intake.

44-Johnathan Scott, Tania Tse, John J. Shacka, PhD

The Relationship Between Alpha-Synuclein, Alpha-Galactosidase A, and Ischemic Stroke

Stroke is a leading cause of death and disability in the United States. There is a crucial need to better understand the post-stroke injury response in the hopes of identifying candidate biomarkers and therapeutic targets. Recent publications indicate that the protein alpha-synuclein (Î±-syn) contributes to the pathogenesis of brain injury following stroke. The Shacka lab has shown previously that mice deficient in the lysosomal enzyme Î±-Galactosidase A (Î±-Gal A) have increased levels of Î±-syn. Interestingly, patients with Fabry disease (a rare, X-linked lysosomal storage disorder caused by mutations in the gene encoding Î±-Gal A) have an increased prevalence of stroke. However, whether a correlation exists between Î±-Gal A, Î±-syn, and ischemic stroke is unknown and requires further exploration. We hypothesize that Î±-Gal A deficiency results in increased baseline Î±-syn, levels of which are further increased following ischemic stroke. To test this hypothesis, we used a fibroblast cell-line generated from wildtype (WT) or Î±-Gal A deficient (Fabry) mice and subjected these cells to oxygen glucose deprivation (OGD), an in vitro model of ischemic stroke. Western blot analysis revealed lower basal levels of Î±-syn in Fabry vs. WT fibroblasts, which is inconsistent with previous observations in mouse brain. However, increased Î±-syn was observed in OGD-treated fibroblasts, and this relative increase appeared greater in Fabry-treated vs. WT-treated fibroblasts. In conclusion, our results suggest Î±-syn is differentially up-regulated in Fabry fibroblasts in an in vitro model of ischemic stroke, and supports a relationship between Î±-Gal A deficiency, Î±-syn and stroke that warrants further investigation.

45-Kaelee Hale, Jennifer L. Larson-Casey, Linlin Gu, and A. Brent Carter

Rac1 Regulates Apoptosis Resistance in Pro-Fibrotic Alveolar Macrophages Via Mediation of Mitochondrial Dynamics and Metabolic Reprogramming

"Background

Pulmonary fibrosis is a disease characterized by irreversible remodeling of the lung tissue. Macrophages are critical in the progression of pulmonary fibrosis. A characteristic feature in macrophages in fibrosis is increased mitochondrial (mt) ROS. The Rho GTPase Rac1 induces macrophage mtROS and is required for the development of pulmonary fibrosis. Although mt dysfunction is associated with apoptosis in many cell types, macrophages from human subjects with fibrosis are resistant to apoptosis.

Hypothesis

Rac1 modulates mt dynamics and metabolic reprogramming to fatty acid oxidation (FAO) to mediate apoptosis resistance in lung macrophages.

Methods

Expression of constitutive active Rac1 (Rac1-CA) was utilized. Mitophagy was analyzed using immunoblot analysis and TEM. Mitochondrial biogenesis was determined by confocal microscopy and RT PCR. A Seahorse Bioanalyzer was used to measure FAO. WT mice and Rac1-/-Lyz2-cre mice were used for in vivo studies. Apoptosis was determined by caspase-3 activity and TUNEL.

Results

Macrophages treated with chrysotile or expressing Rac1-CA displayed increased expression of mitophagy-associated proteins including p62, PINK1, and LC3 II. WT mice exposed to bleomycin had increased mitophagy. Chrysotile increased expression of TFAM. FAO was increased by Rac1. Macrophages from WT mice were resistant to apoptosis, whereas macrophages from Rac1-/-Lyz2-cre mice were apoptotic.

Conclusions

Mitophagy and mitochondrial biogenesis are greater with over-expression of Rac1-CA. Over-expression of Rac1-CA promoted FAO in macrophages. Lung macrophages from WT mice have increased mitophagy and are resistant to apoptosis, while macrophages from mice harboring a deletion of Rac1 lack mitophagy and have increased apoptosis.

46-Joshua Nougaisse

Crystallization of High Affinity Copper Uptake Protein (hCTR1) and Structural Analysis Using X-ray Crystallography

"CTR1 functions as a high affinity copper uptake protein and is the only protein of its class in the human genome. Although there are few studies on CTR1, current evidence supports the idea that the protein acts as a transporter, but is structurally similar to a channel. This structural paradox alone poses several questions about the nature of the regulation and uptake of copper in humans. The goal of this project is to crystallize a purified CTR1 protein and find out the structure and binding mechanisms of CTR1 at high resolution. Based on processed data, steps can be taken to find a mechanism of this protein. Yeast expressing the gene for CTR1 were prepared and the protein was extracted and purified. The purified protein was then grown into a crystallized state under various conditions. Finally x-ray crystallography was used to collect data on the refraction patterns of the protein. X-ray crystallography data reveals an untwinned crystal of CTR1 at high resolution. Currently, there is insufficient data to determine a complete structure of CTR1. Although, the methods in this project resolved the twinning problem that appeared in earlier attempts of this crystallization process. Growing untwinned crystals will eventually allow a complete structure for this protein to be solved. These results will play a significant role in creating novel anti-cancer drugs as well as identifying the exact process of copper transport in the body.
"

47-Joline Hartheimer, Sean Santos, Mert Icyuz, Haley Albright, John Hartman IV

Cellular Mechanism Underlying Gene-Nutrient Interactions Affecting Longevity

"Introduction: Aging is associated with declining function and increased risk of disease. Dietary interventions are known to modulate lifespan and healthspan, yet the cellular mechanisms of nutritional influences on aging are not well understood. Saccharomyces cerevisiae can be used to measure aging by calculating Chronological Life Span (CLS), the amount of time that a non-dividing yeast cell survives. CLS can be measured using Quantitative High Throughput Cell Array Phenotyping (Q-HTCP) which uses robotics and computational analysis. Of great interest to aging in eukaryotes is the fraction of quiescent cells in stationary phase yeast culture that have exited the cell cycle due to nutritional stress, but are still capable of reentering upon rich nutritional conditions.

Objective: To identify gene-nutrient interactions affecting S. cerevisiae on chronological life span and better characterize their cellular mechanisms.

Methods: CLS was measured by Q-HTCP to identify aging phenotypes resulting from different auxotrophic alleles of S. cerevisiae on human-like media with different concentrations of carbon (dextrose) and nitrogen (ammonium sulfate). Mitochondrial activity and cell cycle distribution (G1/G0 arrest) were assessed with flow cytometry.

Results: Dextrose restriction and methionine auxotrophy protected against aging over 28 days. Ammonium sulfateâ€™s effects depended on auxotrophy and dextrose concentration. In two auxotrophic strains, mitochondrial activity decreased over 6 days. Prototrophs had a more stable quiescent (G0) state than auxotrophs over 7-10 days.

Conclusion: Complex gene-nutrient interactions exist in yeast and their mechanisms will be further analyzed with multiwell and multiplex flow cytometric assays with respect to apoptosis, bud scars, and lysosomal acidity.
"

"48-Yasmeen Abdo, Anu Pandit, B.S., Susmita Murthy, B.S., Jianqing Zhang, Ph.D., Jacques E. Riby, Ph.D., Akinyemi I. Ojesina, M.D., Ph.D."

Oncogenic Effects of Somatic Mutations in Splicing Factor ZC3H11A

"Background and Objective:Â
Phenotypic characterization of mutations in cancer is important for understanding disease pathogenesis and developing targeted therapies. The Ojesina laboratory recently identified recurrent hotspot mutations in theÂ ZC3H11AÂ gene in cervical cancer (yet unpublished). This study aims to investigate the genomic and phenotypic consequences ofÂ ZC3H11AÂ mutations in cancer, and to test the hypothesis that the mutation from leucine to proline in position 801 (L801P) ofÂ ZC3H11AÂ is associated with phenotypic features of cellular proliferation, motility, and invasiveness.
Methods:Â
Using the Morpheus software, gene expression profiles were compared between 20Â ZC3H11A-mutant and 52 wildtype cervical tumors to identify upregulated and downregulated genes. The following phenotypic assays were performed on immortalized human embryonic kidney cell lines (HA1E) transduced with either theÂ ZC3H11A wild type or L801P mutant: 1) the MTT assay to measure cell proliferation rates; 2) a wound assay to gauge cell motility;Â 3) Chemotaxis and invasiveness assay using Matrigel.
Results:Â
Gene expression profiling revealed that hemoglobin complex genes and polycomb target genes were upregulated while genes associated with the extracellular matrix were downregulated inÂ ZC3H11A-mutant tumors. Cell lines overexpressing the L801P mutant displayed higher proliferation rates than those harboring the wildtype gene. The mutant was also associated with increased cell motility but a lower invasiveness index.
Conclusions:Â
These data are suggestive of oncogenic effects of somatic mutations in ZC3H11A. Ongoing and future experiments include reiteration of the already performed assays, soft agar colony formation assay and RNA sequencing of the cell lines.
"

49-Sheila Mallenahalli, Colin Reily PhD

Effects of pro-inflammatory cytokines on galactose deficient IgA1 production in IgA Nephropathy B cells

"IgA Nephropathy (IgAN) is the leading cause of primary glomerulonephritis. Elevated levels of Galactose deficient IgA1 (Gd-IgA1) antibody react with IgG autoantibodies, forming circulating immune complexes (CIC) that deposit in the kidney, causing decreased kidney function. IgAN patients often present with synpharyngitic hematuria, suggesting an inflammatory component. In vitro, IL-6 induces Gd-IgA1 production in immortalized B cells from IgAN patients, but not controls. This study tests the effects of other cytokines, primarily IL-4, IL-21 and CD40L, on Gd-IgA1 production and attempts to identify downstream signaling processes responsible for increased autoantigen secretion from both IgAN patients and controls. Pinpointing abnormal inflammatory responses may lead to better treatment regimens, as IgAN currently has no disease specific therapy. EBV immortalized B cells from IgAN patients and healthy controls were exposed to an initial cytokine stimulus (IL-4 at 100 ng/mL, 50 ng/mL, 25 ng/mL; IL-21 and CD40L at 50ng/mL, 25ng/mL, 12.5ng/mL) and incubated for 4 days. Cells were pelleted and lysed for western blotting, and media was harvested for IgA analysis. IgA production was assessed with an in-house IgA ELISA. Gd-IgA1 was assessed through a lectin based ELISA.Exposure to IL-4, IL-21 and CD40L showed no significant change in IgA1 production, but a trend towards decreased Gd-IgA1 production in controls and increased Gd-IgA1production in IgAN samples. Unlike IL-6, IL-4 IL-21 and CD40L had no effect on IgA1 production. However, exposure from these cytokines showed a trend toward decreased galactosylation in IgAN cells. This increased Gd-IgA1 production may lend insight to disease specific galactosylation pathways.

"

50-Rachael Branscomb; Colleen Mikelson, MS

Prolactin receptor signaling in the pancreatic Î²-cell: The role of STAT5

The lactogenic hormone, prolactin (PRL), has many critical functions during pregnancy including a role in the adaptive response of Î²-cell expansion and glucose homeostasis in murine models. Previous data indicates that targets of prolactin signaling in pancreatic Î²-cells include the genes Tph1, Hopx, and IVD. The prolactin signaling pathway through the prolactin receptor (PRLR) is mediated in part by transcription factor STAT5. The objective of this study is to determine if STAT5 is a direct mediator of gene transcription for these genes, further elucidating the signaling pathway of the PRLR and its gene targets. We used both a mouse insulinoma cell line (MIN6) and isolated mouse islets, treated with and without prolactin. The localization of STAT5 binding was detected with the chromatin immunoprecipitation (ChIP) assay, a method that allows for the direct detection of protein-DNA interaction, using a rabbit Î±-STAT5A/B antibody to immunoprecipitate. With overnight PRL treatments, Tph1 expression increased 50+ fold in islets and 6+ fold in MIN6. When compared to control IgG antibody, PRL treatment resulted in a 3-fold enrichment at the STAT5 response element, upstream of the Tph1 gene in MIN6 cells. Enrichment at the STAT5 response element suggests that STAT5 is a mediator for Tph1 expression. Further method refinement is needed for successful islet ChIP. Validation of STAT5 binding for Hopx and IVD is ongoing.

51-Mason Weupe

Crystallization of Yersinia Substrate Binding Protein YfeA

"Yersinia pestis is the causative agent of plague which has devastated mankind throughout history, including Europe in the mid-1300s as the Bubonic Plague. Today Y. pestis continues as a threat in bioterrorism yet many aspects of its biology remain poorly understood. An important process for Y. pestis to survive during infection is transition metal homeostasis, which is the influenced by the ability of Y. pestis to sequester limited metal nutrient from the host. YfeA is a periplasmic substrate binding protein (SBP) in Y. pestis that is the only known polyspecific metal chaperone capable of binding zinc, manganese, and iron atoms, and is crucial for infection. YfeA delivers these metal nutrients that have been sequestered from the host to the YfeBCD transporter for import into the cytoplasm. To understand this process, we crystallized YfeA with (holo) and without (apo) a metal bound. To obtain apo YfeA, we engineered a laboratory strain of E. coli to express the full YfeABCD transporter and fractionated the E. coli periplasm to specifically extract YfeA that had already delivered its substrate to YfeBCD. To generate holo YfeA, we reintroduced metal substrate to apo YfeA and reconstituted the metal-bound state. X-ray scattering data from apo and holo YfeA crystals indicates metal transfer between YfeA and YfeBCD requires the unfolding and refolding of a flexible lobe in YfeA. These results reveal a novel mechanism for metal transfer that can be targeted for future antibiotic drug discovery, as well as, defense against this potential agent of bioterrorism. Results also revealed a significant binding affinity of YfeA towards zinc, as opposed to, manganese and iron. A second polyspecific binding site was observed when YfeA was co-crystallized with manganese and zinc present. The secondary binding site showed, in the presence of manganese, zinc binds.
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"52-Pablo Juarez1,2, Xiaoyong Lei2, and Sasanka Ramanadham2 1Univeristy of California Merced, Merced, CA; 2Department of Cell, Developmental, and Integrative Biology; Comprehensive Diabetes Center University of Alabama at Birmingham, Birmingham, AL

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The Involvement of Endoplasmic Reticulum Ca2+ Leak Via Translocon on iPLA2Î² Induction in Î²-cells

"Type 1 diabetes is an autoimmune disease that is characterized by the destruction of pancreatic Î²-cells. Pro-inflammatory cytokines induce ER stress in Î²-cells, which is associated with an unfolded protein response (UPR) and Ca2+ store depletion, that leads to activation of NF-ïˆ«B and ultimately to Î²-cell apoptosis. GRP78, master chaperone of the UPR, modulates Ca2+release via translocon opening during UPR response and ER stress. It was reported that the Ca2+-independent phospholipase A2Î² (iPLA2Î²) participates in ER stress-induced Î²-cell apoptosis, although the underlying mechanisms by which it does so are not well understood. It might be speculated that the cytokine-mediated induction of ER Ca2+ leak via the translocon induces iPLA2Î². This intriguing possibility led us to investigate the role of the translocon activity on iPLA2Î² induction in ïˆ¢-cells. INS-1 insulinoma cells were treated with puromycin (2 Î¼M) to activate the translocon in the absence and presence of inhibitors of iPLA2Î² (S-BEL, 10 Î¼M) or NF-ïˆ«kB (WA) . Assessments included GRP78, pPERK (ER stress factor), CHOP (ER stress apoptotic factor), p65 (activated NF-ïˆ«B), and iPLA2Î² protein abundances and incidence of cell death by Western and TUNEL analyses, respectively. We find that, as expected, puromycin induced GRP78, pPERK, and CHOP. Further, puromycin induced NF-ïˆ«B and iPLA2Î², WA attenuated iPLA2Î², and both S-BEL and WA attenuated puromycin-induced INS-1 cell apoptosis. Collectively, these findings suggest that iPLA2Î² induction in ïˆ¢-cells undergoing ER stress occurs via GRP78-goverened translocon activation, in part through the NF-ïˆ«B pathway.

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"53-Roberts S.1,2, Aburjania Z.3, Jang S.3, Chang A.3, McMonigle R.3, Sadanandan V.4, Jaskula-Sztul R.3, & Chen H.3

In vitro studies of new anticancer natural compounds in neuroendocrine tumor (NET) cell lines

"Neuroendocrine (NE) cancer is a collective name of tumors that are derived from neural crest cells, and its incidence has increased more than six-fold since 1973. Surgery represents the most viable treatment option for localized cancer. Unfortunately, many patients present with distant metastases making surgery ineffective, and there are limited medical therapies available. We are working in collaboration with the UAB Department of Chemistry to identify novel compounds that can effectively inhibit proliferation of neuroendocrine tumor (NET) cell lines. The objective of our study is to identify novel therapeutic compounds for the treatment of NE cancers. NET cell lines, specifically pulmonary carcinoid cells will be treated with two natural compounds and then assessed for cell cytotoxicity by 3-(4,5-Dimethylthiazole-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. The effect on apoptosis will be assessed with flow cytometry. Possible mechaÂ¬nisms of growth inhibition will be analyzed by detecting cell cycle and apoptotic protein marÂ¬kers by Western blot. MoreÂ¬over, we will test the ability of these compounds to reduce NET markers correlated with malignant phenotyÂ¬pes and poor prognoses such as achaÂ¬ete-Â¬scute homolog 1 (ASCL1) and chromoÂ¬graÂ¬nin A (CgA) using Western blot. We hypothesize that novel natural compounds can have antiproliferative and cytotoxic effects on NET. The flow cytometry will reveal the possible mechanism of cytotoxicity. We hypothesize that Western blotting will reveal the specific proteins involved in this process and confirm the reducÂ¬tion of the highly expresÂ¬sed NET markers.

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54-Elizabeth M. Daugherty, Eman Y. Gohar, Ijeoma Obi, Carmen De Miguel, Malgorzata Kasztan, Joshua S. Speed, Jennifer S. Pollock, and David M. Pollock

G Protein Estrogen Receptor is upregulated to facilitate renal protection in females through eliciting a more enhanced natriuretic response

Premenopausal women suffer from salt-sensitive hypertension less frequently than age-matched men. The novel G protein-coupled estrogen receptor (GPER) has renal protective properties that may be involved in facilitating sodium excretion. We recently observed that activating GPER in the renal medulla of female rats significantly increases natriuresis. We hypothesized renal medullary GPER expression and/or abundance may explain sex-dependent differences in sodium excretion. Male, female and ovariectomized female (OVX) Sprague-Dawley rats were fed normal salt (NS-0.49% NaCl) or high salt (HS-4% NaCl) diets for five days before kidney collection. RT-PCR determined relative mRNA GPER expression. GPER expression in the outer medulla (OM) was significantly higher in NS OVX compared to females (Fold change: 1.91Â±0.43 vs. 1.06Â±0.55, n=6, p<0.05, respectively). Females display lower and OVX display higher relative GPER expression than males. In the inner medulla (IM), NS females express higher GPER levels compared to male and OVX. HS OVX in the OM express significantly less GPER than males (Fold change: 0.62Â±0.10 vs. 1.00Â±0.04, n=6, p<0.05, respectively), while females express less GPER than males. In the IM, HS female and OVX express less GPER than males. Immunohistochemistry localized GPER protein to renal interstitial cells in all rats. In the IM and OM, females fed HS express more GPER than males, with HS females displaying significantly more GPER in the OM (GPER+cells/field, 6.73Â±2.10 vs. 1.88Â±0.52, n=5-6, respectively). We conclude that higher GPER abundance in females on HS diets may account for a more robust ability for natriuresis compared to males and post-menopausal females.

55-Brian Tirado, Maximiliano Grennett, Martin E. Young

Effects of Fasting on Cardiac Glycogen Levels

"Background: Living organisms experience peaks and troughs of biological processes over a 24 hour cycle. These oscillations are essential for maintaining homeostasis in the human body and are known as circadian rhythms. Circadian rhythms are observable in all cells including cardiomyocytes (the muscle cells of the heart). These rhythms allow cardiomyocytes to anticipate sleep/wake and feeding/fasting cycles by regulating metabolism over the course of the day. For example, glycogen levels oscillate in the heart over the course of the day, peaking during the active/fed state. Currently, the mechanisms that drive daily rhythms of glycogen turnover are unknown. Additionally, it is unknown whether feeding or fasting cycles or circadian rhythms are the main driving force of glycogen levels.

Objective: The objective is to investigate whether daily rhythms in glycogen turnover in the heart are secondary to feeding/fasting cycles.

Methods: The mice were randomly divided into one of two experimental groups: ad libitum (normally) fed versus fasted. For fasted mice, food was removed four hours into the light phase. This protocol was chosen because mice exhibit a natural trough in food intake at this time of the day. Hearts were isolated from fed and fasted mice at four hour intervals over a 24-hour period. Glycogen levels were assessed using a spectrophotometric assay.

Results: In ad libitum fed mice, glycogen levels oscillate approximately 2.8 fold throughout the day. In fasted mice, oscillations were attenuated in the heart.

Discussion: This data suggest that feeding/fasting cycles contribute toward cardiac glycogen level oscillations throughout the day.
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56-John Gotham, Oreoluwa Adedoyin, Jeremie Lever, James George

Optimal Preservation Conditions for Flow Cytometry Analysis of Human Peripheral Blood Mononuclear Cells

"The phenotypic diversity of mononuclear phagocytes in the human kidney is poorly understood. To study these cells in the human kidney, we are developing the methodology required to isolate intra-renal mononuclear cells and cryopreserve them for later analysis. Therefore, we designed experiments to determine the effects of cryopreservation and fixation on relative proportions of major mononuclear phagocyte populations in human blood. Information gained from these experiments will be used as the starting conditions for optimization for human kidney leukocytes.

Peripheral blood mononuclear cells (PBMCs) were isolated from human blood and cellular viability was assessed via trypan blue exclusion. To assess the effect of fixation, cells were stained using a 9-color panel and analyzed by flow cytometry. Cells were then fixed and reanalyzed daily for up to 7 days. To test the effects of cryopreservation, PBMCs were cryopreserved and then samples were stained weekly to assess the effect viability and immune cell subpopulations over time.

We observed about 50% reduction in cell viability 1 week after cryopreservation compared with fresh cells (p<0.05, n=3-4) but this remained stable thereafter. There was no significant difference in cell viability among cryopreserved cells regardless of duration of freezing. We observed significant reduction in the percent of CD8+ T Cells from 30.9Â±4.1 to 15.2Â±6.2, and CD3+ cells from 12.1Â±1.9 to 6.41Â±1.5 after 6 days of fixation. (MeanÂ±SEM; Fresh vs. Fixed d6, p<0.05, n=2-6).

PBMCs fixed for over 5 days demonstrate significant alterations in T lymphocyte populations however, there was no significant difference observed with myeloid populations.
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57-Zahra Hooda, Bryan Becker, Jin Chunhua, and David M. Pollock

Splenic Responses to Sympathetic Nervous System Activity and High Salt Diet in ETB-Deficient Rats

Hypertension, or abnormally high blood pressure, contributes to the development of serious cardiovascular disease and is often associated with elevated sympathetic nerve activity (SNA) and endothelin signaling. The effects of SNA and endothelin on the heart and kidney have been explored; however, its effects on the spleen, a blood reservoir and immune organ, have been relatively uninvestigated. We hypothesize that elevated SNA increases norepinephrine and endothelin-1 in the spleen, and that renal sympathetic denervation (DNx) decreases these factors. We used ETB-Deficient rats (ETB-Def), which lack functional ETB receptors except on sympathetic nerves and transgenic littermate controls (TG). ETB-Def have higher SNA, blood pressure, circulating endothelin-1, and are salt-sensitive. Rats underwent bilateral renal sympathetic denervation or sham procedure and were placed on normal salt (NS; 0.49% NaCl) or high salt (HS; 4.0% NaCl) diet. Spleen weight was highest in HS ETB-Def rats (2.3Â±0.1 p=0.01 mg/g) compared to all groups (ETB-Def/NS 1.9Â±0.1; TG/HS 1.8Â±0.1; TG/NS 1.7Â±0.1 mg/g). Norepinephrine content was higher in NS rats compared to HS rats in all groups (p=0.02). There was no significant interaction between norepinephrine and DNx (p=0.83) or blood pressure (p=0.54). There was not a significant interaction between endothelin-1 and salt (p=0.81) or DNx (p=0.85).There was a significant inverse correlation between norepinephrine and endothelin-1 in Sham NS ETB-Def (p=0.03) and TG (p=0.02). Overall, the demonstrated effects of salt diet and SNA on the spleen show an important relationship between the spleen and SNA, which should be explored further.

58-Molly Easter, Maheshika S. Somarathna, Tayana Isayeva-Waldrop, Kelly Hyndman, Timmy C. Lee

Endothelin B receptor and Venous Intimal Hyperplasia Development in Rat Arteriovenous Fistulas

The vascular access is the lifeline for hemodialysis patients. The preferred type of vascular access is an arteriovenous fistula, a direct connection between an artery and vein. However, 60% of AVFs fail due to poor vascular remodeling and venous intimal hyperplasia development. The role of Et-b receptor in the vascular homeostasis is complex. In some vascular beds Et-b receptors can stimulate vasoconstrictor signaling on vascular smooth muscle cells. On the contrary, stimulation of Et-b signaling on endothelium cells activates the vasodilator activities. The involvement of Et-b receptor signaling in venous intimal hyperplasia formation is unclear. In this study, we compared the formation of intimal hyperplasia in transgenic Et-b deficient rats to wild type transgenic rats. We hypothesize that the lack of Et-b receptors in the transgenic Et-b deficient rats will increase venous intimal hyperplasia in arteriovenous fistulas. Arteriovenous fistulas were created in the femoral artery and vein of ET-b-deficient transgenic and wild type transgenic rats. After 7 days, the fistulas were harvested for histological and morphometric analysis. Fistula veins were stained using the Verhoeffâ€™s Van Gieson elastic tissue fiber stain. The Et-b deficient transgenic rats showed an increase in hyperplasia formation compared to the wild type transgenic rats. In conclusion, Et-b receptors play a role in decreasing the early development of venous intimal hyperplasia in arteriovenous fistulas. More research needs to be done to understand the interactions between Et-b receptors and venous intimal hyperplasia development in arteriovenous fistulas.

59-Jing Khoo, Tameka Key, Paul Stewart, Esteban Arnold, Ayona Roychowdhury

A Method to Control Arduino-Based ROV Using Wireless EEG-Headset with FPV System

For an animal to explore and interact with its environment, it's brain must first send signals to its muscles. This allows the animal, by moving its body, to adjust its field of view and respond to external factors. Through the use of electroencephalography (EEG) to collect data from the brain, a device was developed for a subject to exercise conscious control over their field of view without the need of sending signals to their muscles. In this project, a novel method of generating neural feedback was explored. An Arduino-based remotely operated vehicle (ROV) was programmed to receive signals from a modified Mindflex â€“ a toy that uses a NeuroSky EEG chip to record brainwaves â€“ and moved in response to a subject's brain activity. The NeuroSky chip filters EEG signals and uses Fourier analysis to provide relative measurements of brain activity in the eight frequency ranges most commonly used to represent EEG data. Additionally, the chip produces proprietary values â€“ â€œattentionâ€ and â€œmeditationâ€ â€“ which are calculated from the other frequency bands and are designed for the user to exercise conscious control over the Mindflex and MindWave games. A camera was attached to the ROV that allowed subjects to remain motionless as they viewed the ROVâ€™s surroundings through first-person view (FPV) headset while controlling their brainwaves. Subjects can thus experience a new way of moving through the world, using conscious control of a device without muscular activity.

60-Jayde Price, Emily Malone MPH, Courtney Balentine MD/MPH, Melanie Morris MD

Effects of Virtual ACE Training on Baseline Katz Score Documentation

The Katz Index of Independence in Activities of Daily Living (Katz ADL) assesses mobility in the elderly population by determining levels of dependence in bathing, dressing, toileting, transferring, continence, and feeding. The assessment is associated with patient outcomes and information used to decrease risk of adverse events during or post-surgery. The assessment was integrated into University of Alabama (UAB) Hospitalâ€™s nursing documentation in November 2013. The care delivery program, Virtual Acute Care for Elders (Virtual ACE) encourages consistent documentation of assessments, such as the Katz assessment, for treating elderly and vulnerable patients. This studyâ€™s purpose is to determine the efficacy of Virtual ACE training in hospital units by comparing the amount of baseline Katz scores missing before and after training. Patients were identified in the UAB National Surgical Quality Improvement Program (NSQIP) cohort (n=14,318). 582 patients met the following criteria: Age â‰¥ 65 years, received a colectomy, proctectomy, hepatectomy, or pancreatectomy procedure, had surgery between 1/1/2014 â€“ 1/8/2017. The data was limited to 279 patients undergoing post-operative care on the GI medicine (GISO) or surgery (GISU) unit. Before Virtual ACE, the missing baseline Katz scores was 69/173 (40). After Virtual ACE, the missing baseline Katz scores was 28/106 (26). The study found that there were significantly fewer missing baseline Katz scores after training. Results show that Virtual ACE is beneficial to train hospital staff to record baseline Katz ADL scores. This analysis will support future efforts to disseminate Virtual ACE to other units at UAB hospital and other hospital systems.

"61-Eric Lee(1), Malgorzata Kasztan, PhD(2), David M. Pollock, PhD(2)
(1)School of Natural Sciences, University of California, Merced, Merced, CA
(2)Cardio-Renal Physiology & Medicine, Division of Nephrology, University of Alabama at Birmingham, Birmingham, AL
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Evidence for Reactive Oxygen Species Increasing Endothelin-1 and Renal Injury in Humanized Sickle Mouse

"Sickle cell disease (SCD) alters renal structure and function that often leads to morbidity and mortality. SCD creates a heightened state of hypoxia and increased oxidative stress, via increased reactive oxygen species (ROS). The effects are thought to contribute significantly to sickle cell nephropathy (SCN). Moreover, it has been shown that endothelin 1 (ET-1) is elevated in the plasma of SCD patients and contributes to the development and progression of SCN including glomerular ROS production. The aim of our study was to determine effects of the anti-oxidant drug, tempol, on ET-1 and glomerular injury in humanized sickle cell mice (HbSS). HbSS mice and genetic controls (HbAA) were treated with tempol (1mmol/L) or vehicle for two weeks and placed in metabolic cages for the last 2 days. Markers of kidney injury, urinary protein and albumin concentrations were measured using Bradford and immunoperoxidase assays, respectively. Urine osmolality was determined by vapor pressure osmometer. Glomeruli were isolated to determine ET-1 mRNA expression. Glomerular ET-1 mRNA expression in tempol-treated HbSS mice revealed significant decrease when compared to untreated HbSS group (1.03Â±0.22 vs. 2.57Â±0.17). Tempol also significantly reduced proteinuria and albuminuria in HbSS mice to levels similar to controls (3.9Â±0.3 vs. 5.9Â±0.8 and 45.3Â±10.6 vs. 94.1Â±24.9, respectively). Moreover, tempol-treated HbSS showed promising trend towards decrease in urine output and increase in urinary osmolality (n=4-7), but more experiments are needed. Tempol had no effect on control HbAA mice. These findings support the hypothesis that ROS contribute to elevated ET-1 and renal injury in HbSS mice.
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62-Samantha E Yates, J Paige Souder, Daniel A Gorelick

The G protein-coupled Estrogen Receptor is Required for Normal Swimming Performance in Zebrafish

Estrogens regulate the development and function of the cardiovascular system via activation of nuclear estrogen receptors alpha and beta and the G protein-coupled estrogen receptor (GPER). Zebrafish embryos with a deletion mutation in the gper gene have reduced heart rate relative to wildtype. Reduced heart rate in embryos may inhibit proper cardiovascular development, leading to reduced cardiac output in adults. The goal of my research is to determine the effect of the GPER mutation on cardiac output in adult zebrafish. Cardiac output is difficult to measure in free-swimming zebrafish. However, previous research demonstrated that a measure of swimming performance, critical swimming speed (Ucrit), which can be readily measured, is directly proportional to cardiac output. We therefore used the swim tunnel assay to measure the Ucrit of wildtype and maternal zygotic gper mutant fish (MZgper-/-) at 12 and 18 months of age. We found that MZgper-/- males had significantly lower Ucrit than wildtype males at both ages tested. 18 month old MZgper-/- females had significantly lower Ucrit than same-aged wildtype zebrafish, but we did not find a significant difference between the Ucrit of 12-month female and MZgper-/- mutant and wildtype fish. These results indicate that gper is required for normal cardiac output in aged zebrafish. Additionally, the cardiac phenotype presents earlier in male zebrafish, suggesting a more prevalent role for gper in male cardiac function. Future studies will perform histological analysis on MZgper-/- zebrafish hearts to detect anatomical defects that may contribute to reduced cardiac output, such as reduced valve width.

63-Shantasia Thomas, Dr. Benjamin Y. Owusu, and Dr. Joanne Murphy-Ullricn

The Role of Calreticulin on Extracellular Matrix Production in Diabetic Nephropathy

"Diabetes is a major cause of end stage renal disease. Diabetes is characterized by hyperglycemia, which can induce endoplasmic reticulum (ER) stress and enhance extracellular matrix (ECM) production via activation of TGF-beta signaling. Activation of TGF-beta has been shown to stimulate ECM production which is a hallmark of fibrotic diseases such as diabetic nephropathy. Our preliminary data demonstrates that the ER calcium regulatory protein, calreticulin (CRT), modulates the expression and processing of collagen I as well as ECM deposition. Initial studies have also shown that CRT is required for glucose and TGF-beta stimulation of ECM protein expression in the human proximal tubular cell line (HK-2 cells), making it an important regulator of ECM production in fibrotic diseases, such as diabetic nephropathy. The primary objective of this study is to determine whether CRT regulates high glucose-mediated ECM production in HK-2 cells. CRT was knocked down in HK-2 cells by transfection with siRNA specific for CRT, and as a control, non-targeting (NT) siRNA. Cells were stimulated with glucose for 72 hours. CRT knockdown and its affects on ECM proteins was determined by Immunobloting. The ultimate goal of the study is to investigate a novel molecular mechanism underlying glucose-mediated ECM production and potentially identify CRT as a future therapeutic target for treatment of fibrotic diseases, specifically diabetic nephropathy.
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64-Monica R. Holler, Philipp Tellers, Lawrence C. Sincich

The Functional Weighting of Cone Photoreceptors in vivo

In order to gain a comprehensive understanding of neural circuitry, one must understand how neural signals are generated and propagated throughout any network. In the visual system, cone photoreceptors are the entry point for visual signals, and are the only class of photoreceptors that contribute to our color vision. Single cones and their influence on retinal circuitry have previously been characterized in vitro by measuring cellular responses of ganglion cells when exposed to stimuli of various wavelengths and intensities. Here we aim to characterize the functional weights of individual cones of the macaque retina in vivo. Imaging with adaptive optics scanning laser ophthalmoscopy (AOSLO) provided us with real-time access to the photoreceptor mosaic of the retina, where we projected a series of stabilized, bi-chromatic movie stimuli. While stimulus presentation occurred, we recorded action potentials extracellularly in the lateral geniculate nucleus (LGN), the thalamic relay nucleus of the visual system. Spatiotemporal receptive fields of LGN neurons were extracted by reverse correlation in order to identify the cones of interest. Focusing on the cones that formed the receptive field center, we analyzed the cellular responses of LGN neurons derived from distinct stimulus patterns that parametrically stimulated photoreceptors at different intensity levels. From these data we estimated the thresholds and functional weighting of single cones. These findings will give a more detailed depiction of cone responses in vivo and how information is processing in the early visual system, providing new insights into how individual cones subserve our vision.

65-Alexis D. Johnson, R. Colton Ritchie, and Nicole C. Riddle

Inducing Mutations in HP1a to Examine the Function of Phosphorylation Sites

There are two types of chromatin: heterochromatin, which is densely packed and less accessible to transcription factors, often rendering it transcriptionally silent; and euchromatin, which is less condensed, more accessible, and therefore often transcriptionally active. The Heterochromatin Protein 1 (HP1) family plays a major role in heterochromatin maintenance and gene regulation in both Drosophila melanogaster and humans. HP1 proteins have a chromo domain, hinge domain, and chromoshadow domain. The chromo domain binds to methylated sites on histones, while the hinge domain primarily connects it to the chromoshadow domain which dimerizes with the chromoshadow domain of another HP1 protein. HP1 proteins are reported to have post-translational modifications (PTMs), and phosphorylation likely occurs at many sites including the hinge domain. The Drosophila genome contains three paralogs of the HP1 family expressed in most tissues: HP1a, HP1B, and HP1C. We will generate mutations at known phosphorylation sites in HP1a in order to examine their functions. The mutations will be introduced into the D. melanogaster genome using the CRISPR/Cas9 system which uses the Cas9 nuclease and a custom guide RNA to make targeted cuts in the Drosophila genome. The cuts will be repaired with a donor plasmid containing the desired mutation, which will cause the flies to produce a modified protein. Using these transgenic animals, we will test the functions of the PTMs of HP1 proteins and investigate their role in HP1 complex formation.

66-Rachel E. Sutton, Christopher Graham, Poulami Basu Thakur, Casey Morrow, Greg Kennedy, Michael J. Gray

Do Lactic Acid Bacteria Convert Glucosinolates to AHR Agonists during Food Fermentation?

"There has been a long-standing observation that fermented foods provide health benefits in the human gut. The Aryl Hydrocarbon Receptor (AHR) found in the human gut has also been found to promote a healthier gut by reducing inflammation and the risk of cancer. The AHR is activated by a variety of molecules, which are termed AHR agonists. Precursors of AHR agonists found in vegetables, which include glucosinolates, are thought to be converted into AHR agonists by the action of enzymes or bacteria, either in foods or in the microbiome. We hypothesize that the lactic acid bacteria (LAB) in fermented foods might convert glucosinolates to AHR agonists which may promote a healthier gut. In collaboration with Dr. Greg Kennedy, UAB division of Gastrointestinal Surgery, we tested levels of AHR agonists and bacterial populations over the course of a natural sauerkraut fermentation. We prepared sauerkraut and measured AHR agonist activity at different time points using a dioxin response element luciferase assay, which allowed bioluminescence to be recorded as an indicator of AHR activity. Results from the assay showed very low levels of AHR activity around 1 (fLUC/rLUC). We will run the assay again with samples that have a neutral pH and a higher concentration to test whether our hypothesis is correct. If the assay is successful, and AHR activity is increased throughout the fermentation process, it may lead to further studies regarding AHR activation and fermented foods.
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"67-Katie Hyde Bethany Hilyer"

Movement in the Classroom

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One of the most pressing issues in the field of education is the lack of student engagement. This age-old problem of student engagement in the classroom is problematic because previous studies have shown that greater student engagement leads to greater student achievement. This issue has persisted because previous studies have offered conflicting results. The purpose of this research study was to explore how physical activity might benefit students in the classroom. We wanted to find out if physical activity in the classroom could engage students which has been proven to lead to greater student achievement. The research study was conducted during a summer program at Tarrant Elementary with second grade students. The conclusions of this research study were based on observation and student surveys. The studentsâ€™ writing also helped draw the conclusions of this research study. The findings of this study aligned with previous studies to show that students participate with more enthusiasm and focus after physical activity. Additionally, students participated with more enthusiasm and focus during lessons and activities that involved movement such as the nature scavenger hunt. Our study showed that physical activity is especially beneficial for students in the morning because it allows them to wake up which helps them to be able to focus. We found that students are most productive after extended physical activity such as recess. This study is significant for educators because it should motivate them to integrate physical activity into their classroom to engage students which will lead to greater student achievement.

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68-Tamara Montes

The Language Barrier for Language Minority Students in Education

" The English Only movement, as it relates to education, was marked by several landmark propositions passed throughout the 21st century in certain states that mandated instruction in public schools to be taught in English. As a result, bilingual education programs were eliminated, posing a problem for states that had a high concentration of language minority students, or students whose native language is not English. Now, when the percentage of language minority students in the public school system is at 8 percent (an estimated 3.7 million students) and rising, the language barrier is prominent in education, and is an obstacle for language minority students trying to attain a quality education.
I spoke to a group of ESL students (with varying levels of english proficiency) about their views on the ESL program they are currently in, and their plans for higher education, based on the amount of preparation they believe they have received. The students who were identified as very proficient in English had clear plans for higher education, while the students who were identified as limited proficiency in English had no plans or very vague plans for a higher education. There was a clear link between English proficiency and plans for a higher education, which is why bilingual education should be implemented in schools to help bridge the gap between language minority students and language majority students, and to ensure that each student (regardless of their native language) attains a quality education and furthers their education beyond high school.
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69-Jacob A. Garcia, Dishant K. Shah, Patrick TJ. Hwang, Grant C. Alexander, David K. Cooper, Anath Shalev, Wanxing Cui, Tatsuya Kin, Jeonga Kim, and Ho-Wook Jun

Enhancement of pancreatic islet transplantation via islet encapsulation with a peptide amphiphile nanomatrix gel

Pancreatic islet transplantation (PIT) is a viable treatment for Type-1 Diabetes. However, substantial pancreatic islet Î²-cell loss during the peritransplant period is detrimental to the efficacy of PIT. A large contributing factor to islet death is the immediate inflammatory response after transplantation. Thus, to protect the transplanted islets from the immune response, an immunoisolation strategy has been applied to encapsulate islets within a semi-permeable immune barrier. A self-assembled peptide amphiphile (PA) nanomatrix gel enables the encapsulation of islets, while providing an immune barrier and extracellular matrix (ECM)-mimicking, islet nurturing microenvironment. In this study, the islet protective effect of the PA nanomatrix gel was assessed by culturing encapsulated islets with differentiated inflammatory cells (U937 cells; human monocyte cell-line) for 3 and 7 days. PA nanomatrix gel encapsulated islets did not stimulate pro-inflammatory cytokine (IL-1Î² and TNF-Î±) secretion and maintained excellent islet viability up to 7 days. Additionally, dithizone (DTZ) staining analysis showed that PA nanomatrix gel encapsulated islets exhibit a greater number of insulin producing Î²-cells than that of the bare islets group. Further evaluation of islet functionality was assessed by performing a glucose stimulated insulin release test at 3 and 7 days. PA nanomatrix gel encapsulated islets demonstrated greater glucose stimulated insulin release than bare islets. Based on these results, the PA nanomatrix gel shows great potential for protection of implanted islets against inflammatory responses and increased islet survival, which will lead to enhanced islet engraftment during the early post-transplant period.

70-Daniel P. Craven, Vinoy Thomas

3-D Printing of polycaprolactone and blended scaffolds: Printing Process Optimization

Blending is an easy way to tune the properties of polymeric biomaterials. This study was conducted to optimize design specifications and standards for printing-parameter settings when 3-D printing polycaprolactone (PCL) and various blends into scaffolding capable of interacting with tissue or cells. PCL is an FDA-approved polymer for bone tissue engineering in the body due to its biocompatibility and low bioreactivity. PCL, Polydioxanone (PDO) and BioSynÂ® (a copolymer of glycolide, dioxanone, and trimethylene carbonate), are biocompatible absorbable suture materials. Blending enables us not only to tune the mechanical properties but to modify scaffolding to different degradation timescales, as PCL has a long period of degradation, generally lasting over a year, while the suture materials have short periods of degradation, ranging from 4-12 weeks. Our study revealed that PCL and PDO-PCL blends exhibited superior printability to PCL-Biosyn blend within the limit of the BioBot 3-D printer used. The melting and recrystallization temperatures, as well as melt viscosity and yield strength, all can have an effect on 3-D printability and scaffold quality; creating consistent samples is also necessary for further experimentation.

71-Christian Marshall, Mohamed Selim, Benjamin Geiger-Willis, Selvum Pillay

Glass Macro-Balloon Impact Strength Characterization

Macro-Balloons (MBs) are used for a wide range of applications and most commonly in offshore structures. Due to the hollow and lightweight properties of these MBs, when they are dispersed into the matrix of a material, a lightweight and highly isolative composite material is created that is called a syntactic foam. This foam is applied to different offshore modules to make them more buoyant in deep water environments. Despite the benefits of adding Macro-Balloons, they fracture easily under impact in offshore drilling modules in the oil and gas industry. The goal of this study was to determine the critical impact strength of glass MBs and correlate it with the size variation. Accurate testing required measurements of a sample size of MBs to take into account the variance of shape and size. Samples of balloons cured in epoxy resin of two sizes were made to replicate the nature of a syntactic foam material. This allowed investigation of the impact strength of small-scale syntactic foam similar to real world applications. In addition, a new design of a fixture to secure each sample Macro-Balloon was fabricated in order to ensure accurate results during Low Velocity Impact (LVI) testing. The results conclude that the smaller size MBs have higher impact strength than that of larger ones. Moreover, embedding MBs within epoxy resin causes the impact strength to drop compared to neat epoxy resin. Finally, heating MBs prior to mixing with resin do not show any improvement in impact strength.

72-Sherilynn Knght

Retrieval Analyses of Wear and Debris in Oxidized Zirconium Total Knee Arthroplasty

"Background: Oxidized zirconium (OxZr) was introduced for total knee arthroplasty material as an alternative for the common cobalt chromium (CoCr). The OxZr was shown in similar studies to be more scratch and wear resistant than CoCr components. Bone degradation caused by osteolysis could be reduced by using OxZr implants, and increasing the longevity of total knee replacements.
Purpose: The goal was to characterize and analyze the effects of wear on oxidized zirconium, polyethylene, and surrounding tissues, on oxidized total knee replacement systems. We hypothesize that of the eight OxZr femoral condyles, only a few will show wear. We also expect to see a positive correlation between OxZr scores and articulating components.
Methods: Eight total knee arthroplasty (TKA) systems made from OxZr and polyethylene were retrieved from patients after their passing. Each component (femoral condyle, patellar, and tibial) were scored visually by the degree of wear. One specimen was used in histology to study the wear debris in soft tissue by: (1) suspending tissues in paraffin, (2) trimming the tissue, and (3) staining the tissue. Photos of soft tissue and surface wear were taken.
Results: OxZr was not as wear resistant as anticipated. 100% of the OxZr femoral condyles exhibited some form of wear. Wear damage to the PE on articulating components occurred in nearly all specimen. Histological analyses showed no evidence of inflammation or wear debris.
Conclusion: Hypothesis is rejected, and further studies should focus on acquiring patient data with TKR systems, micromotion, and histological analyses on more systems.
"

73-Aissah Kaba and Alan Eberhardt

The effect of Porosity and Orientation on Mechanical Stress in 3D Printed ABS Scaffolds

"Bone injury and trauma is a prevalent issue in the arthroplasty community. Bone defects can be caused by severe mechanical stress and conditions such as cancer, osteolysis and osteoporosis. Despite the many technological advancements in the implant and graft fields, both methods have either a biological or mechanical weakness that does not allow them to be optimal solutions to these problems. One proposed solution came in the form of a biocompatible 3D printed bone scaffold. A bone scaffold is a structure that helps with the reformation and growth of bone tissue at the site of defect while providing structural integrity. In this lab, we seek to create an optimally porous and mechanically strengthened scaffold using a simple 3D printer. We hypothesized that as porosity increases, the mechanical strength of the scaffold decreases. To consider the relationship between porosity, orientation and strength, 5 scaffolds of varying porosity were designed using Solidworks and then put through compression tests using a MTS 858 Mini Bionix. The data from the MTS was used to develop a linear regression model that would help predict the max stress of a scaffold to target real bone strength. The results of our experiment confirmed that with increasing porosity, the mechanical strength of a scaffold decreases. Another conclusion made was when loaded in the vertical orientation, scaffolds have much higher stress levels than when loaded in the horizontal orientation. We met the target stress levels of cancellous bone, however we were not able to meet them for cortical bone.
"

"74-Chris Nutter, Meng Zhao, MD, Wuqiang Zhu, MD/PhD, and Jianyi Zhang, MD/PhD "

Investigating the maturation and cell-cycle of hiPSC-derived cardiomyocytes after electrical stimulation

Ischemic heart disease is one of the leading causes of death worldwide. In the last several decades, induced pluripotent stem cell-derived cardiomyocytes have been shown to exhibit a potential way of treating ischemic heart disease without the need of a complete heart transplantation. One major obstacle for these IPS-CM is their immature phenotype, with previous work showing that transplantation of these cells induces cardiac arrhythmia. Therefore, a need for maturation before transplantation is required for tissue regeneration to become successful. Several studies have implemented â€œnatural stressorsâ€ to help emulate the environment that an in-vivo cardiomyocyte is subjected to. This studyâ€™s aim is to induce IPS-CM maturation through electrical stimulation while concurrently applying genetic modifications to enhance cell proliferation. Overexpression of cyclin D2, a member of the D-type cyclins involved in cell cycle regulations, has been shown to increase cell proliferation. We hypothesize that inducing maturation through electrical stimulation coupled with the overexpression of cyclin D2 will increase maturation and cell cycle of cardiomyocytes. After exposing the cardiomyocytes to an electrical stimulation mode of 5 Volts, 5 millisecond pulses, and 2 Hertz for a period of 7 days, our results indicate partial maturation of cardiomyocytes via an immunohistochemistry assay. Also, we found an increase in cell cycle of the cyclin D2 strains compared to the wild type control cells. In the future, we hope these results will give us a better understanding of the conditions required for a successfully higher yield of IPS-CM transplantations in the future.

75-Cole Chiselko, Abigail Conlon, Quyen Khong, Cassandra Venson

Preventing Childhood Obesity Through Early Health Education

"Abstract

Abstract: Preventing Childhood Obesity Through Early Health Education

Author(s): Cole Chiselko, Abigail Conlon, Quyen Khong, Cassandra Venson, Dr. Cindy-Grimes Robison

Affiliation/Institution(s):Â Better Basics, Alabaster YMCA

Introduction:

Better Basics is a non-profit organization that strives to equip children with a desire for learning. The agency works to improve the community by providing resources that promotes literacy. Community health assessment has revealed that the consequences of limited health literacy impacts health outcomes in relations to childhood obesity (Chari, 2014).

Aim(s):Â Â

The purpose of the Community Impact Project was to cultivate an enhanced awareness of diet and exercise through education about childhood obesity.

Method(s):Â

A pretest was developed and conducted to evaluate knowledge concerning childhood obesity regarding nutrition and exercise. Lesson plans were created and teaching sessions occurred one day a week over a month. The children were informed about different exercises with interactive instruction including how to identify information on food labels, calories, sugar, and fat content. A question and answer period concluded the discussion. A posttest was administered and analyzed to determine the effectiveness of the instruction.

Result(s):Â

Analysis concluded that 85% of children correctly defined obesity and identified major contributors to the problem and 100% described the recommended daily activity.

Conclusion(s):Â

Time restraints, lack of conductive environment, and attention span posed a challenge. The most significant accomplishment included increased percentages on the posttest. Lesson plans were successful tools encouraging healthy choices and physical activity. An early approach to childhood obesity prevention can provide children with information to decrease the risk of becoming overweight.

"

76-Courtney Lippert, Audrey Swee

Sleep and PTSD Among Truck Drivers

"Background: Truck drivers (TD) report poor sleep. Many drivers work longer than they are legally allowed to drive. Many factors predict poor sleep quality. The associations between PTSD and sleep disturbance are very strong. However, the relationship between PTSD and sleep in the TD population is very limited. The purpose of this study is to determine the associations between excessive daytime sleepiness, PTSD, and use of healthcare resources for mental health.
Methods: A recruitment message and link to the Qualtrics-based survey were posted on the web and social media sites. TDs were able to click on a link to access the anonymous survey site. SPSS was used to perform statistical analyses (descriptive and association).
Results: This subset of data included 36 participants. Of those 14 had completed data points. The majority of the participants were Caucasian males. There were 8 veterans. The Epworth Sleepiness Scale (ESS) was strongly and positively correlated with seeking professional treatment for emotional distress (r=0.660, p=0.10), and was moderately and positively correlated with PTSD (r=0.498, p=0.16).
Implications: Because only 8 participants stated they were veterans, there may be other sources of PTSD as yet undetermined in this group. Participant attrition is a significant issue in this study. Mitigating strategies are being planned. TD are a highly mobile and remote population who may have unrecognized mental health issues that require innovative treatment. This study strengthens the argument that further research is needed to understand the depths of these issues.
"

77-Brittany K. Robinson-Chesnut, Margaret E. Zink, Rachel Mumbower, BSN, RN, & Karen Heaton, PhD, FNP-BC, FAAN, FAAOHN

Feasibility of an Online Educational Intervention for Long-haul Truck Drivers: A Case Study

"Introduction: Approximately 3 million drivers are employed in the long-haul trucking industry in the United States. Truck drivers are a vulnerable population that experience work-related injuries associated with fatigue. Fatigued driving is a public health concern because of the risk drivers may pose to highway users. Interventions are needed to help drivers manage health on the road. Due to the high-mobility of this population, the feasibility of such interventions is particularly important. This study sought to determine the feasibility of an online educational intervention that was developed to promote sleep in this population.

Aim(s): Determine the feasibility of the Electronic-Management and Mastering of Fatigue (E-MAMF) education intervention for use in long-haul truck drivers.

Method(s): Analyzed 15 structured telephone interviews with 3 long-haul truck drivers who completed a training module (EMAMF). Interviews were conducted at weeks 2-5 following module completion. NVivo 11 was used for data management. A cyclical method of coding and thematic analysis was used to produce themes.

Result(s): While the individuals interviewed had a positive perception of the educational materials, it was determined that the EMAMF intervention would need improvements in feasibility. Central themes included: 1) internet signal, 2) time constraints, and 3) accessibility problems.

Conclusion(s):
Findings suggest that the EMAMF intervention is well-received in this population. However, adjustments in feasibility may increase future utilization. Due to traveling and irregular work hours, an efficient intervention with reliable access is necessary. Future studies are needed to improve the feasibility of E-MAMF and related interventions.
""

78-Courtney Eckl, Connor Grove, Kennedi Hill, Shannel Washington

Meeting the Psychosocial Needs of the Homeless through Recreation

Introduction: The Firehouse Shelter provides emergency housing and meal services to Birmingham-area men. Current programs offered at the shelter include addiction services, a clothing closet, and access to social workers. Recreational activities and their psychosocial benefits, however, are limited.
Aim: To provide therapeutic recreation that promotes psychosocial wellness to Firehouse Shelter residents.
Methods: A weekly film series with a guided discussion was developed to provide recreation and foster social bonding. Films were selected for their ability to entertain, act as a basis for discussion, and fit within a two-hour time frame.
Results: This experience challenged stereotypes about homelessness and reinforced understanding of strategies for stress reduction, such as therapeutic recreation, covered in previous nursing courses. Active listening techniques that communicate empathy, learned in prior clinical experiences, were used to overcome barriers to discussion. Conclusion: Challenges included encouraging attendance and keeping the residents engaged. Project effectiveness was enhanced by movie selection and therapeutic communication. Empathy for the homeless was gained along with an appreciation for recreation as a form of coping and stress management. This experience will be applied to the care of hospitalized patients to ensure that they have meaningful activities available to promote coping.
"

79-Benjamin E. Kimbell, Teresa K. Martin, Taylor E. Wyatt, Racquel Innis-Shelton, Fady M. Mikhail, Andrew J. Carroll, Vishnu B. Reddy, Luciano Costa, Laura Purvis, Elizabeth E. Brown

Characteristics of Study Participants Enrolled in the Molecular And Genetic Epidemiology (iMAGE) Study of Myeloma

"Purpose: Multiple myeloma (MM) is the most common hematologic malignancy affecting Blacks in the US, with standardized incidence rates that are 2 to 3-fold higher than Whites. The rationale for the disparity remains unclear. The overall purpose of the iMAGE Study of Myeloma is to characterize genomic and non-genomic determinants of MM susceptibility, progression and survival and differences by race.

Methods: Eligible MM cases were identified based on the ICD-9 classifications (203) or International Classification of Diseases for Oncology third revision code 9732/3 and recruited from the UAB Hematology and Medical Oncology clinics. Eligible controls were residents of Alabama aged â‰¥21 years without a self-reported history of cancer excluding non-melanoma cancers of the skin. One to two controls were sampled from updated population-based databases established from list-assisted random digit dialing methods and frequency-matched to cases on age (Â±5 years), sex and race (Black, White). Epidemiologic data were obtained by trained interviewers using a structured questionnaire. Biospecimens were obtained from all participants and sorted CD138+ bone marrow plasma cells from a subset of MM cases.

Results: From May 2009 to February 2017, the iMAGE study team constituted the population-based case-control study that includes a total of 1,762 participants (726 cases and 1,036 controls). A total of 229 participants were deemed ineligible leaving a total of 1,533 available for analysis. Overall, cases and controls did not differ substantially by race; however, modest non-clinically significant differences were observed by age and sex despite frequency-matching on these factors, of which, the latter is indicative of a disproportionately higher participation rate among female controls. Of the total 561 cases, the majority were male (54.0%) with a mean age of 60(Â±10) years at diagnosis. Black cases were significantly younger at diagnosis compared to White cases (mean age, 58(Â±10) years versus 62(Â±9) years; P=<0.0001).

Conclusions: The iMAGE Study is unique and includes comprehensive, high-quality epidemiology, clinical and laboratory data as well as biospecimens to fill a critical gap in knowledge required to improve our understanding of myeloma etiology and differences by race. I participated in each element previously described including the analysis of study participant characteristics.
"

80-Emily Tinsley

The Relationship between Insurance Status and Patient Satisfaction

Improving experience and patient satisfaction in health care has been a goal for years. Framed by the Andersen model, an ongoing effort has been made to understand all the variables that play a role in influencing the relationship between health care and patient outcomes, including satisfaction.In recent time, there has been little research that understands the relationship between health insurance and patient satisfaction.This is important to know because people with different types of insurance may will act differently when it comes to reaching out for healthcare. Our study was aimed at evaluating health insurance and satisfaction to see if we could find a relationship.Throughout my course of this project, we have looked at predisposing factors such as age, gender, marital status, education, ethnicity, and how people view their own health care status. We also looked at enabling factors and review over approximately 22 articles from Pubmed to gather past information on this relationship.

81-Osisami, Oladele; Bakitas, M., DNSc, CRNP; Palmore, J., RN, BSN; Kvale, E., MD, MPH; Nichols, A., MD; Howell, S., DNP; Dionne-Odom, J. N., PhD, RN; Mancarella, G. A., MPH; Huang, S., PhD; Tucker, R., MD; Azuero, A., PhD, Bagcivan, G., PhD

Is Non-Hospice Palliative Care â€˜Colorblindâ€™? - Evaluating Racial Differences in Inpatient Non-hospice Palliative Care

"Minorities are less likely than whites to utilize hospice services and more likely to receive medically-ineffective treatments at end-of-life. Barriers towards hospice utilization among African Americans (AA) include lack of awareness, religious beliefs, and overall mistrust of the healthcare system. Research specifically aimed at disparities in non-hospice palliative care is scarce.

We conducted a comparative cross sectional study of the UAB Center for Palliative and Supportive Care (CPSC) program inpatient databases from October 2004 to December 2015. The aim was to determine if there were racial differences in clinical care trends.

The sample (n=11786) was 50.1% male, 62.3% white, and median age 64.42 years. AAs statistically significant demographic and care trends included: younger median age, longer PCCU LOS, shorter time from admission to consultation, and fewer DNR statuses. Compared to the time period 2004-2010, AAs consulted from 2011-2015 were more likely to have consults for non-pain symptom management reasons, were more likely to be full code at consult, and were more likely to receive home hospice at discharge. Areas that remained similar for both whites and AA included hospital LOS.

While there are some racial differences in inpatient non-hospice palliative care use, there are also consistencies between the races. Over time, fewer racial differences were noted. Earlier introduction of non-hospice palliative care consultations may be helping to eliminate some disparities. Further research on the impact of non-hospice palliative care is indicated to fully articulate racial differences or the lack thereof.
"

"82-April Emanuel, Shelby Ferris, Chartisa Odum, Stephanie Pentecost, & Cathy Boardman

Diabetes: Donâ€™t Sugarcoat it!

"Cooper Green Mercy Health Services provides preventative and primary healthcare to the underserved population of Jefferson County. A knowledge deficit was observed among patients in the Diabetes Clinic about incorporating a healthy diet to assist in controlling blood sugar and exercise that promotes weight management. The goal was to provide an educational opportunity to the population diagnosed with diabetes and to those who believe that they are at risk for diabetes.Â The target population were people diagnosed with diabetes. The main objective was to educate this population on how to control their diabetes through healthy eating habits. A questionnaire was distributed in the diabetes clinic to assess the populationâ€™s current knowledge about nutritional options. The survey results indicated a knowledge deficit in nutritional management for diabetes, instead of medication management. Educational material was utilized by students for nutritional counseling, prediabetic screening, and diabetes management at the entrance of Cooper Green. From the survey, it was found that the population understood the mechanisms of diabetes, but struggled with implementing the associated interventions. Through the outreach table, twelve people were educated and referred to the diabetes clinic. The population who are at risk or diagnosed with diabetes lack nutritional education and exposure to healthy eating habits and diet that would assist them in preventing long-term complications. Diet plans and recipes would be a useful teaching tool for this patient population. A great impact can be achieved through nutritional education.
"

83-Stephanie Diei

Racial and Gender differences on Smoking Cessation Aids Among Patients with Cancer

"Tobacco use is the leading cause of preventable deaths in the U.S and a powerful carcinogen. Roughly half of lung cancer patients are current smokers at the time of diagnosis and up to 83% continue to smoke after diagnosis. Previous literature has shown that both females and African Americans experience greater difficulty in attempting to quit. The aim of the present study is to examine variation in the outcomes of cancer patients that are former smokers (e.g., no cigarette use within the past 30 days) and their use of smoking cessation aids based on race and gender.
Participants (N=178) were recruited at Kirklin Hematology & Oncology Clinic at UAB. Participants demographics included 53.6% Male, M Age = 66 years, 79.5% Caucasian. A questionnaire assessed participants smoking history and use of smoking cessation aids. Descriptive analyses examined racial (Black v. White) and gender differences among former smokersâ€™ perceptions of smoking cessation aids (nicotine replacement therapies (NRT), medication, behavioral therapy, and e-cigs/technology).
As a result, only 21.4% of former smokers used any smoking cessation aid, while the majority (78.6%) quit smoking â€œcold turkeyâ€. Racial comparisons indicated 10.5% of Whites reported that NRT helped them to quit compared to 4.2% of Blacks. Gender comparisons indicated 12.9% of females reported that NRT helped them to quit compared to 4.9% of males. Overall, this suggests that NRT was most helpful in smoking cessation for White and female smokers. These findings may assist healthcare providers determine better ways to support their patients in becoming smoke free.
"

84-Courtney Eckl, Connor Grove, Kennedi Hill, Shannel Washington

Meeting the Psychosocial Needs of the Homeless through Recreation

Introduction: The Firehouse Shelter provides emergency housing and meal services to Birmingham-area men. Current programs offered at the shelter include addiction services, a clothing closet, and access to social workers. Recreational activities and their psychosocial benefits, however, are limited.
Aim: To provide therapeutic recreation that promotes psychosocial wellness to Firehouse Shelter residents.
Methods: A weekly film series with a guided discussion was developed to provide recreation and foster social bonding. Films were selected for their ability to entertain, act as a basis for discussion, and fit within a two-hour time frame.
Results: This experience challenged stereotypes about homelessness and reinforced understanding of strategies for stress reduction, such as therapeutic recreation, covered in previous nursing courses. Active listening techniques that communicate empathy, learned in prior clinical experiences, were used to overcome barriers to discussion. Conclusion: Challenges included encouraging attendance and keeping the residents engaged. Project effectiveness was enhanced by movie selection and therapeutic communication. Empathy for the homeless was gained along with an appreciation for recreation as a form of coping and stress management. This experience will be applied to the care of hospitalized patients to ensure that they have meaningful activities available to promote coping.
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85-Mayowa Otuada, Destiny Perry

The Mommy Manual

"Introduction: Many first- time moms lack education on how to care for themselves and their babies during pregnancy, and after delivery. They also do not fully understand breastfeeding and its overall benefits. Nurse-Family Partnership (NFP) provides home visitations preparing and educating them for birth, and teaching them to become knowledgeable mothers over the next two years.
Aims: The goal of this project is to educate mothers on the effects of breastfeeding, increasing milk supply, and storage. NFP provided mothers a booklet with information answering the most frequently asked questions. By educating these women, there are hopes of an increase in the initiation and prolongation of breastfeeding.
Methods: The book is designed to be very colorful to attract the readerâ€™s attention. The booklet will be something that the clients can refer to for all their concerns. The booklets that were created are to be given to clients on their initial visit from the nurse.
Results: This project will provide first time mothers with more information about breastfeeding. It answered many questions pertaining to their body and baby which they shy from when with their provider.
Conclusion: Some challenges NFP faced within the community include; establishing a trusting relationship with clients, and getting them to open up about their concerns. After working with NFP, it showed that some pregnancies do not go as planned and this affects mothers all through pregnancy. NFP helps these mothers through home visits and constant follow up which helps guide the mother through the pregnancy.
"

"86-Akshar Patel, Neel Patel, Amir Nejat, Nathaniel Lawson"

Cutting efficiency of diamond burs for dental zirconia

"Materials and Methods: A zirconia block (Lava Esthetic, 3M ESPE) was sectioned into 5.4 mm thick sections with a lapidary saw. Specimens were then sintered according to the manufacturers recommendation resulting in a final thickness of 2.43 mm. Diamond burs were used to cut the zirconia blocks. in a custom UAB Bur Testing Device which used a computer controlled cutting turbine (40,000 RPM) with water spray (5.45L/min) and a 0.98N load. Two cuts were made on every zirconia block for 10 minutes each while using the same bur for both cuts. Four different diamond burs were tested(n=6). A digital light microscope with image analysis software was then used to measure the distance each cut made in the zirconia block. Representative zirconia specimens and diamond burs from each group were gold-coated and examined in a SEM (Quanta FEG 650, FEI) using the secondary electron (SE). The edges of the cutting surfaces were examined for edge chipping. Data were analyzed with 2-way ANOVA and Tukey post-hoc analysis for factors bur type and order of cut (i.e. first or second cut).

Conclusion: Factors bur type, order of cut and their interaction were all significant (p<.01). There was no significant difference between cuts for the first cut, however, the NeoDiamond and Komet 4ZR burs produced longer cuts for the second cut. All burs showed significantly greater first cut than second cut. SEM imaging reveals that edge chipping can be observed on the cuts used with the Neodiamond, Komet 4ZR, and Komet 5856

"

87-Madison Files, Jasmine Gaitor

Vaccination Information for Medicaid Recipients

"Alabama Community Care is a government funded organization that provides information and resources to medicaid recipients. One common barrier among these individuals preventing them from accepting services from this establishment is a knowledge deficit related to health care. Before this project was implemented many of this facilityâ€™s recipients were not participating in the appropriate vaccination series that the CDC recommends for infants from birth to 6 years old. Previous attempts had been made in order to fill the knowledge gap of these individuals, but were unsuccessful due to the size and difficulty of the material provided. The purpose of this community impact project is to increase community health care education and promote consumer compliance by providing medicaid recipients with an informational resource on these vaccinations in a user friendly format that is simple to understand. Multiple strategies were used when creating this resource including communication with the clinical instructor, collaboration with the community site faculty, and research on the immunizations required after childbirth. This project concluded by providing vaccination details that are easily accessible for medicaid recipients, written based on a fifth grade reading level, and outlined in an easy to follow chart to increase awareness and education on vaccinations.
"

88-R. Mitchell Hungerpiller, Jr., Brittany A. Shelton, Deirdre Sawinski MD, Rhiannon D. Reed, Paul A. MacLennan, Margaux N. Mustian, Jayme E. Locke

Optimal Timing of Hepatitis C Treatment among HCV+ Kidney Transplant Candidates

"Background: Kidney transplant (KT) candidates with hepatitis C (HCV) can be treated pre- or post-KT. However, treated HCV patients lose access to HCV+ organs, which are associated with significantly shorter time to transplant. The purpose of this study was to determine the most cost-effective treatment options for these patients.

Methods: A Markov model comparing two strategies (pre vs. post-transplant treatment with direct acting antivirals (DAAs)) was developed using probabilities from the Scientific Registry of Transplant Recipients (SRTR) and published literature with a three-year time horizon. Costs were measured in 2017 US dollars and utility in quality-adjusted life years (QALYs). Strategies were compared using incremental cost-effectiveness ratios. One-way probabilistic sensitivity analyses were conducted.

Results: When the probability of receiving a KT while HCV+ was 24.3%, 32.0%, and 50% within 3-years of listing, the effectiveness of pre-transplant DAA treatment was $136,024/QALY, $136,298/QALY, and $136,967/QALY, respectively. DAA treatment post-transplant was dominated (i.e. more costly while yielding less benefit) at 24.3% and 32.0% (Incremental Cost-Effectiveness Ratios (ICER): -569,777/QALY and -2,272,607/QALY, respectively). However, when the probability of receiving a KT while HCV+ was >50% within 3-years of listing, treatment post-transplant was no longer dominated (ICER: 674,153/QALY) indicating greater effectiveness of treating HCV post-transplant.

Conclusion: These preliminary analyses suggest that when the probability of receiving a KT while HCV+ within 3-years of listing was <50%, candidates benefit most from pre-transplant treatment; whereas HCV+ candidates at centers with >50% probability of KT while HCV+ within 3-years of listing achieve greater benefit with post-transplant DAA treatment of HCV.
"

89-Aundrea L. Harrison, Camille R. Schneider, Jessica Bahorski, Paula C. Chandler-Laney

Association of breast milk fat concentration with infant meal size, frequency, and weight change

The energy density of breastmilk is highly variable among mothers and due almost entirely to variation in the total fat concentration of the milk. Few studies have examined the association of milk fat with infant growth. This study tested the hypothesis that breastmilk fat concentration is positively associated with infant weight at 4 weeks of age after adjusting for birth weight. We will also explore whether breastmilk fat is associated with infant meal size and frequency. Healthy mother-infant dyads (N=10) enrolled in an ongoing study of determinants of breastmilk composition. Breastmilk was collected from mothers using one full breast expression between 8:00 and 10:00 am and immediately analyzed for total fat using the CreamatocritPlusâ„¢. Infants underwent a meal test and the volume of breastmilk consumed was determined by pre- and post-test infant weight. Mothers reported infant birth weight. Pearson correlations coefficients were calculated to examine the association of breast milk fat with infant meal size and frequency, as well as infant weight at 4 weeks of age adjusted for birth weight. Breast milk fat was significantly inversely associated with infant weight at 4 weeks of age after adjusting for birth weight (r=-0.73, P<0.05), but not with infant meal size or frequency. If confirmed in a larger cohort, these results suggest that the composition of breastmilk may reflect prior infant growth patterns. However, the mechanisms underlying this association are unknown."

90-Charles Faulk

How Does the Affordable Care Act Affect the Burnout Rates of Pediatric Physicians?

"The Affordable Care Act has contributed to several changes on how pediatric physicians deliver care to their patients. The purpose of this study was to determine if the implementation of the Affordable Care Act has caused an increase in burnout rates in pediatric physicians. Furthermore, this research provided information on how these physicians perceived the Affordable Care Act and how it contributed to the care they provided to their patients. We surveyed pediatric physicians in The Childrenâ€™s of Alabama Health System in order to determine the effects of the Affordable Care Act on these physicians.

The hypothesis of this study is that due to the implementation of the Affordable Care Act, pediatric physicians will experience increased levels of burnout. The findings from this survey revealed that the Affordable Care Act has led to an increase in administrative work on these physicians. It has also resulted in decreased levels of autonomy for these physicians. In addition, 61% of the responders reported that they feel emotionally exhausted at the end of their work day. However, the results show that these physicians very seldom experience burnout due to the Affordable Care Act. Furthermore, the results also showed that these physicians do not believe that the Affordable Care Act has improved the quality of care that they provide to their patients. In addition, 52% express that the Affordable Care Act has had a negative effect on their practice.

"

91-Nidhi Manu, Avantika Naidu BPTh, David A. Brown PT PhD

Session-to-session performance measures of stroke survivors performing two body-weight-support treadmill training protocols

"Purpose: The goal of my project was to analyze data from a completed training study that used two body-weight-supported treadmill-training protocols (i.e., Hands-Free (HF) and Skills-Based (SB)). Both used a novel robotic-treadmill interface (KineAssist), to improve walking outcomes for stroke survivors. We hypothesized that 1) the HF group would spend more time at the desired heart rate (HR) intensity, 2) both groups would need decreased body-weight-support (BWS) levels over training, and 3) there would be an increase in distance traveled and steps taken per session, but to a greater extent in the HF group.
Methods: Using the KineAssist to provide BWS and a safe walking environment, we randomized 39 poststroke participants into two training groups. The HF group trained without handrails, while the SB group trained in nine essential walking skills also without handrails. Both groups trained for 30 minutes at 60-80% of their target HR reserve/session, three times/week for six weeks. During each session, we measured participantsâ€™ HR every minute, and rate of perceived exertion (RPE) every two minutes. We recorded BWS levels, total distance traveled, and number of steps taken per session.
Results: Our results showed that neither group adhered well to the target HR range, but that both perceived their exertion to be at least somewhat hard for most of training. Participants in both groups needed less BWS over time, and walked farther and with more steps over the course of training. The increases in distance traveled and steps taken were similar for both groups.
Conclusions: Both groups demonstrated poor HR adherence, but reported high RPE levels. This disconnect between actual and perceived intensity might be due to the challenge of walking with a weaker limb, but this finding requires further investigation. The similar between-group improvements in distance and steps may be one reason for our lack of observed group differences in overground walking outcomes."

92-Hanleigh James; Susan Davies, PhD; Lonnie Hannon III, PhD

How Do Structural Factors Influence the Sexual Risk Behavior of Young African American Males?

African American males experience disproportionately high rates of sexually transmitted infections and early fatherhood. Sexual risk behaviors should be studied from an ecological perspective because sexual attitudes and behaviors are strongly influenced by social and cultural factors. Social and environmental determinants of STD were identified and will be essential in reducing STD prevalence rates among African American males. The study methods involved formative data collection, via community ethnography and structured interviews of 50 African American males from the Woodlawn community, an area in East Birmingham that experiences exceedingly high rates of STD, HIV, and adolescent pregnancy. The primary target group was sexually active African American young males (ages 19-26) at risk for STD infection. The secondary group involved community citizens, such as Woodlawn community service providers, clinicians, juvenile justice staff, etc. The results showed that three main contextual factors heavily influenced sexual risk behavior in the Woodlawn community, which included quality of education, familial influence, and access to healthcare. We concluded that we must rebuild these low resource communities to support African-American young males and their families, invest in proper healthcare, and develop programs that are community-based. The study provided insight that can inform future intervention efforts to reduce risk behaviors in young African American males through local community-based channels, and it also provided better understanding of factors related to STD transmission and prevention in urban African-American young males at risk for STDâ€™s, and to assess feasibility of various approaches to reach this population.

93-Cameron Hale, Dr. Robert Mohr, Tyler Whitaker

Modeling the Evolution Of Simple Organic Molecules In Interstellar Grains

Interstellar ice grains are observed to be chemically changed by UV photolysis, and this change causes the molecular composition of the grain to become complex. We want to know if it is possible to write a program that can be a base platform for modeling ice grains undergoing UV photolysis. The program will model the ice grainâ€™s composition starting with simple molecules and radiate the grain until organic molecules are formed. The modeling of the progression of this ice grain evolution starts with simple molecules including H2O and CO. Many of the exact reaction processes in these ice grains are not well known, nor the percentages involving the types of reactions that can occur during photolysis. To make this program work initially many factors are being ignored, and many assumptions are being made. Over time this code can be edited to be more accurate, and complicated as new information makes itself available.

94-Ashley Smith, Dr. Paul Baker

The Synthesis of BC5 via Low Pressure High Temperature CVD

Chemical vapor deposition (CVD) is an efficient and popular method for depositing high purity, uniform thin films in the growth of novel materials and the method we choose to synthesize superhard novel material BC5. Various concentrations of CH4 and B2H6 were investigated to find a formula which produced a composition of 16% boron to 84% carbon with a crystalline structure. These thin films were grown on silicon and molybdenum substrates due to their high melting temperatures. Optical Emission Spectroscopy was used to observe the concentrations of gases in the CVD in the synthesis of superhard BC5. We hypothesized if C2 and BH were kept in a ratio of 6-8% and the substrate temperature remained between 900Â°C-1000Â°C, BC5 could be grown on a substrate and exhibit crystalline structure. We observed that B incorporates into thin films in higher concentration at higher temperatures. These trials resulted in two incomplete films with approximately the composition of BC5, confirmed by X-ray Photoelectron Spectroscopy (XPS). One film showed sporadic crystallite growth throughout the substrate with heavy concentration in the center and the other film showed a smooth, reflective film on the corners of the substrate. The crystallite film exhibited a shifted diamond like peak in X-ray Powder Diffraction (XRD), suggesting that it may have a similar structure to diamond.

95-Erasmo Canongo,Bipolb Barman, Ashlyn Burch, David J. Hilton

Broadband Terahertz generation and detection

We studied broadband Terahertz generation and detection using plasma in air. The plasma was generated by focusing a 1.5 W amplified Ti-sapphire laser beam in air. We detected the THz frequencies with an air-breakdown coherent detection system (ABCD) and explored the dependence of laser power on THz generation. As an added extension we constructed a gas flow cell containing nitrogen gas to increase the bandwidth. We observed that THz generation was strongly dependent on laser power and decreased with decreasing power and vanished after 0.6W

96-Brandon L. Scoggins, Cheng-Chien Chen

Atomic Multiplet Theory for Transition-Metals and Rare-Earth Materials

We develop Python codes to evaluate the matrix elements of atomic multiplet Hamiltonian for d (l=2) and f (l=3) orbitals. The Hamiltonian uses non-interacting, spherically symmetric hydrogen-like orbitals as basis states, with the effects of crystal field environments, electron-electron interactions, and spin-orbit couplings treated with degenerate perturbation theory. The Tanabe-Sugano diagrams representing the atomic multiplet levels for d orbitals as a function of octahedral crystal field strength are exactly reproduced. The ground state energies and eigen-energy degeneracies are also benchmarked for f orbitals. Our codes can be generalized to arbitrary crystal field environments, and the resulting energy eigen-values and eigen-states provide the necessary information for simulating photon-based spectroscopies via Fermiâ€™s golden rule for transition-metal and rare-earth materials. In particular, we plan to apply the code to study x-ray Raman spectra of cerium metals under high pressure.

97-Morgan Matthews

Optical properties of two-dimensional metallic and semiconducting nanostructures

Understanding how light interacts with assemblies of nanostructured materials has applications in light displays, communication and sensing. For example, in the case of lasing from nanospheres semiconductors (diameter ~ 40 nm), a combination of low absorption loss, enhanced light scattering and light localization all contribute to create lasing efficiently. Here, we numerically study how changes in a nanostructureâ€™s shape, size, and material can modify fundamental light-matter properties such as absorption, scattering and localization. To do so, we use a commercial three-dimensional electromagnetic solver based on Finite-Difference Time-Domain methods to study nanostructures of metal (gold and silver) and semiconductor (zinc oxide). We first study their optical properties at the single nanostructure level as a function of size to understand their scattering properties. Furthermore, for the case of zinc oxide nanostructures, known for its lasing action, we study the effect of assembly on its light localization properties. We systematically add extra nanospheres to the square lattice (termed as â€œdefect nanosphereâ€) to determine changes in its photonic bandstructure. Through these scattering and light localization studies, these results provide an initial method to quantify the important requirements for efficient lasing in nanostructured materials

98-Nicolas Merino, Aaron Alford, Sithira Ratnayaka

Theranostic Systems of Polymers and Tannic acid for Ultrasound Therapy Drug Release

Theranostic systems combine drug carrying/delivery capabilities (therapeutic) with imaging/sensing (diagnostic) characteristics. This allows theranostic systems to deliver drugs in an imaging-guided fashion. Ultrasound imaging offers less precision than other systems, but is substantially cheaper, faster, and abundantly available, making it a great option for this application. The following research is centered around the fundamental study of biocompatible tannic acidâ€“poly(N-vinylpyrrolidone) (TA-PVPON) multilayer micro- and nanocapsules that have drug carrying capacity as well as theranosic characteristics. These microcapsules were fabricated using the layer-by-layer technique. This research attempts to quantify the amount of ultrasound energy needed to increase imaging contrast of the capsules. Various frequencies and amplitudes of ultrasound therapy were applied and imaging of the capsules was done with a microscope as well as a clinical ultrasound device (SONIX RP ultrasound scanner). The application-driven reach of the research was expanded with custom-synthesized poly(N-vinylcaprolactam) PVCL-PVPON diblock copolymers which were assembled into vesicle-like structures above the lower critical solution temperature of the PVCL block and â€œlockedâ€ with tannic acid for stability at room temperature. These â€œpolymersomesâ€, or nanocapsules, are much smaller than the multilayer microcapsules which allows for enhanced permeability in vascularized biological environments. We proved that Ultrasound increases the contrast of microcapsules by up to 100%. In addition, nanocapsules have shown theranostic characteristics and drug carrying capacity. This work on capsules is groundbreaking and has potential to become a viable targeted drug delivery mechanism, while the fundamental characterization of applied ultrasound provides a foundation for a multitude of US-treated polymer systems.

99-Sabrina G. Siu, Eric H. Remington, Renato P. Camata

Solid-state Reaction Synthesis of Gd:BaZrO3 for the Production of Pulse Laser Deposited Thin Films for Fuel Cell Applications

Solid oxide fuel cells (SOFCs) are electrochemical conversion devices, as fuel is supplied to the unit, chemical energy is converted into electricity and heat with the use of an ion-conducting electrolyte. Perovskite structured proton-conducting oxides, such as doped barium zirconate, have been a point of interest for electrolyte materials due to their intended intermediate operating temperatures (400-700 Â°C) in comparison to the standard electrolyte material yttria-stabilized zirconia (YSZ), which has high operating temperatures (800-1000 Â°C) [1-4]. A solid-state reaction synthesis method was used to create gadolinium-doped barium zirconate (Gd:BaZrO3) targets for the purpose of creating thin films with pulsed laser deposition (PLD). Thin films were deposited on silicon and single crystalline MgO substrates with varying deposition parameters including substrate temperature, background oxygen pressure, and film thickness. X-ray diffraction (XRD), x-ray photoelectron spectroscopy (XPS), and scanning electron microscopy (SEM) were used to characterize structural properties of targets and thin films. Electrical impedance spectroscopy (EIS) was used to analyze target material and thin films for conductivity-temperature dependence measurements. Both through-plane and in-plane conductivity of target material was recorded. Further study needs to be done to optimize deposition parameters in order to report conductivity measurements for thin films created with Gd:BaZrO3.

100-Tyler Whitaker, Cameron Hale, Robert Mohr

Computational models of the evolution of pure oxygen ice grains

Near solar ice grains are a potential source for some of the complex organic molecules that could have started life on Earth. I developed code for computational models of UV photolysis of pure oxygen ice grains to test both the feasibility of modeling this system and to see if laboratory tests are reproducible through this method. I believe this computation model will work, and that the UV photolysis of ice grain particles will match the data that has been found experimentally. I used the programing language python purely because of personal preferences. I developed two variations of the code. The first uses a Monte Carlo approach, randomly selecting particles that are hit by photons and using probability rules to determine the types of reaction the photon causes. The second tracks the positions of the particles which will be the governing component for allowed reactions for that particle. The two codes showed dramatically different results, which is due to how the percentages are aligned. The data could not be analyzed fully as the data that we were matching to was presented in terms of IR spectroscopy rather than number of particles. The next steps of my project would be to learn how these particles would emit IR to be read in spectroscopy, converting this to a faster language, and developing the methods to include other atoms in hopes to build more complex molecules.

101-Rick Watkins, Ozarfar Garov, Sergey Mirov, Vladimir Fedorov

"Electrical Characterization of Aluminum-doped Zinc Sulfide and Zinc Selenide Semiconductor Crystals"

The development of new types of electrically pumped solid state lasers based on transition metal doped II-VI wide band semiconductors requires a unique combination of the electrical and optical properties of gain elements. In this paper, we report on the optimization of technology for the formation of n-type conductivity and its characterization in CVD grown polycrystalline ZnSe and ZnS samples. To achieve this goal, we annealed samples in Al vapors with exposition times ranging from 4 to 11 days. The best results were achieved for 4 days of annealing time. The electrical conductivity of the fabricated samples was measured as 15.3 Î©*cm with the use of indium electrical contacts. Though samples measured with these contacts provided optimal conductivity, the procedure requires directly heating the sample and can prove difficult for thin crystals. Alternatively, we report on the optimization of ohmic contact formation on doped and undoped ZnS/ZnSe semiconductors. Several different contacts based on Al, Cr, Cu, Fe, and Ti metals were fabricated and characterized to eliminate Schottky barriers. Plasma deposition was used to deposit 50 nm layers of these metals onto the electrically conductive crystals which were then annealed at 900Â°C (600Â°C for Al) for 3 hours before a 200 nm layer of Ag was deposited. The best ohmic contacts were obtained from the Cr-Ag and Fe-Ag combination. Our next goal will be to measure electroluminescence of the Cr and Fe doped ZnSe/ZnS samples using the developed technology for formation of the electrical conductivity and ohmic contacts.

102-Jabrya Davis, Sherita Etheridge, MSN, CPNP, Meredith Holmes, Linsley Powers, Nick Rocha

Safety in the City

"Introduction: Better Basics provides reading intervention to Inglenook Elementary School which is located in a lower socioeconomic community. There is a lack of appropriate safety education among the children in this program.
Aim(s): The goal of this service project is to provide safety education through interactive learning strategies and literacy.
Method(s): The children received weekly lessons on water, fire, automobile, and neighborhood safety. The lessons included reading books, educational worksheets, and interactive discussions. The project targeted children between the age of 8 years to 11 years old. This education provided knowledge that will help them make safe and cautious decisions when faced with potential hazards.
Result(s): These weekly interactive lessons equipped the children with knowledge to handle various safety situations. After teaching these weekly lessons, the children were able to relay the information back and provide examples of how they could implement these lessons into their daily lives.
Conclusion(s): One challenge of this service project was keeping the children attentive for an extended amount of time. Interactive lessons were the most effective with the children because they can be involved as well as contribute previous knowledge to the class discussion. This experience provided insight into the lack of safety awareness in the community and reinforced how much of an impact community nursing can have on children specifically.
"

"103-Tayler Mazingo, Lissette Ornelas, Jaci Speegle, Danielle Sullivan

Health and Wellness Promotion for Children

The Pelham YMCA provides programs that â€œbuild healthy spirit, mind, and body for all.â€ The identified problem facing the preschool population was a lack of education regarding hand washing, adequate nutrition, exercise, and dental hygiene. The purpose of the project was to teach children the importance of proper hand and oral hygiene, adequate nutrition, exercise, and adopting a healthy lifestyle. The target population was children from kindergarten through fifth grade. The groupâ€™s objective was to provide information about clean and healthy living. The group provided coloring sheets, posters, and artificial food and teeth for demonstrations. Visual aids for hygiene and nutrition created an active learning environment. For the hand hygiene, nutrition and oral care presentations, the children were taught how to properly wash their hands, brush their teeth and choose healthier food options. Utilizing games and demonstrations, helped the children learn by using visual, auditory and tactile learning styles. For example, they observed how germs are spread through the glitter and lotion demonstration. Attendance and attention span were two of the main problems we faced. Their ages made it difficult for the children to focus for extended time periods. Overall, the presentations were successful. The children answered most questions correctly and displayed interest in the topics discussed.

104-Karli Duncan, Stephanie Eckerd, Hope Jacka, Quang Pham

Urban Kids and UABSON: First Aid Kit Education

"Introduction: Urban Kids mission is to work with vulnerable children in the West End Birmingham community. The identified problem was a lack of resources to address first aid issues at the site.
Aim: The goal of this project was to educate the children at Urban Kids how to correctly use a first aid kit and how apply the first aid kit items to real life emergency situations.
Methods: The goal was to teach participants through hands on activities and participation learning. First aid kit items were gathered (band-aids, antibiotic ointment, ACE bandages, etc.) to make a first aid kit for the use of the children and employees at Urban Kids. A brief introduction was taught about first aid through providing scenarios with interventions, a poster with first aid directions, emergency phone numbers, written first aid instructions, and an introduction to the items in the first aid kit.
Results: The children were attentive to the presentation and after asked several questions regarding the information. After the presentation, a verbal quiz was given to the children, asking what they should do in certain scenarios, such as a minor burn or an allergic reaction; as a group, most of the children were able to recall and answer our questions pertaining first aid. The first aid kit items were further described and explained of their intended use to the Urban Kids Director.
Conclusion: The group hoped to provide a better understanding of basic first aid and how to correctly use a first aid kit.
"

105-Cara Crumpton, Tristan Terrell, Robyn York"

Educating the Population on the Importance of Safe Sex

"Introduction: The Shelby County Health Department (SCHD) provides services to the public, including testing for sexually transmitted infections (STI), family planning services, immunizations, WIC certification, cancer screening, and environmental services. The identified problem was a lack of health literacy regarding safe sex practices as evidenced by increased rates of STIs and unplanned pregnancy.
Aim(s): The purpose of this project was to educate the population on methods of preventing sexually transmitted infections and unplanned pregnancies.
Method(s): The target population was adolescents and young adults. The objective was to reduce sexually transmitted infections and unplanned pregnancies. The group provided supply bags filled with educational material on condom use, birth control options, and sexually transmitted infections. The bags included condoms and hand sanitizer wipes.
Result(s): The group distributed the supply bags along with providing an overview of the materials, answered questions, and provided a list of additional resources. The supply bags were made in both Spanish and English. The patients took interest in learning about the materials provided to them. The SCHD staff also found great value in the supply bags.
Conclusion(s): A communication barrier and lack of patient influx were two challenges faced when distributing the supply bags. A translator was not always available when the bags were given to Spanish speaking patients. A larger number of patients are seen in the afternoon, making the groups scheduled morning clinical a difficult time to distribute the bags. Overall, the supply bags were received with positive feedback from both patients and staff.
"

106-Aiyana Haydon-Dunnmore, Meredith Minyard, Kiran Mufti

The Bitter Truth Behind the Sweetness of Diabetes

Introduction: Project Horseshoe Farm offers adult and youth day programs to provide social enrichment, health services, and educational support to the people of Greensboro, Alabama. Increasing rates of Type 2 diabetes in children is a significant challenge facing the healthcare system. The lack of access to healthcare in rural communities often compounds this problem.

Aim(s): The purpose of this project was to educate participants on the (1) effects, (2) detection, (3) prevention, and (4) treatment of diabetes in adolescents and children.

Method(s): The target population was children from kindergarten to high school. The objectives of this project were teaching: eating healthy foods; importance of exercise; obesity and diabetes prevention; and diabetes treatment. The group created a PowerPoint presentation discussing the objectives. A human pancreas model provided a visual for the participants. Stations were set-up to assess blood pressure, weight, BMI and blood glucose level. Open ended questions were used to assess learning.

Result(s): The group presented to children at the AHEC summer enrichment program (SEP) and Project Horseshoe Farm. A post-survey was completed by 34 participants at the SEP. Ninety-four percent of the participants had increased knowledge about diabetes. All 34 participants believed they could educate others about diabetes, distinguish between healthy and unhealthy foods, and thought the presentation was informative.

Conclusion(s): The presentation enabled participants to learn about the pathophysiology, signs and symptoms, and prevention and treatment of diabetes. The group hoped the information will lead to improved health. Challenges included addressing various education levels, time constraints, and teamwork.

107-April Emanuel, Shelby Ferris, Chartisa Odum, Stephanie Pentecost

Diabetes: Don't Sugar Coat It

"Introduction: Cooper Green Mercy Health Services provides preventative and primary healthcare to the underserved population of Jefferson County. A knowledge deficit was observed among patients in the Diabetes Clinic about incorporating a healthy diet to assist in controlling blood sugar and exercise that promotes weight management.
Aim(s):Â The goal was to provide an educational opportunity to the population diagnosed with diabetes and to those who believe that they are at risk for diabetes.Â
Method(s):Â The target population were people diagnosed with diabetes. The main objective was to educate this population on how to control their diabetes through healthy eating habits. A questionnaire was distributed in the diabetes clinic to assess the populationâ€™s current knowledge about nutritional options. The survey results indicated a knowledge deficit in nutritional management for diabetes, instead of medication management. Educational material was utilized by students for nutritional counseling, prediabetic screening, and diabetes management at the entrance of Cooper Green.
Result(s):Â From the survey, it was found that the population understood the mechanisms of diabetes, but struggled with implementing the associated interventions. Through the outreach table, twelve people were educated and referred to the diabetes clinic.
Conclusion(s):Â The population who are at risk or diagnosed with diabetes lack nutritional education and exposure to healthy eating habits and diet that would assist them in preventing long-term complications. Diet plans and recipes would be a useful teaching tool for this patient population. A great impact can be achieved through nutritional education.
"

108-Jacob Cecil, Anna Phillips, and Krista Vinson

The Need for Nurses in Rural Health Communities

"Introduction: The West Central Alabama Area Health Education Center (WCAAHEC), located in Greensboro, Alabama, exists to improve access to quality health care by recruitment of healthcare professionals in underserved communities. Rural communities often have shortages of healthcare resources and providers.
Aim(s): The goal of the project was to assist WCAAHEC in educating individuals about the: (1) lack of rural healthcare professionals; and (2) advantages of working in a rural environment.
Method(s): The group created a short video including statistics about inequalities the people in rural communitiesâ€™ face. Interviews were conducted with a rural nurse practitioner, volunteer registered nurse, and the WCAAHEC director who all practice in Greensboro. The interviews showed what a rural nurse does and how the career can be rewarding. The goal was to create a recruitment tool WCAAHEC can use to attract healthcare professionals and individuals interested in practicing in rural communities.
Result(s): The two-minute-long video will be placed on WCAAHECâ€™s website as a recruitment tool to attract healthcare providers, especially nurses to rural communities.
Conclusion(s): The challenging part of the project was to, in less than two minutes, illustrate the reality the people in rural communitiesâ€™ face accessing healthcare. Looking through the eyes of a rural practitioner allowed the group a glimpse of the struggles and benefits of working in a rural setting. The experience was rewarding and provided insight into ways access to healthcare can be improved for rural communities.
"

109-Audra Beck, Armand Fernandez, & Dashia Moore-Harris

Substance Abuse Among Homeless Youth in Central AL

"Introduction: One Roofâ€™s mission is ending homelessness through advocacy, education, and coordination of social services to prevent service duplication and identify gaps in care among member agencies. A point-in-time count is conducted annually to assess the numbers of homeless persons at any given time in the streets of Birmingham. Results from the January 2017 count show an emerging subpopulation of unaccompanied youth (18 - 25) with a 13% increase from 2016-2017 with associated substance abuse problems. A survey was created to help One Roof assess and address future needs of homeless substance abusing youth.
Aim(s): To create and distribute a survey providing One Roof data on youth substance abuse issues to address future needs in education, programs, and risk reduction
Method(s): Analysis of data from the January 2017 point-in-time count identified a need to assess disparities among substance abusing homeless youth. A survey was created and distributed to youth assessing type of drugs used, frequency of use, consumer behavior, etc. Survey development and design of question wording, style, and order were analyzed to obtain quantitative and qualitative data.
Result(s): Surveys showed most commonly used substances are weed and alcohol (100% use weed and 67% use alcohol). The questions revealed majorities of homeless youth do not understand negative effects of substance use.
Conclusion(s): The most difficult challenge faced was finding youth to interview. Through survey response analysis, further interventions are needed to shape youth views towards substance use and social determinants such as stable housing and employment must be attained.
"

110-Aaron Brown, Anna Flickinger, Kay Lynn Nguyen, Zack Sanford

Exceptional Teaching Strategies

"The Exceptional Foundation is a nonprofit organization that provides services to the mentally and physically challenged population in Jefferson county and surrounding counties. The problem identified is a knowledge deficit among the participants in regards to social skills related to hand hygiene. The goal of this project is to create a standardized plan to provide a structured approach to teaching. A short teaching plan was created to cover the basic topic of hand washing. This plan is capable of being tailored to the different cognitive levels of each group of participants at the discretion of the staff. The target population is the participants of the Exceptional Foundation, and the objective is to provide staff members with different methods of teaching including interactive activities that are fun and health-based. The intended accomplishment will be to raise the participantsâ€™ and staffsâ€™ awareness of the importance of hand washing to prevent the spread of infection between participants. A teaching plan that included a list of ideas and activities for incorporating this topic was created and received by the activities coordinator to be integrated into their social skills time. Through this, the importance of hand hygiene was brought to the staffâ€™s attention. Challenges included scheduling conflicts with the Foundation that led to limited clinical experiences at the site. In conclusion, the group hopes that the participants and staff will utilize the teaching plan provided. The goal is for future clinical groups to continue creating teaching plans about other important health-based topics.
"

111-Hannah Eaton, Danielle Hamilton, Bailey Hendricks, Tatiyana Reynolds

Disease Disguised: STD Recognition and Prevention

"Introduction: Aletheia House is a community-based organization providing substance abuse treatment and prevention services to low-income individuals and the communities in which they live. We identified a need within the Aletheia House community for sexual health education.
Aim(s): The goal of this project is to educate the consumers to recognize signs and symptoms of sexually transmitted diseases, and about overall safe sex practices.
Method(s): To serve the community, the group will be providing information on safe sex practices using presentations and pamphlets for both men and women at Aletheia House. The objectives are to discuss sexually transmitted diseases, their signs and symptoms, treatments, testing, and prevention.
Result(s): Through the group's presentations, Aletheia House community members gained new knowledge about safe sex and STIs and will apply that knowledge in their lives outside of the facility. The staff of Aletheia House gained education material in the group's pamphlets and presentation slideshows to use in teaching future members of the community.
Conclusion(s): The student-led teaching on STIâ€™s provided an excellent opportunity for the group to understand how to educate special populations. The students recognized the importance of community nurses promoting optimal health by offering sexual health education to low-income individuals. The group was challenged to accommodate for the variation of education levels within the program while teaching and they were challenged to resolve personal biases to provide ethical care. The Aletheia House community expressed gratitude for the effort shown in advocating for healthier lifestyles of at risk individuals.
"

112-Bradley Hamm, Adriana Sullivan, Nicole Thomas

Diabetes Workshop

"Abstract
Abstract Title: Diabetes Workshop
Author(s): Bradley Hamm, Adriana Sullivan, Nicole Thomas, Melanie Daniel
Affiliation/Institution(s): The Shepherd Center
Introduction: Diabetes is a devastating disease that affects millions of Americans in the United States. The Shepherd Center of Birmingham offers free activities and learning opportunities for seniors. The UAB Nursing Students presented information related to diabetes prevention and management to consumers at the Shepherd Center.
Aim(s): The goal of this project is to improve knowledge of diabetes in consumers attending the Shepherd Center.
Method(s): Consumers at the Shepherd Center received a pre-test. After the pre-test a one-hour class was provided to consumers followed by a question and answer session. Consumers were then given a post-test. The scores of the pre- and post-test were reviewed and yielded a 20% overall improvement in knowledge regarding diabetes.
Result(s): After giving the pre- and post-test, there was a 20% increase in overall scores. This indicates improvement in the level of knowledge about diabetes.
Conclusion(s): An obstacle of the presentation was the wide age range between the seniors and students. This was overcome by the implementation of the social model, which allowed for more effective communication. Knowledge among the seniors was improved as evidenced by the post-test results. After reflection, it would be more beneficial to incorporate various teaching methods to accommodate the participantsâ€™ varying learning styles."

113-Bhavik Patel and Caelainn Phillips

Learning to Manage Stress

"Introduction: Project Horseshoe Farm supports independence and quality of life for vulnerable people in the community. Limited access to healthcare, poverty, and low health literacy often lead to stress in this population.
Aim(s): The purpose of this project was to educate the participants on stress: (1) causes, (2) management techniques, (3) effects on the body, and (4) prevention exercises.
Method(s): The day program participants who were elderly or mentally and emotionally challenged was the target audience. The group delivered the project over two days. The first lesson helped participants identify stressors and ways to manage them. The lesson started with an icebreaker followed by an education session, music therapy, and making a stress ball. Day two included an: M&M icebreaker with questions about causes of stress; paper body organ game; and exercise game.
Result(s): Participants gave positive verbal feedback about the stress ball activity. The group identified a lack of enough information on the causes of stress in the day one lesson. Based on this assessment the group added the necessary information to the day two lesson. The participants were quizzed at the end of the second lesson to access learning.
Conclusion(s): Providing education on stress management to the participants required activities to be tailored. The group adjusted teaching styles and information about stress management and healthy lifestyle choices to keep the participants engaged and eager to learn. The group learned about the daily struggles rural citizens face and how education can provide an impact. The participants gave encouraging feedback.
"

114-Kelsey Hobbs, Helen Kim, Addison Wiginton

Urgent Care: Worth the Wait?

""Introduction: Cooper Greenâ€™s urgent care clinic is dedicated to providing quality health services to the indigent population of Jefferson County regardless of insurance status. Literature indicates that long wait times can negatively impact patient satisfaction (McMullen & Netland, 2013). At this clinic, patients experience an approximately two hour wait time.

Aim(s): The goal was to identify what factors are causing this longer wait time and to suggest ways to eliminate these issues and improve patient satisfaction.

Method(s): Over two weeks, an observational time study was conducted with 27 patients observed and times were recorded when they were: called to an exam room, seen by a nurse and physician, and discharged. After this, a patient satisfaction survey was administered to determine the impact of waiting on patients. A physician and charge nurse were interviewed about their thoughts concerning the wait and suggested improvements.

Result(s): The time study showed that out of 28 patients, 21 waited over an hour to be called to an exam room, and 19 waited over 90 minutes to see a physician. The interviewed charge nurse stated that the long wait was due to a high patient-staff ratio, and the physician indicated ineffective charting software was the problem. The patient survey showed that three out of 13 patients thought their wait was too long.

Conclusion(s): Limited time and patient flow hindered this study; however, sufficient data was gathered for Cooper Green to make future changes to address the wait times, such as increasing staffing and updating software. "

115-Chelsea Aaron, Anna Jacobs

Promoting safe medication disposal in community agencies

"Introduction: First Light is a homeless shelter for women and children located in downtown Birmingham. Many residents abandon their prescription and non-prescription medications when they leave First Light. When not disposed of safely, medications can become a danger to individuals and the environment.
Aims:Â To review medication disposal practices, create a plan that meets FDA recommended guidelines, and correct unsafe medication disposal practices that place people and the environment at risk.
Methods:Â The agencyâ€™s current medication disposal practices were reviewed and found not to meet FDA recommendations. In consultation with agency leadership, an informational brochure was developed that outlines FDA approved medication disposal practices and identifies local resources that accept unwanted medication for safe disposal. This information was shared with other community agencies who work with the homeless.
Results:Â This experience required the team to apply concepts from courses in pharmacology, community, and adult health. Course materials related to health literacy supported development of the educational brochure. The team gained an appreciation for the difficulties community agencies face when developing the processes needed to safely and legally manage the complex issues surrounding medication administration and disposal
Conclusions:Â Â Obstacles faced by the team included resistance to change by some of the community agencies and limited options for medication recycling. Project effectiveness was enhanced by professionally communication and the ability to create a sense of urgency for change. This experience reinforced the need to safeguard patients, the community, and the environment by adhering to FDA-approved medication disposal practices.
"

116-John Hathaway, Trey Helton, Kollyn Kaiser, Adrienne Wilburn

Coping Mechanisms to Positively Mold the Community

The Foundry is a vital resource in the Bessemer area where substance abusers and former inmates learn skills to foster re-entry into their community. This is a stressful time for such a population as they are adapting to a new life beyond the facility. Due to the restructuring of their lives, the community assessment identified that positive coping mechanisms are needed to facilitate a safe transition. The goal was teaching the importance of proper coping mechanisms and providing examples to introduce to the residents. A pre-survey was developed and given to evaluate the baseline of the residentsâ€™ knowledge. A brochure was designed to include definitions, interventions, and desired outcomes, then was distributed. The objectives were to identify the most efficient and cost-effective coping mechanisms. They were instructed how to use skills, such as meditation and coloring, with return demonstrations. At the end of the session, a post-survey was conducted to compile the data. There were 45 pre-surveys answered, and 91% said they were willing to try the new coping mechanisms that were presented in the brochure. When the post-survey was given, 62% said they did use the coping skills provided and would continue to use them when stressful situations present themselves. Recommendations included a greater variety of coping mechanisms and better timing for the surveys and presentation. Challenges were a lack of accurate results due to not having the same individuals return for reevaluation. Overall, the residents found this project beneficial and applicable for their daily lives.

117-Taleeya Daniel, Ashley Gaines, and Claire Long

The Effectiveness of Mental Health Outreach ProgramsTelevision Teaching

"Introduction: South Highland Presbyterian Church Outreach Project (SHOP) began on September 9, 2014 to build on the success of their pre-existing mental health outreach programs: Sunday Club and Sharing Group. South Highland is committed to providing quality holistic mental health interventions to participants to increase their mental, physical and spiritual well-being.
Aim(s): The purpose of this project is to provide a series of holistic mental health interventions that address the overall needs of SHOP Participants. These interventions will enhance program goals of promoting an environment that encourages maintenance of sobriety and increased coping skills.
Method(s): At weekly meetings, nursing education is implemented to influence lifestyle changes for the clients. The short-term goal for each meeting is to provide an intervention to the secondary issues the clients may encounter in their daily routine. Each activity utilizes teach/teach back methodology followed by interactive member discussion.
Result(s): Community impact was achieved by influencing positive holistic lifestyle changes among clients in the areas of: breaking bad habits, countering negative thoughts, implementing healthy diets and exercise, coping with feelings of isolation, implementing creative therapy including creating six-word memoirs and participating in drum circle, and how to set SMART goals.
Conclusion(s): Population health concepts involving working with vulnerable populations were operationalized through our service experience at SHOP. Retrospectively, we would have focused on fundraising to ensure that SHOP participants could have access to funds for medical emergencies.
"

118-Dylan Byrnside, Beth Crumpler, Bria Dial, Autumn Hughes

Television Teaching

The population served by Cahaba Medical Care in Centreville, AL is comprised of clients in all stages of life. Clients receive treatment for routine check-ups and wellness appointments, mostly related to hypertension and diabetes. We will address adherence to wellness appointments, and the consequences for clients with hypertension.The purpose of the project is to provide clients with information about appointment adherence and the relation to long term health goals. The group aims to create a television announcement to inform hypertensive clients at Cahaba Medical Care of the importance of adhering to their appointments. The target population is adult hypertensive health consumers. The objective is to provide educational information on the positive and negative benefits of attending appointments and to increase adherence. A teaching announcement will play on televisions in the lobby. Strategies include the research done, providing validity to the information that will be presented to clients and collaboration with Cahaba Medical Center, to tailor the information to the needs of clients. The group hopes to increase adherence and client knowledge level. The group was unable to do a full evaluation of the effectiveness of the project due to time constraints. The group is grateful to have collaborated with Cahaba Medical Care producing a television teaching announcement to improve adherence of hypertensive appointments. The greatest challenge was the time constraints which hindered collection of the project results. The group still hopes the project will increase adherence and client knowledge level.

"119-Kirsten Martinez, Erin Wisor"

First Steps to Understanding STIs

"Introduction:
Greater Alabama Health Network â€“ First Steps is a medicaid-funded program serving underprivileged mothers with a goal to decrease infant mortality by having healthy mothers and babies during and after pregnancy. The barriers with the community are lack of transportation and lack of patient compliance, which are undesirable situations dealt with in the community.
Aim(s): The main goal is to provide expectant mothers with learning materials to prevent undesirable health outcomes related to STIs.
Method(s): Various learning materials including a pamphlet, website and poster board. The target population is expectant mothers. The main objective is to keep underprivileged mothers free of STIs and promote healthy pregnancies. The learning materials explain the physiology, prevention, methods of transmission and how to treat the most common STIs. The primary purpose is to educate expectant mothers on STIs and the complications they can cause during pregnancy. These learning materials are implemented to help create a healthy lifestyle, free of sexually transmitted infections during and after pregnancy.
Result(s): The outcome of these various learning materials allowed mothers to gain the knowledge about STI awareness, prevention and treatment. The hope for this project is to prevent co-infection to neonates as well as increased health outcomes for women during pregnancies and for future pregnancies.
Conclusion(s): It is hoped that these learning materials will continue to create STI awareness for women of all ages to provide for healthier pregnancies and a reduction in STI prevalence rates.
"

120-Grace Butler, Mallory Fields, Caitlyn Jones

Coping with Trauma: Creating a "Chill Zone"

"Introduction: Urban Kids is a program developed by Urban Ministries in the West End community. Many of the children in this program have experienced trauma. Their poor coping skills interfere with daily activities, learning, and relationships.
Aim(s):Â Â The goal of this project is to educate children and caregivers on stress management and to provide a calm environment with various resources for relieving stress and anxiety. The room will lessen trauma-induced emotional and behavioral problems.
Method(s):Â A serene environment was provided by painting a small room a blue-grey color and decorating it with cozy seating and materials. Art therapy with coloring sheets and journals, music therapy with tranquil CDs, and aromatherapy with lavender scents were provided. Glitter calming bottles, stress balls, and soft toys were also added. The children and staff were taught how to use the resources.
Result(s):Â The children showed enthusiasm towards the room, which they named the â€œChill Zone.â€ The staff said the room would be beneficial for calming and disciplining. The childrenâ€™s survey showed the most common responses were anger and loneliness; the most common reactions were clenched fists and deep breathing. The children learned positive ways to express their emotions and implement those strategies in situations outside of the classroom.
Conclusion(s):Â Â Challenges in completing this project were securing necessary resources and developing an age-appropriate survey. Helpful factors were a schedule which allowed for painting without children present, donated paint supplies, and staff support and input. The calming environment provided a successful strategy for children to deal with stress."

121-Ryan Doyle, Abigayle Hood, Jake Perkins, Tyla Smith

Getting Fit While You Sit: Implementing a Chair Yoga Class

"Abstract
Abstract title: Getting Fit While You Sit: Implementation of Chair Yoga Classes at Shepherd Center East
Author(s): Ryan E. Doyle, Abigayle I. Hood, Jake W. Perkins, Tyla D. Smith, &
Sherita K. Etheridge, MSN, CRNP
Affiliation/Institution(s): Shepherd Center East
Introduction: The Shepherd Center is a recreational facility in the East Lake community that provides a safe setting for seniors to remain physically and socially active. For this aging population, access to activities that will allow them to remain physically active and maintain physical fitness is a challenge.
Aim(s):Â The goal of the community impact project is to expose, the members of this community, to a low impact yoga based exercise program. Incorporating these exercises will increase flexibility, balance, strength and coordination.
Method(s):Â The older adult population received weekly yoga classes. The yoga classes included tree poses, lunges and rhythmic finger exercises in order to increase balance, strength and coordination. A UAB School of Nursing student facilitated the class while 3 additional students demonstrated movements and monitored safety.
Result(s):Â The individuals in this community now have a better understanding of yoga principles and practice. They can now implement these exercises safely in their own homes to supplement their existing exercise routine.
Conclusion(s):Â One challenge of this project was modifying the exercise program to accommodate safety for this population. Continuation of this project would be of great benefit to the Shepherd Center. "

122-Kiana Dowdy, Kadie Morris, and Brownlee Smith

Encouraging Children to Establish Healthy Eating Patterns

"Introduction: Students partnered with PEER Inc., an organization sponsored by a church in the East Lake Community of Birmingham. This area is a food desert where community members are challenged by a lack of healthy food choices. Members also experience economic challenges that impact their ability to obtain healthy foods.
Aim(s): The goal was to introduce children to affordable, nutritious snacks by demonstrating kid-friendly recipes, while they participated in activities at PEER Inc.
Method(s): Students incorporated produce found at the East Lake Farmersâ€™ Market hosted by PEER Inc., into our recipes. Children in the East Lake Community, ages 5-18, who participated in the PEER Inc., program were the target population. A key objective was to teach the children healthy eating lifestyles easily implemented at home. Students demonstrated recipes to the campers during their classroom time allowing them to sample the food. These recipes were distributed in a recipe book to each child at the end of camp.
Result(s): The project was centered on instilling the concept of healthy eating to the children at camp in hopes of starting a trend at home. Three affordable, nutritious recipes were demonstrated to the children. The campers were taught kid-friendly facts about the different ingredients in each recipe. Small samples were provided to inspire them to prepare the snacks at home. Their responses to the recipes were enthusiastic.
Conclusion(s): After demonstrating recipes to the children at East Lake PEER Inc., they were given recipe books to take home."

123-Anna Jones, Peyton Lewis, Lauren Lowery

Grooving Into a New Way of Life

Introduction: New Rising Star Missionary Baptist Church is located in East Lake, Alabama. They provide a summer enrichment program that focuses on reading and math skills. There is a lack of health education and physical fitness within this program.
Aim(s): The goal of this service project is to provide an interactive, educational course in health education and physical fitness. This will positively influence their understanding of physical fitness and encourage a healthy lifestyle.
Method(s): UAB School of Nursing students provided information on health education and health promotion to children ranging from the age of 3 to 6 years old. This information created an awareness of the importance in maintaining a healthy lifestyle and the long-term benefits of exercise. The nursing students demonstrated various exercises using upbeat music. They also demonstrated the use of altering the environment by dimming lights and using expressive dance moves to make exercise fun.
Result(s): At the beginning of the project, the children were able to identify 3 out of 6 vegetables and 5 out of 6 fruits that were presented; the children were also only able to name 1-2 ways to exercise. After the education, they were able to identify all 6 of the fruits and vegetables, and were able to identify 3-4 different ways to exercise.
Conclusion(s): The preschool children are now aware of various fun ways to exercise, as well as new healthy food options. Some challenges faced were limited resources and maintaining the childrenâ€™s attention.
"

124-Daniel Attaway, Oâ€™Meika Robinson, Sara Beth Womack

Encore To-Go: Home-Based Activities for People with Dementia

"Introduction: The Encore program at Canterbury United Methodist Church provides respite care for adults with dementia through fellowship and engaging activities. The programâ€™s goal is to provide social support and engaging activities to individuals with dementia while providing caregivers with stress relief.

Aim:Â Provide program participants with home-based, caregiver led, therapeutic recreation similar to what they experience at Encore.

Methods:Â Designed â€œEncore To-Goâ€ boxes/bags that contained recreational activities participants and their caregivers can do at home that specifically support 1) physical movement, 2) sensory stimulation, 3) cognition, and 4) emotional wellness.

Results:Â Experiences gained at the Encore program reinforced course material regarding the impact of dementia on the person and their community. The course material provided a foundation for understanding disease processes, use of appropriate communication techniques, and methods to address stigma. Time spent with Encore participants gave the team the opportunity to develop empathy for people and families living with dementia while refining their ability to communicate with people who have impaired cognition.

Conclusions:Â Â Obstacles faced by the team included the impact of memory loss on participant ability to engage in activities, caregiver burden, and the stigma associated with dementia. Project effectiveness was enhanced by teamwork and the ability to clearly communicate. Overall, the experience provided the team with the skills needed to work with people and caregivers living with dementia and understand the impact this disorder has on individual and family health.
"

125-Zach McElroy, Chelsea Spann, Maggie Stuart

Improving Fine Motor Skills in Adults with Developmental Disabilities

Introduction: Eaglesâ€™ Wings Inc. is a non-profit agency that provides various individualized services to adults with developmental disabilities. Eaglesâ€™ Wings provides training for individuals to improve basic skills so they can one day be independent and gain employment. The individuals need more activities that will further their independence and improve their fine motor skills.

Aim(s): The projectâ€™s purpose is to implement various activities aimed at improving fine motor skills and promoting independent living.

Method(s): The population that will be impacted is adult individuals who have developmental disabilities. Many of these individuals have difficulties with fine motor skills due to their diagnosis. This project creates opportunity to practice by means of activity boxes which will have supplies to practice buttoning shirts, using zippers, tying shoes, and opening door locks with keys.

Result(s): It was immediately apparent the boxes were important and needed in this community because the individuals initially struggled with the tasks. Over some time, they were seen getting better at the tasks and their confidence immediately skyrocketed.

Conclusion(s): This project was very rewarding, just from making new friends and positively making a difference in these individuals lives. The most important take-away is that the individuals deserve all the same things that an average person does.
"

126-Taylor Donelson, Rachel Givins, Katelyn Leake

Sanitation, Safety, and Security in the Spring Gardens Community

"Introduction: UAB nursing students collaborated with Spring Gardens, an entity of the Jefferson County Housing Authority (JCHA). The mission statement of JCHA is â€œTo provide decent, safe, sanitary, and affordable housing and related services to qualified citizens.â€ Close assessment of Spring Gardens Community revealed insufficient sanitation, security measures, and safety practices. Many residents displayed deficient understanding of methods for proper management of trash disposal to reduce attraction of animals and pests to the neighborhood.
Aims: The purpose of this project was to educate residents about sanitation and safety measures to improve community health and security. Objectives included educating the population about sanitation precautions; specifically, appropriate waste disposal and food storage. Home safety tips, fire safety, fall prevention, and community security strategies were emphasized to improve overall safety.
Methods: A user-friendly education brochure was developed and presented to residents during a community gathering. In addition, this information was disseminated to all residents via an established community newsletter.
Results: Impact of the project was demonstrated by notable improvements in sanitation, safety, and security within the community.
Conclusion: Spring Gardens community health and security practices were positively impacted by increased knowledge and understanding of methods to improve safety and sanitation."

127-Marleigh F. Gracien, Samantha L. Kinter, Nicole L. Ogle, & Courtney B. Ryals

The Effects of Extreme Heat in the Birmingham Area

"Introduction: Urban Ministry is an organization focused on assisting poor and low-income people in the Birmingham area. One major problem experienced by vulnerable populations is a lack of resources to manage extreme heat.
Aim(s): The main focus of this project was to raise awareness and educate vulnerable populations in the Birmingham area regarding heat exposure and heat-related illnesses that can impact health.
Method(s): This project served Urban Ministry by providing education and resources to vulnerable populations at risk for heat exposure and heat-related illnesses. Education of the target population were implemented through street outreach and visiting shelters. Brochures and water bottles with customized labels containing information regarding extreme heat and hydration were provided.
Result(s): Educational brochures and water bottles were distributed to homeless individuals on the streets of downtown Birmingham and shelters. Over the course of two days, thirty-two homeless men and women were counseled.
Conclusion(s): During the course of this project many obstacles were experienced including inclement weather, time constraint, lack of resources, and nomadic population. With this knowledge, developing a partnership with the City of Birmingham would be beneficial. Future consideration when working with homeless populations include poor vision and illiteracy. Good communication between student nurses and consumers, wearing uniforms that identified the group as healthcare providers, and having the support of an experienced social worker created a quality working environment. As a result of this experience, empathy to the stressful environment in which many people live was gained. "

"128-Kelsey Brumbeloe, Ross Ham, Tamara Strawn"

Check. Record. Review. Monitoring For A Better You!

"Introduction: Citizens of Birmingham may be unaware of the importance of monitoring blood pressures, recording results, and when to seek assistance. Students partnered with BFRS to develop a teaching tool for use by firefighters when educating citizens about hypertension.
Aim(s): The purpose of this project was to provide the community with an educational tool focused on blood pressure monitoring to aid in prevention or management of hypertension.
Method(s): Students developed an easy-to-read educational pamphlet with hypertension facts and space for serial blood pressure recording. Citizens with existing heart conditions, including hypertension were the target population. A Smog Readability Test was conducted to evaluate the pamphlet to assure contents were written at a 5th grade reading level, resulting in a tool accessible to a larger group of readers. Students instructed firefighters in pamphlet use when educating community members about hypertension and blood pressure monitoring. The project goal was empowering citizens to personalize their health care and prevent or manage their hypertension effectively.
Result(s): Firefighters were equipped with a pamphlet to encourage community members to obtain and record blood pressures for review by their health care providers. This tool is sustainable, can be easily updated, and initiates long-term community health impact.
Conclusion(s): Ultimately, more citizens have a user-friendly tool to check, record, and review their blood pressures to share with their healthcare providers during visits. Challenges included condensing a wealth of information into a usable, appealing tool that inspires citizens to record serial blood pressures.

"

"129-Jesslyn Burchfield Breck Fowler Charlie Mims Brielle Wilkerson"

Increasing Empathy and Education about Diabetes to Mentally Disabled Communities

"Introduction: The JCCEO Adult Day Care services 25-90 year olds with mental illnesses and dementia. The project focused on educating patients about diabetes and nutritional choices to improve serum glucose levels and to increase empathy in peers without diabetes.
Aim(s):Â The goal was to educate members of JCCEO Adult Day Care about the importance of diabetes care.
Method(s):Â The objectives were to teach patients with and without diabetes about a healthy dietâ€™s effect on overall health, to provide information on healthier choices, and to reduce enabling by peers. This was implemented by providing fun coloring books and games to teach about diabetes care and nutrition to meet the defined objectives. A pre-test and post-test were utilized to evaluate the lessonâ€™s effectiveness. The hope was to accomplish a positive impact on health by encouraging healthy diets.
Result(s):Â The 50 patients selected to participate were receptive to learning. They were engaged in the lesson plan and actively asked questions about the information. The patients were able to vocalize appropriate responses to the pre-test survey. Five randomly selected participants were able to vocalize the importance of diabetes care and make good diet choices in the administered post-test. One patient chose to not to participate in the lesson.
Conclusion(s):Â Â The cognitive functioning of some patients made it difficult for them to retain information and understand concepts, leading to frustration. The remaining patients were enthusiastic about sharing what they learned with their peers. Further lessons are needed to reinforce long term learning for all individuals"

130-Martinez, Kirsten. Wisor, Erin

First Steps to Understanding STIs

"First Steps to Understanding STIs
Martinez, K., Wisor, E., Melton, V., Greater Alabama Health Network.
Greater Alabama Health Network â€“ First Steps is a medicaid-funded program serving under privileged mothers with a goal to decrease infant mortality by having healthy mothers and babies during and after pregnancy. The barriers with the community are lack of transportation and lack of patient compliance, which are undesirable situations dealt with in the community.
The main goal is to provide expectant mothers with learning materials to prevent undesirable health outcomes related to STIs.
Various learning materials including a pamphlet, website and poster board. The target population is expectant mothers. The main objective is to keep underprivileged mothers free of STIs and promote healthy pregnancies. The learning materials explain the physiology, prevention, methods of transmission and how to treat the most common STIs. The primary purpose is to educate expectant mothers on STIs and the complications they can cause during pregnancy. These learning materials are implemented to help create a healthy lifestyle, free of sexually transmitted infections during and after pregnancy.
The outcome of these various learning materials allowed mothers to gain the knowledge about STI awareness, prevention and treatment. The hope for this project is to prevent co-infection to neonates as well as increased health outcomes for women during pregnancies and for future pregnancies.
It is hoped that these learning materials will continue to create STI awareness for women of all ages to provide for healthier pregnancies and a reduction in STI prevalence rates.
"

131-Sheau Lam, Kayla Stanley

Managing Hypertension in the Work Environment

The OH&S Occupational Medicine Program provides services to UAB employees to promote health and education in the workplace with a goal of injury and illness prevention. OH&S Occupational Medicine accomplishes these goals through risk assessment and preventive medicine. This site requested assistance with development of an education program for hypertension management for Building Services employees.It was identified there is a high prevalence of Building Services employees with hypertension. The project, Managing Hypertension in the Workplace, aims to improve hypertension management by increased employee involvement.This project involved creation of wallet cards to keep a record of blood pressures and BMI. Additionally, a fact sheet was distributed to explain hypertension. Both tools will be utilized during a small Q&A session with a few Building Services groups, where they can ask personalized questions. Our main objective is for this group to become actively involved in managing their hypertension through educating and interacting with this population with a goal that they understand hypertension better and implement the interventions discussed. Various employees were given fact sheets and wallet cards to use. Many of the employees engaged in the Q&A session and asked questions relevant to hypertension. The facility is planning to upload documents on their website for future use by employees.It was a challenge hosting the Q&A session due to conflicting work schedules. However, it has been rewarding to see the employeesâ€™ responsiveness to teaching. Ultimately, managing hypertension is a process that involves education, patient engagement, and consistency. It is the hope that this project will provide the first step to improved hypertension management in this group.

132-Shelby Calhoun, Haley Charrier, Anna Williams

Contraception Education in Rural Bibb County

Introduction: Cahaba Medical Care is a Federally Qualified Health Center (FQHC) in Centreville, Alabama that provides affordable medical care to all patients regardless of ability to pay or insurance status. After observation and discussion with one of the family nurse practitioners it was suggested that there was a need for comprehensive contraception information pulled together into one pamphlet.
Aim(s): Our goal is to provide information to clients that will allow them to make an informed decision about available contraceptive methods provided by Cahaba Medical Care.
Method(s): We developed a pamphlet that provides information on the types of contraception available at Cahaba Medical Care. This pamphlet will be available to all patients of the clinic and will focus on the risks and benefits of contraception and decreasing any stigma that may be related to the use of contraception.
Result(s): The pamphlet has been developed and approved by UAB School of Nursing faculty and the staff of Cahaba Medical Care. This project reinforced class material relating to developing educational materials and social determinants of health. We were able to develop our pamphlet using information we learned about how to write on an appropriate level and conveying information in a concise manner. In addition, we were also able to see first hand how the social determinants of education, poverty, and lack of access to health care actually impact rural communities.
Conclusion(s): A major challenge of this project was timely communication with staff of Cahaba Medical. A major takeaway of this project is the difference in education between rural and urban communities.

"

133-Erin Arcuri, Maddy Collins, Karson Mink, Kendra Woodham

Say Cheese

Introduction: The New Rising Star Baptist church provides a summer program for children grades pre-school to eighth grade. It is a fun, safe environment that allows children to continue learning and promotes retention of information learned during the previous school year. Children in this community lack knowledge and resources regarding oral hygiene the community project will address gaps in knowledge.
Aim(s): The goal is to increase the childrenâ€™s level of knowledge on the importance of oral hygiene and on ways to increase hygiene in a fun and engaging way.
Method(s): The children at New Rising Star summer camp were presented with an interactive lesson regarding proper oral care. A pretest was given to assess knowledge prior to the lesson. After the pretest, nursing students taught a lesson on proper techniques for cleaning teeth and preventing cavities. A posttest was given during a debriefing session to assess knowledge after the lesson.
Result(s): The childrenâ€™s knowledge was assessed prior to and after the lesson. During the debriefing session, an increase in the studentâ€™s knowledge was assessed. The children could answer the questions accurately after the lesson was given.
Conclusion(s): Capturing the childrenâ€™s attention and keeping them on task was the biggest challenge faced. This experience taught us how to communicate effectively with children, which will improve teaching effectiveness throughout our careers.
"

134-Kathryn Jones, Sarah Quick, Melissa Tate

"Blaze" Your Way Into the Sun!

Abstract
Abstract Title: â€œBlazeâ€ Your Way into the Sun!
Author(s): Kathryn Jones, Sarah Quick, Melissa Tate, Dr. Melanie Daniel
Affiliation/Institution(s): Workshops Inc.
Introduction: A green space is widely viewed as a health promoting quality of the community environment, ranging from mental to physical health benefits. Workshops Inc. provides paid, on-the-job training for people with intellectual, mental and physical disabilities. This project addresses the lack of an outdoor space for Workshops Inc. Stress experienced as the result of an indoor work environment is alleviated by a community green space.
Aim: The goal for the project is to provide knowledge on the health benefits of being in an outdoor environment.
Methods: A pretest was administered to consumers, followed by a one-hour teaching session. A post-test was administered and results compared to the pre-test.
Results: The results revealed an increase in the knowledge of improved health as an outcome of being outside. The consumers that participated in the teaching sessions represented a diverse population within Workshops Inc. During the teaching session, participants remained engaged throughout, including partaking in both tests. The participants showed an interest in spending time in any outdoor environment.
Conclusion: These results indicate a successful learning experience. The teaching improved the knowledge of the mental and physical health outcomes of being outdoors.
"

135-JaVarus Humphries, Tyler Bell, James Shikany, Despina Stavrinos

Older Adult Hypertension and Body Mass Index: The Role of Individual Differences in Executive Function

Nearly 33% of older adults report hypertension, relating to greater obesity and other risk factors as they age. Therefore, a major goal for researchers and clinicians is to identify mechanisms of maintained obesity in older adults with hypertension. While obesity likely increases the risk of developing hypertension; maintenance of higher body mass index (BMI) may be attributed to cognitive difficulties associated with hypertension. Hypertension may lead to cognitive problems including impaired executive function (EF). EF is defined as the cognitive control of behavior and is important for the self-regulation of dietary habits and treatment adherence. Therefore, the current study investigated whether EF difficulty mediated the impact of hypertension on the maintenance of greater BMI in older adults. Fifty older adults (Mage=71.8 y, SD=6.2 y, 47.9% female) were recruited to participate in a larger study looking at driving performance among older drivers. Medication history and BMI were obtained as well as EF ability measured by the BRIEF-A. Hypertension was defined by reports of active hypertension medication use or not. T-tests were conducted to determine group differences on study variables, followed by a series of linear regressions to determine the effects of hypertension on BMI. Older adults prescribed hypertension medication reported higher BMI and greater EF difficulty. Problems with meta-cognitive ability but not behavioral regulation, mediated the effect of hypertension on higher BMI. Self-reported EF difficulty may play a role in maintenance of higher BMI in older adults with hypertension. Longitudinal analysis and stricter criterion for hypertension grouping would further this research.

136-Natalie Conboy, Benjamin McManus, MA, Jeffrey T. Martin, Despina Stavrinos, PhD

Impact of Media Multitasking on After-Hours Work-Related Media Use and Sleep Quality

"Introduction:
Frequent media use, extended work availability, and poor sleep habits all negatively influence health. Previous studies indicate that extensive media use is linked to decreased sleep and physical activity; working after-hours is associated with poorer health; and sleep deprivation is linked to increased psychological and safety problems. The complex relationship between personal media habits, after-hours work-related media use, and sleep quality is unknown. Medical residents frequently use media for work purposes and experience poor sleep, providing an ideal population for examination. It was hypothesized that personal and after-hours work-related media use are positively linked and negatively affect sleep quality in residents.
Method:
Fifteen residents (Mage=29.73 years, SD=2.28; 73% male) completed questionnaires regarding personal media use and media multitasking, after-hours work-related media use, and sleep quality. Residents wore actigraphy wristbands that measured physical activity during study participation (M=9.60 days).
Results:
Increased work-related emails read after-hours correlated with decreased step counts (r=-.57, p=.03). Increased media multitasking was associated with less time spent working via computer after-hours (t=-2.24, p=.04), indirectly associating with improved sleep quality (indirect effect=-0.74, 95% CI [-1.61, -0.16]).
Discussion:
Findings suggest that personal media habits affect physical activity and sleep. Contrary to the hypothesis, increased levels of media multitasking were associated with improved sleep quality, potentially by leading to greater efficiency during working hours and decreased time spent working after-hours. Future studies should consider different populations when examining the potential benefits of media multitasking and its safety implications, including those related to drowsy driving and motor vehicle crashes.
"

137-Grace Albright, Ben McManus, MA, Despina Stavrinos, PhD

Effect of Parenting Style and Teen Executive Functioning on Distracted Driving

"Introduction Motor vehicle collisions are the leading cause of unintentional injury and death in teens. Parenting styles are associated with teen risky driving behavior and safety attitudes. Parenting styles may also affect executive function (EF), processes active during driving and which may further impact teen driving safety. It is unknown if influence of parenting styles on teen driving behaviors depends on the teenâ€™s EF. This study examined how parenting styles and EF affect teen distracted driving behaviors.
Methods Thirty-three licensed teen drivers (Mage = 17.12 years, SD = 1.05; 64 % female) completed performance-based EF measures of planning, cognitive flexibility, and working memory and completed a questionnaire regarding distracted driving behaviors. Participantsâ€™ mothers completed the Parenting Styles and Dimensions Questionnaire providing scores for Authoritative, Authoritarian, and Permissive parenting styles.
Results EF significantly moderated the effect of permissive parenting style on the reported frequency of texting while driving among teens (t = -2.54, p = .02). Higher mother permissiveness scores were associated with increased texting and driving in teens with lower EF scores, whereas higher mother permissiveness scores were associated with decreased reported texting and driving in teens with higher EF scores.
Discussion Permissive parenting combined with low EF in teens was associated with more distracted driving behaviors exhibited by teens. Additional research may explore direct effects of parenting on teensâ€™ distracted driving. Parenting strategies improvement through training programs could be beneficial to all parents. Teensâ€™ EF should be considered in parenting programs to help parents address specific needs.
"

138-Celeste Fernandez, Jessica H. Mirman, Despina Stavrinos

Comparing the Factor Structure of the Driving Habits Questionnaire in Older and Younger Drivers

""Background: Previous factor analysis of the Driving Habits Questionnaire (DHQ) has revealed a one factor solution for a sample of older adults. To our knowledge, a factor analysis of the DHQ has not been done in a sample of younger drivers.
Objectives: To determine the factor structure of the DHQ in a sample of young drivers and compare it with adult drivers.
Methods: A secondary analysis was conducted on data from the TRIP lab data repository (n=378); 247 participants were aged 21 years and older and 131 were younger than 21 years. Driving avoidance was measured using 9 items from the DHQ. The 9 items from the DHQ were analyzed for the two groups (21+ group and under 21 group) using principle axis factoring in SPSS 24.
Results: The Kaiser-Meyer-Olkin value was .879 for the 21+ group and .80 for the under 21 group; Bartlettâ€™s Test of Sphericity was statistically significant for both groups. For the 21+ group there was one factor with an eigenvalue exceeding 1, explaining 50% of the variance. In the under 21 group there were two factors with eigenvalues exceeding 1 explaining 39.3% and 13.7% percent of the variance, respectively.
Conclusion: Results indicate a single factor solution, â€œavoidanceâ€ for the 21+ and a two factor solution, â€œgeneral avoidanceâ€ and â€œtraffic congestion/volume avoidanceâ€ for the younger group. Additional research could determine what motivates younger drivers to avoid certain situations and if avoidance behaviors are protective against motor vehicle crash risk, as they are in older adult populations.

"

139- LaKaylyn Washington, Tyler R. Bell, MA, & Despina Stavrinos, PhD

The Impact of Weather on Visual Inattention during Driving among Adolescents

"
Introduction: Visual inattention is a leading cause of motor vehicle collisions in teens and may be more dangerous during distracted driving and hazardous weather conditions. The objective of the current study was to assess the role of frequency and duration of visual inattention on driving in adolescents and how rain conditions may worsen the impact of visual inattention.
Method: After removing individuals who were missing videos or wearing sunglasses, 14 participants (Mage=17.50, SD=1.09, 50% female) were included in the current study.
Participants completed three simulated drives in clear weather and one with rain. In the clear weather drives, participants engaged in one of three distraction conditions: no distraction, texting, or phone conversation. In addition, each drive contained a hazard. Lastly, the drive with texting was repeated in the presence of rain. For each drive, driving ability was recorded as average/variability in speed, acceleration, lane position, and head distance. To measure visual inattention, visual behavior was recorded inside the car. Two independent experimenters coded the number and duration of off-road glances. General estimating equations were conducted to examine the impact of visual inattention on driving ability after controlling for gender, driving experience, distraction, and drive order.
Results: Visual inattention related to higher average lane position and headway distance, though the effect was diminished during rain. Visual inattention also related to greater variability in lane position and headway distance, but lower variability during rain.
Discussion: Visual inattention is an observable factor impacting driver safety though dependent on weather condition.
"

140-Karan P. Patel, Despina Stavrinos, PhD, Haley J. Bishop, PhD, Jessica H. Mirman, PhD

Examining the Learning-to-drive Process among Teens with ADHD or Trouble Staying Focused

"Novice drivers with ADHD may be at risk due to associated impairments. Parental supervision and practice are important in the learning-to-drive process. Literature suggests that teens with ADHD and teens with trouble staying focused (TF) may have difficulty learning to drive. This study is among the first to examine the relationship between inattention and on-road driving assessments (ODA) performance.

The aims of the study were to determine if ADHD/TF teens: (1) were more likely to fail an ODA than typically developing (TD) teens and (2) had different amounts of practice driving than TD teens.

Data from survey and ODA portions of the TeenDrivingPlan (TDP) study (NCT01498575) were analyzed. Parent-Adolescent dyads (n=162; 24 ADHD/TF) were assigned to: ODA and surveys; or surveys only. Participants were randomized 3:2 to receive the TDP or usual practice for 24 weeks during the learnerâ€™s-permit period. Analysis endpoints were passing/failing the ODA and self-reported quantity of practice in 6 environments assessed at week 24.

13 (5 ADHD/TF; 8 TD) of 162 participants failed the ODA. The proportion of TD teens who failed was 6% compared to 21% of ADHD/TF teens (X2(1, N= 13) = 4.861, p= .027). Teens with ADHD/TF had fewer minutes of supervised practice (M = 133.86, SD = 89.07) than TD (M = 145.99, SD = 122.22), however comparisons were not statistically significant.
As expected, teens with ADHD were more likely to fail the ODA. Future research should investigate the impact of structured, driving training programs on families of teens with attention deficits.
"

141-Mary Katherine Bridges, Tyler R. Bell, MA, & Despina Stavrinos, PhD

Effect of Adolescent Inattention and Impulsivity on Visual Attention during Simulated Driving

"Introduction: Individual differences in cognition may be related to visual inattention to the road, resulting in unsafe driving outcomes among adolescents. Previous studies suggest that inclinations of inattentiveness and impulsivity, commonly present among individuals with Attention-Deficit/Hyperactivity Disorder, are particularly detrimental to driving.
Objective: To determine if subclinical inattention and impulsivity in typically-developing adolescents may be associated with visual inattention while driving, especially during high cognitive workload.
Method: 14 participants (Mage=17.50, SD= 1.09, 50% female) were included in the study. Participants completed the Disruptive Behavior Rating Scale, a measure of frequency/severity of inattention and impulsivity, and completed three simulated drives with one of three randomly ordered conditions: no distraction, texting, and hand-held phone conversation. Two experimenters used video recordings to independently code the number and duration of visual glances off road and reasons for off road glances (e.g., texting, steering operations). Linear regressions were used to analyze the impact of inattention and impulsivity on frequency and duration of visual inattention and the interacting role of distraction conditions.
Results: Linear regression showed that inattention and impulsivity related to more frequent glances off the road. Greater inattention related to more glances to the dashboard and drive-relevant operations while greater impulsivity related to more glances to mobile devices for texting and calling. Furthermore, inattention related to longer duration off road as cognitive workload increased.
Discussion: Among healthy adolescents, inattentive and impulsive traits may explain visual inattention while driving, especially when distracted. This may be used to develop preventative behavioral modifications to lessen distracted driving."

142-Brooke Bailey, Scarlett Ridley, Davic C. Schwebel

Are Working Memory and Processing Speed Associated with Child Pedestrian Safety?

"Introduction. According to the National Highway Traffic Safety Association, 233 child pedestrians were killed and 8,000 were injured in traffic crashes in 2015. One contributing factor for pedestrian injury is childrenâ€™s immature cognitive development. We examined the relations between the still-developing cognitive abilities of working memory and processing speed and the number of street crossings resulting in hits made by children in a virtual pedestrian environment.
Methods. As part of a larger study, 7-8 year old participants completed the digit span, picture span, coding, and symbol search subtests of the Wechsler Intelligence Scale for ChildrenÂ®-Fifth Edition (WISC-V). Digit and picture span subtests measure working memory, and coding and symbol search subtests measure processing speed. Participants also completed three sets of seven street crossings in a virtual reality environment, delivered through a smart phone placed in View-Master goggles.
Results. Correlation analyses showed significant relationships between scores on digit span (r(65)=-.33, p<.01), picture span (r(65)=-.39, p<.01), and coding (r(65)=-.25, p<.05) subtests and childrenâ€™s average number of virtual pedestrian collisions.
Discussion. Cognitive abilities of working memory and processing speed are associated with childrenâ€™s ability to cross the street, with working memory perhaps playing a larger role than processing speed. The strength of the association between working memory and child pedestrian safety might be explained by the fact that safe pedestrians must remember the status of traffic in one direction while looking in the opposite direction in order to successfully judge when it safe to cross the street.
"

143-Elizabeth S. Davis, Adam M. Goodman, Tyler R. Orem, Nathaniel G. Harnett, Muriah D. Wheelock, Sylvie Mrug, David C. Knight

Adolescent violence and its effects on emotional reactivity

There is little information available on the neural function of adults that have been subjected to emotional, physical, and/or sexual violence during adolescence. However, prior research has shown that victimization during adolescence blunts endocrine and physiological responses during psychosocial stress (Elzinga et al., 2008; Voellmin et al., 2016), and other research has found that the prefrontal cortex is responsible for individual differences in stress reactivity (Wheelock et al., 2016). Therefore, the present study investigated the impact of victimization during adolescence on the neural response to psychosocial stress in adulthood. Participants (18-22 years of age) completed the Montreal Imaging Stress Task (MIST), a psychosocial stress task designed to investigate neural activity in response to stress. Brain activity was then compared to these participantsâ€™ violence exposure during adolescence (measured prospectively at 4 time points from 11-18 years of age). We found that the prefrontal cortex and hippocampal activity of adults during the MIST varied with the frequency of victimization they experienced during adolescence (p < .01). These findings suggest that victimization during adolescence blunts stress reactivity later in life, which may be mediated by regions of the prefrontal cortex and hippocampus.

144-Josiah J. Robinson, Jenni B. Rouse, Lindsay Stager, Kristin T. Avis, David C. Schwebel

Personality Predictors of Sleep Deprived Cognitive Performance on the Continuous Performance Test (CPT)

"Background: Literature yields mixed results on the influence of personality on cognition. Voluntary sleep deprivation, a common practice among college students, has substantial impact on human functioning, including cognition. Sleep deprivation may influence cognition differently among people with different personalities, disadvantaging some students over others during cognitively-intense tasks such as test-taking. This study examined relations between personality and sleep-deprived cognitive performance.

Methods: Thirty-six college students ages 18-27 years (M=22.99, SD=2.71, 74% female, 41% Caucasian) were exposed to 24 hours of total sleep deprivation (verified with actigraphy) before completing computerized cognitive tests. The self-report Big Five Inventory assessed the following personality traits: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Connersâ€™ Continuous Performance Test (CPT) measured attention through errors of commission and omission, reaction time, and interstimulus interval changes. Linear regressions examined relations between personality factors and CPT outcomes.

Results: While other associations approached significance, only relationships with commission errors yielded significant results. Neuroticism was significantly related to commission errors (R2=.15, F(1,33)=5.98, p<.05). Commission errors were also significantly related to conscientiousness (R2=.13, F(1,33)=4.79, p<.05).

Discussion: Conscientiousness and neuroticism predicted commission errors, indicating increased impulsive behavior when sleep-deprived. Among people high in neuroticism, this may reflect proclivity toward negative emotions like anxiety that create impulsive behavior patterns when sleepy. Among people high in conscientiousness, hypersensitivity to error may hinder cognitive performance and create impulsive responses when sleepy. In summary, sleep-deprived performance in cognitively-demanding tasks such as test-taking may be impacted differently among individuals with different personalities. We recommend future research to explore further. "

145-Canelo Gordon, Isabella R.; Rodriguez, Christina M.

Association between attention-deficit/hyperactivity disorder symptoms and child abuse risk

" Previous research has found that attention-deficit/hyperactivity disorder (ADHD) symptoms are related to more adverse parenting styles. Parents with ADHD react more negatively to childrenâ€™s misbehavior, show deficits in parenting skills, and experience more stress in parenting. Theoretically then, this pattern of findings should put those with ADHD symptoms at greater risk of becoming physically abusive to children. Consistent with Social Information Processing Theory, those with compromised attention are more likely to misperceive discipline situations that would place them at elevated risk to physically abuse children. The likelihood of becoming physically abusive can be assessed in both parent and pre-parent populations. The current study evaluated the relationships between ADHD symptoms and child abuse risk in a sample of emerging adults and their childhood caregivers. Emerging adults reported on their likelihood to abuse future children, their caregiversâ€™ ADHD symptoms, and their own ADHD symptoms. Independently, male and female caregivers provided their perspective about their own ADHD symptoms, their childâ€™s ADHD symptoms, and their physical abuse risk. Among the findings, childrenâ€™s own likelihood to become abusive was associated with their perception of their parents having more symptoms of ADHD. To further investigate this association, a series of mediational models were considered that evaluated whether the multi-informant design in this study could estimate physical abuse risk. Our results would have implications for both parents raising children with ADHD as well as for parents who are experiencing ADHD symptoms themselves."

146-Michael Liptrot II

Anticipated and Experienced Stigma in Healthcare Settings: A Mixed-Methods Approach

""Objective/Rationale: This study explores the stigma experienced in healthcare settings by individuals with HIV. Both experienced stigma (i.e., discrimination) and anticipated stigma negatively impacts health behaviors. Few studies have examined stigma in healthcare settings.
Methods: 76 qualitative interviews were conducted with HIV-infected women of diverse backgrounds in a larger Womenâ€™s Interagency HIV Study (WIHS) throughout multiple sites. Interviews discussed barriers of treatment, adherence, and different stigmas. Questionnaires (N=399) were adapted from an HIV stigma measure viewing experienced stigma from four sources: healthcare workers, family, partners, and community members. A parallel scale assessed anticipated stigma from these sources. ART adherence was assessed by asking how often participants took their medications over the past six months.
Results: Qualitative analysis revealed many participants anticipated/experienced HIV-related stigma throughout healthcare settings. Participants described how these experiences motivated missing HIV care visits or missing medications. Reported experienced stigma in healthcare settings was significantly associated with sub-optimal ART adherence (AOR=0.58, p=.01, 95% CI [0.39,0.86]). Anticipated stigma in healthcare settings was significantly associated with sub-optimal ART adherence (AOR=0.64, p=.004, 95% CI [0.48,0.87]). Anticipated stigma was higher than experienced stigma in healthcare settings (t=13.74, SE=0.04, p<.001). Anticipated stigma in healthcare settings was the only stigma measure associated with sub-optimal ART adherence (AOR=0.67, p=.046, 95% CI [0.45,0.99]).
Discussion: HIV-infected women in the United States report significant HIV-related stigmas in healthcare settings, and these negatively impact their adherence to HIV treatment recommendations. Interventions should address stigma among healthcare workers, as well as to help women develop strategies to resist stigma and protect their health. "

147-Alex Veerasammy, Catheryn A. Orihuela, Sylvie Mrug

Witnessing Community Violence and Sleep Problems in African American Adolescents

"As many as 93% of adolescents residing in urban communities have experienced community violence, which contributes to depression, behavioral problems, and academic difficulties. Additionally, many adolescents experience sleep problems, which contributes to poor mental health. Cross-sectional and short-term longitudinal studies have demonstrated an association between violence exposure and sleep difficulties. However, few studies have examined relationships over several years. This study investigates reciprocal relationships between witnessing violence and sleep problems in urban adolescents. We hypothesize that witnessing community violence will predict increased sleep problems over time.
Eighty-four adolescents from Southern United States, participated in three waves of a longitudinal study (Mages=13,16,18). At each wave, participants completed self-report measures of sleep problems and community violence exposure.
An autoregressive cross-lagged model tested relationships between exposure to violence and sleep problems. Results show that witnessing community violence at Time 1 was associated with concurrent sleep problems (B=0.53, p<.01), and also predicted greater sleep problems at Time 2 (B=0.29, p<.05). Community violence at Time 2 was not associated with sleep problems at Times 2 or 3.
Findings indicate that urban youth who witness violence in their neighborhoods in early adolescence are more likely to experience current sleep problems and develop more sleep problems over the next three years. However, witnessing violence in middle adolescence does not seem to contribute to increased sleep problems in late adolescence. Thus, early adolescence may represent a more vulnerable developmental period for the effects of violence exposure on sleep. Future studies should use larger and more diverse samples.

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148-B. Patrick Grider, Destiny Erskine, Crystan Irwin, Trevor Martin

Examining the relationship between Religiosity, Substance-Abuse, Self-Esteem , and Risky-Sexual Behavior

Upon entering university, students also enter an unprecedented period of availability, wherein opportunities for risky behaviors (e.g. substance-use and risky sexual behaviors) are significantly increased. University students are at an exceptionally high-risk for contracting sexually-transmitted diseases, being sexually victimized, as well as experiencing unwanted pregnancies. Consequently, the high prevalence of STDs among college students has made sexual coercion, date rape, sexual harassment, and unwanted pregnancies all public health concerns unique to college populations. This study examines the relationship between Substance-abuse, self-esteem, religiosity, and risky-sexual behavior. Surveys were distributed to psychology students (n= 125) at the University of Alabama at Birmingham. Each survey included the Cognitive Appraisal of Risky Events (CARE) questionnaire, Duke University Religion Index (DUREL), and the Rosenberg Self-esteem scale.

149-Kaitlyn Tarver

Revitalization or Eradication: Gentrification in the Avondale Birmingham Community

"Gentrification isÂ a process of revitalizing a neighborhood that often involves buying and renovating neighborhood homes and businesses to cater to a different demographic than their current inhabitants. This often leads toÂ displacement ofÂ low-income families and small businesses.Â The topic of gentrification has beenÂ debatedÂ inÂ the Avondale community of Birmingham, AL. The purpose of this study is to analyze the revitalization efforts of the Avondale community andÂ toÂ determineÂ whether patterns of gentrification are causing the displacement of long-term residentâ€™s due toÂ housing and retail development.Â This study analyzed both historical and empirical data to draw conclusions about the impacts neighborhood changes have had on residents. Analysis includedÂ the historic development of Avondale, statistical census data, previous and currentÂ housingÂ prices, demographicsÂ of past and current residents,Â andÂ differences in cost and variety of past and current retail stores and businesses.Â The Little 5 Points Neighborhood in Atlanta, GA is also examined as aÂ comparisonÂ to the changes in Avondale. Results of this research indicate both successful revitalization efforts and alarming gentrifying qualities that have displaced lower income residents and showcase marketing toward a higher socioeconomic clientele. Future and ongoing housing re-development plans still need to be closely followed to monitor for planned efforts to sustain and develop affordable housing for current and long term-lower income residents.
"

150-Lindsay Stager, Josiah Robinson, Marissa Swanson, & David C. Schwebel

Prevalence of Injury Hazards in the Daily Living Environments of Ugandan Children

"Background: Children in low- and middle-income countries (LMICs) are 3.4 times more likely to die of injury than children in high-income countries. Environmental differences may contribute to this disparity. This study examined the prevalence of Ugandan childrenâ€™s parent-reported exposure to common hazards.

Methods: 152 parents of first- and sixth-graders were recruited from 3 rural Ugandan schools. Self-report questionnaires were read to parents in their native language, with answers indicated by marking distinct symbols. We selected one random child from data for parents with multiple children. Prevalence rates of hazard exposure were assessed and compared between grades using chi-square.

Results: The most commonly accessible hazards were axes, knives, and cooking areas, with >88% of children having such access. Sixth-graders were marginally more likely to have access to large animals (p=.076) and significantly more likely to have access to open pits (p=.043). Additionally, 51.7% of children walked to school on roadways, with 72.0% spending at least 40 minutes walking to and from school daily. Over half of children had daily exposure to stray dogs and loose livestock on roads, and 29.9% climbed trees daily.

Discussion: Elevated exposure to hazards in the daily living environments of Ugandan children increases their vulnerability to severe injuries, further perpetuating the high rates of child injury in Uganda. These data demonstrate the need for specific interventions to reduce risk of child injury in Uganda and other LMICs. Identifying which hazards are most prevalent in the lives of Ugandan children facilitates prioritization of safety interventions.
"

151-Lindsay Stager, Jonathan Adams, and Sylvie Mrug

Pubertal Timing and Parenting as Predictors of Externalizing Problems in African American Adolescents

"Background: Early pubertal onset has been associated with externalizing problems in Caucasian adolescents; however, less is known about this relationship among African American youth. Limited research suggests that the relationship between pubertal timing and externalizing problems is amplified by poor parenting. The current study examines whether key dimensions of parenting (nurturance and knowledge) moderate the relationship between pubertal timing and externalizing problems in African American youth.
Methods: Seventy-six participants (53% female; 96% African American, 3% White, 1% Hispanic) completed a longitudinal study, self-reporting pubertal timing; parental knowledge and nurturance; aggression (relational, physical, and nonphysical); and delinquency. Linear regressions evaluated the effects of pubertal timing, parent-child relationship variables, and their interactions at wave 2 (M=14.7 years) on externalizing outcomes at wave 3 (M=16.1 years). Simple slopes tests followed up significant interactions.
Results: Parental knowledge moderated the relationship between pubertal timing and physical (Î² = .36, p < .01) and relational aggression (Î² = .34, p < .01). Parental nurturance was also found to moderate the relationship between pubertal timing and relational aggression (Î² = -.33, p < .05). Additionally, parental knowledge predicted less physical aggression (Î² = -.22, p < .05) and later pubertal timing predicted increased delinquency (Î² = .26, p < .05).
Discussion: These results illuminate relationships among pubertal timing, parenting, and externalizing outcomes in African American adolescents. Future research should replicate these findings in larger and more diverse samples.
""

152-Roishinique J. Johnson, Mina Y. Momeni, Nicole C. Riddle

Using Recombinant Proteins to Study HP1-Hhistone Interactions

Chromatinâ€™s essential functions include efficient packaging of DNA into a small volume to fit into the nucleus of the cell and controlling gene expression. Chromatin exists in two main forms: heterochromatin, which is highly condensed and typically transcriptionally inactive, and euchromatin, which is more accessible and typically transcriptionally active. The establishment and maintenance of heterochromatin is essential for organismal health. The Heterochromatin Protein 1 (HP1) family is a highly conserved protein family involved in heterochromatin formation and gene silencing. Drosophila melanogaster has three HP1 paralogs that are present in most somatic tissues: HP1a, HP1B, and HP1C. HP1 proteins interact with histone tails through their N-terminal chromo domain. These histone tails often are methylated at specific lysines, and the specificity for a given methylated lysine residue is thought to contribute to the functional differences between HP1 paralogs. To further study the interaction between post-translationally modified histones and HP1 proteins, HP1a, HP1B, and HP1C were fused to a GST (glutathione S-transferase) tag. Then, the proteins were expressed in E. coli and purified via their GST tag. The purified proteins will be applied to a histone tail array to determine their binding specificity for a collection of post-translationally modified histone tails. Here, we present our progress in the tagging and isolation of the three Drosophila HP1 proteins.

"153-Samantha Foster1, Sarah Glover1, Anil Kumar Challa2 Science & Technology Honors Program1, Department of Genetics2 University of Alabama at Birmingham, Birmingham AL, USA"

Understanding the function of zebrafish robo3 isoforms using CRISPR-Cas9 generated mutations

The Roundabout (Robo) family of receptors and their Slit ligands are involved in various aspects of embryonic development including well-established roles in axonal guidance. While they were originally discovered for their role in axon guidance, they have been shown to mediate cell signaling in a variety of cell types. There are multiple genes in the family including robo1, robo2, robo3 and robo4. Three of the genes (robo2, robo3 and robo4) have distinct isoforms.Â While Robo3 isoforms has been reported in various species, isoform-specific roles during embryonic development are not fully understood. In humans horizontal gaze palsy with progressive scoliosis (HGPPS) is caused by mutations in the robo3 gene (Burgess et al., 2009). In zebrafish, robo3 isoforms show distinct spatiotemporal expression patterns in non-neuronal and neuronal cell populations during embryogenesis and early larval development. Isoform-specific gene knockdown studies using antisense morpholinos in zebrafish suggested distinct functional outcomes during gastrulation and axonogenesis (Challa et al., 2005). Bioinformatic analysis of the zebrafish genome also shows the presence of a previously uncharacterized robo3Âlike sequence that is uniquely present in the teleost lineage (unpublished data).Â Stable mutations can provide important insights into gene function that cannot be obtained by transient gene knockdown experiments. CRISPRÂCas9 technology makes it possible to create a variety of mutations and gene modifications in specific genes. This project focuses on creating targeted mutations in zebrafish robo3.1 and robo3.2 genes that will allow a deeper understanding of their roles in early embryonic development.

"154-Kennedy Harris Anderson Butler Farah Lubin, PhD"

Neat1 Expression and Related Epigenetic Marks are Regulated by Glutametergic Stimulation

It is well established that epigenetic changes in the hippocampus are necessary for long term memory formation, and that dysregulation of epigenetic regulation occurs in numerous cognitive disorders, including temporal lobe epilepsy and Alzheimerâ€™s disease. However, the mechanisms of epigenetic regulation in memory formation are not completely understood. Specifically, Nuclear Enriched Autosomal Transcript 1 (Neat1), a long non-coding RNA, has been shown to play a role in regulating the excitability of human neurons, and in targeting epigenetic regulation to specific genes, a process hypothesized to be crucial for memory formation. However, Neat1â€™s role in memory formation is as of yet unexplored. Preliminary data revealed that Neat1 knockdown in the mouse hippocampus improved the performance of mice on hippocampus-dependent memory tasks, while knockdown of Neat1 in neuronal cells altered the mRNA expression of memory-related genes. Stimulation of neuronal cells with potassium chloride results in temporary down regulation of Neat1 expression; however, the response of Neat1 to glutamatergic stimulation is as of yet uncharacterized. We are beginning to examine the expression of the neuronal-excitability regulating lncRNA Neat1 in response to glutamatergic stimulation in the murine neuronal Neuro-2a cell line. Western Blot analysis showed that c-fos, a marker for neuronal activity, is elevated changed in the presence of 2.5uM glutamate one hour after stimulation. This treatment also resulted in downregulation of the Neat1 transcript one hour after stimulation, similar to changes observed with potassium chloride.

155-Cameron Harper

Examination of neural dynamics of verbal episodic memory performance in TLE using Magnetoephalography

"The systems-level neuronal mechanisms that coordinate the distributed neuronal activities in the cerebrum and contributes to the emergence of a coherent cognitive state or a pathological state (i.e., seizures) remains poorly understood. Investigation of functional connectivity via the brainâ€™s electromagnetic activity has emerged as an important method to investigate these neural cognitive networks under normal or pathological states.
The present investigation explored the relation between memory networks and epileptic activation patterns in persons with temporal lobe epilepsy. We hypothesized that memory processes expressed by performance on a verbal paired associates (VPA) learning paradigm were to be impaired, depending on the overlap of that memory taskâ€™s underpinning network with the epileptic network for each participant. Utilization of UABâ€™s magnetoencephalography (MEG) was the main measurement tool for brain activity. Two patients participated in the experiment, each with Temporal Lobe Epilepsy (one patient had epilepsy localized throughout the right hemisphere, the other throughout the left hemisphere).

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156-Lee,Walker and Santiago

Mesurements of Stoke and Cancer Patients

Measuring patients BP(Blood Pressure) and Tpr lTemperature on a chart and compare stats for indications of medical interventions.

157-Paige B. Jackson, C. Justin Bartlett, and Dr. S. Aaron Catledge

Injectable Electrospun Polymer Fibers with Cellulose Nanocrystals to Enhance Mechanical Properties in Calcium Sulfate/Phosphate Bone Cements

Autologous bone grafts are one source of replacement for bone today; however, a potential danger that this bone graft causes is a high risk of infection because surgery is performed at two different sites. Instead, constructing composites out of biodegradable synthetic materials to make bone grafts could be more advantageous and safer. Nonetheless, a common problem with these cements is their inability to bear significant load, which limits its applications to non-load bearing sites. To improve the load-bearing capabilities of calcium sulfate/phosphate bone graphs, we incorporate electrospun polymer fibers of gelatin containing cellulose nanocrystals (CNC) with the goal to enhance their fracture strength. This is based on the concept of engineered cementitious composite (ECC), which experience large strain (up to 6%) with controlled micro-cracking prior to failure. Guided by ECC theory, we synthesized novel cellulose whisker-reinforced gelatin short fibers for injectable bone cements (comprised of calcium sulfate and calcium phosphate). Atomic Force Microscopy (AFM) revealed roughening of gelatin surface upon addition the CNC, which is expected to increase the fiber/matrix frictional bond strength (without causing fiber breakage) leading to strain hardening at lower fiber volume fractions. The hypothesis is that the addition of the electrospun gelatin fibers containing CNC should increase the fracture strength of the bone graft, and the bone graft should maintain its strength as it undergoes cracking similar to ECC.

158-Kayla Hazelwood

Growing Health- Swan Project

"With rising rates of obesity, diabetes, and high blood pressure in the south, particularly in the Black-belt of Alabama- a demographically impoverished area, this garden project serves to reduce and prevent the cause of their core health issues. This initiative is also known as â€œSwan Projectâ€ partnered with non-profit Spirit of Luke rural healthcare clinic. During the clinic, one person came in with a blood sugar of 450, which is extremely high. The doctor asked if the patient was eating healthy foods, and they explained that they had to travel half an hour to buy fresh produce. The underlying issues of food scarcity and un-regulated diets can be prevented with partnership with Fort Depositâ€™s mayorâ€™s office. The community garden now serves to help underserved populations by providing fresh foods. Fort Depositâ€™s parks board is the dedicated task force caring for the garden and also serving to promote awareness on the risks of diabetes, how to eat a diabetic diet, and how to prevent diabetes. The community garden exists to promote and inspire healthier lifestyles in the African American community. From community involvement, the outcomes of the garden include providing underserved communities easy accessibility to vegetables at no cost, and incorporating the conceptual and physical importance of fresh produce into a healthy personâ€™s daily diet. The community gardens offers growth and guidance to its respective caretakers and consumers on sustaining a healthier lifestyle. The ultimate long term future goals include reducing and preventing obesity, diabetes, and high blood pressure in communities with scarce resources and lack of access to healthcare.
"

159-Miriam Bernard, Michael Seifert, and Roslyn B. Mannon

Early Intervention Improves Long-term Outcomes in Kidney Transplant Recipients with Subclinical Inflammation

Background: Serum creatinine-based estimates of kidney transplant function only detect established inflammation. Allograft biopsies are more sensitive in detecting injury, and many transplant centers use surveillance biopsies to assess the adequacy of immunosuppression at early times post-transplant when the creatinine is stable.

Objective: We reviewed the UAB surveillance biopsy program since its inception (May 2015). We hypothesized that kidney recipients with early subclinical inflammation (SCI) would have increased incidence of acute rejection and graft loss compared to those with normal surveillance.

Methods: The primary outcome was a composite endpoint of acute rejection or graft loss. The primary exposure was SCI, defined as borderline or subclinical rejection based on Banff 2009 criteria.

Results: We reviewed 267 consecutive kidney biopsies, of which 42 were 6-month surveillance. Our cohort was enriched for higher immunological risk compared to prior studies (64% black and 62% deceased donors). Half of all subjects had SCI at 6 months, and half of those were treated with increased immunosuppression at their physicianâ€™s discretion. There were no differences in serum creatinine, proteinuria, or demographics between those with versus without SCI. The incidence of the composite endpoint was significantly higher in those with SCI (19% vs. 0%; P=0.04, log-rank test). While not uniform, treatment of SCI reduced the incidence of the composite endpoint (RR 0.33).

Conclusions: SCI was present in 50% of kidney recipients and associated with increased rejection and graft loss. Treatment of SCI is an early intervention that may improve long-term outcomes, but must be validated in future studies.

"160-Gabrielle Brow, David Rountree, Dr. Xiong Ding, Dr. Pengfei Wang

"Synthesis of Gemcitabine Prodrug for Reduced Cytotoxicity

"Cancer is the second leading cause of death in the United States. While there are many chemotherapy drugs available to treat a variety of cancers, these medications are often not well targeted, and can cause undesirable side effects. The goal of this research project is to create a biologically inert chemotherapy prodrug with a PPG (photolabile protecting group) attached to the active site of the drug. This inactive form can be given to patients, and later made active by use of light. The ability to selectively activate the drug to its antineoplastic form allows for increased local concentration at tumor sites, and decreased systemic concentration. Gemcitabine is a cytosine analogue that is used to treat various forms of cancer. This experiment will design three gemcitabine prodrugs with PPGs to evaluate their toxicity and activity. Three different benzylic PPGs with a different meta amino group will be synthesized. The PPGs will be attached to gemcitabine through nucleophilic addition. Two of the three PPGs have been synthesized, with steady progress being made on the synthesis of the third. Currently, various different synthetic pathways are being investigated to selectively protect and deprotect gemcitabine to allow for the addition of the PPGs.
The cytotoxicity and activity of the desired gemcitabine prodrugs will be compared with free gemcitabine on cancer cell lines before and after irradiation. These findings may be useful in the implementation of a more effective drug treatment with fewer side effects for the variety of cancers that gemcitabine is used to treat.
"

161-Adetokunbo Ayokanmbi, Suranjana Dey, Farruk Lutful Kabir, William Harris

Role of MiRNA-145 on Pathophysiology of Cystic Fibrosis

"Background: Cystic Fibrosis (CF) is a common genetic disorder most prevalent in Caucasians where it affects 1/2500 individuals. The genetic mutation involves the CF transmembrane conductance regulator (CFTR) gene, resulting in a defect in ion (Cl- and HCO3-) transportation. The most common mutation is a deletion of phenylalanine at position 508 (F508del-CFTR). Currently, there is no cure for CF. However, pharmacological treatments directly targeting the mutated CFTR protein have recently received FDA approval. We have recently identified microRNA (miRNA; noncoding RNAs that regulate gene expression) that specifically target CFTR transcription and translation and alter F508del CFTR response to corrector strategies.
Hypothesis: miRNA-145 is increased in CF biospecimens in association with lung disease progression and response to 508del CFTR correction.
Methods: Exosomes isolated from CF/non-CF plasma/serum specimens and from cell culture supernatant will be analyzed and compared for the presence of miRNA including miRNA-145, a TGF-beta dependent miRNA that suppresses CFTR expression. miRNA isolated from purified exosomes will be quantified by real-time qPCR.
Anticipated Results: We expect miR-145 content in exosomes will be increased in CF compared to non-CF subjects. In CF patients, we hypothesize that miRNA-145 expression is elevated in association with disease progression
Conclusions: Our studies will identify miRNA as a potential biomarker of CF and suggest that altered miRNA expression may contribute to CF pathobiology and response to therapeutic intervention. These results will complement previous in vitro work in primary airway epithelia and underscore the significance of miRNA to CF pulmonary disease.
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162-Anjali Kamath"

Understanding 14-3-3 Phosphorylation and it's Role in Alpha Synuclein Solubility

"Parkinsonâ€™s Disease (PD) is the second most common neurodegenerative disorder in the world. It is a progressive disorder marked by motor features such as tremor and slowness of movement and by non-motor symptoms such as cognitive dysfunction. The disease is caused by the death of dopaminergic neurons in the substantia nigra due to a toxic aggregation of alpha-synuclein, a protein abundant in pre-synaptic nerve terminals. One of the most abundant proteins in the brain, 14-3-3 proteins, are a family of chaperone protein that have been shown to colocalize with alpha synuclein.

My lab has previously shown that phosphorylation of 14-3-3 at the serine 232 site (S232) blocks the ability of 14-3-3 theta to reduce cell death in cellular models of PD (Slone 2015). We have also shown that there is an increase in phosphorylation of 14-3-3theta at the S232 site associated with the detergent insoluble protein fraction in post-mortem PD brains (McFerrin et al., 2017). Based on this data, the purpose of this study is to test if phosphorylation of 14-3-3 directly impacts 14-3-3 and alpha-synuclein solubility in a cellular PD model. We hypothesize that 14-3-3 phosphorylation at S232 site promotes insolubility of 14-3-3 proteins.
Overall, we expect this experiment to demonstrate that increased phosphorylation of 14-3-3 at the S 232 site will lead to increased insolubility levels of 14-3-3. This in turn would then promote aggregation of alpha synuclein and thus speed up the neurodegenerative process.
"

163-J. David Gear, Ryoichi Kawai

Analysis of ARF and GBF1 membrane dynamicsÂ using stochastic particle-based FRAP simulation

Coat protein I (COPI) vesicles are essential to protein trafficking between the Golgi apparatus and the Endoplasmic-Reticulum. There is extensive descriptive knowledge of the molecular events necessary for the assembly of COPI vesicles, but an understanding of the underlying biophysical principles is not well developed. Assembly of COPI vesicles is initiated by ADP-ribosylation factor (ARF) and its guanine nucleotide exchange factor (GBF1), both of which cycle between the cytosol and the Golgi membrane. In this work, we focus on the initial stage of vesicle assembly with the aim of determining physical parameters associated with the membrane dynamics of GBF1 and ARF, such as the diffusion coefficients, and the membrane association and dissociation rates. Membrane dynamics information is obtained indirectly from a fluorescence recovery curve using Fluorescence Recovery after Photo-Bleaching (FRAP) of fluorescently tagged GBF1 and ARF. We have developed a stochastic, particle-based reaction-diffusion simulation of the FRAP experiment, and the resultant simulated fluorescence recovery curve is fit against the experimental curve in an iterative curve fitting process to determine the physical parameters of interest.

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164-Wynton Sims

The 10% Initiative--Increasing the Number of African-Americans Pursuing Careers in Science and Medicine

"Of the total U.S. medical school enrollment from 2016-2017, only 5,856 out of 88,304 total enrollees were African-Americans. The sad reality is that, currently, African-Americans are enrolling in medical school in record low numbers. The same is true for African-Americans enrolling in STEM undergraduate and graduate programs. From 2008-2013, African-Americans received <8% of all STEM bachelorâ€™s degrees and <5% of all STEM doctorate degrees. This underrepresentation of African-Americans, which is a pervasive issue in both medicine and science, has had detrimental effects on the health of the African-American community and led to an increasing health disparity gap in the United States. Thus, to implement change locally, I have proposed an initiative that will target high-ability African-American high school students with the goal of stimulating interest in careers in science and medicine. A key feature of the program will be mentoring, and through creating mentoring networks consisting of 1 professional mentor, 1 student mentor, and 2 mentees, I hope to provide the mentees with a quality support system that will advise and encourage them on their way to becoming future scientists and physicians. In addition to keeping in consistent contact with the mentees, the mentors will have the option of hosting monthly seminars, ranging in topic from health disparities in the African-American community to underrepresentation of African-Americans in science and medicine. Additionally, students will be provided with service opportunities and a potential opportunity to tour the graduate and/or medical facilities at UAB.
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Long-term healthcare utilization by older survivors of hematopoietic cell transplant (HCT): A report from BMTSS-2

"Background: HCT survivors carry a high burden of morbidity. However, the pattern of healthcare utilization by older HCT survivors who are at highest risk for morbidity is not known.
Methods: We ascertained self-reported healthcare utilization within the past 2y by 660 2+y survivors who were â‰¥65y at study participation, across three domains: (1) general medical contact; (2) cancer/HCT-related visit; and (3) high-intensity visit (emergency room [ER] or urgent care center). Potential risk factors for lack of domain-specific healthcare utilization were examined univariately. Variables with p<0.1 were included in the multivariable model, which was stratified by HCT type and adjusted for age, gender, and race.
Results: Allogeneic HCT 216 2+y survivors were followed for a median of 8.9y (3.6-36.5) from HCT. Among 15+y survivors, 98% reported medical contact in the last 2y. The prevalence of cancer/HCT-related visits declined over time (2-5y post-HCT: 78%; 15+y post-HCT: 30%), while the prevalence of high-intensity visits increased (2-5y: 25%; 15+y: 47%). Lymphoma patients were more likely to report HCT/cancer-related visits (OR=2.98, p=0.048) than AML patients. HCT survivors with poorer health status were more likely to report high-intensity visits (OR=2.3, p=0.02). Autologous HCT 444 2+y survivors were followed for a median of 9.6y (3.7-28.6) from HCT. Among 15+y survivors, 97% reported medical contact in the last 2y. There was a decline over time in the prevalence of both cancer/HCT-related visits (2-5y: 70%; 15+y: 42%) and high-intensity visits (2-5y: 34%; 15+y: 28%). Compared to lymphoma patients, myeloma patients were more likely to report cancer/HCT-related visits (OR=2.1, p=0.01), as were patients who were concerned about their health (OR=2.4, p<0.001). Females were more likely to report high-intensity visits (OR=1.6, p=0.04), as were those who reported poorer health (OR=1.9, p=0.01).
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166-Cameron LaFayette, Mackenzie L. Davenport, Kyle P. Feeley, Dr. Mick Edmonds

Utilizing CRISPR-Cas9 to Target Non-coding MicroRNA for Deletion

" MicroRNAs (miRNAs) are non-coding RNAs that are essential in post-transcriptional gene regulation. miRNAs are dysregulated in human malignancy, including lung cancer, which is the leading cause of cancer death. To study miRNA function in cancer, overexpression studies use qRT-PCR (quantitative Real-Time PCR) to compare expression in cancer cells and immortalized cells. Long-term miRNA knockdown is challenging due to the low availability of reagents and difficulty sustaining inhibition due to the small size of miRNA (approx. 20bp). To determine if specific miRNA are necessary for lung cancer progression, we propose using CRISPR-Cas9 to delete miRNA in human lung cancer cell lines. CRISPR-Cas9 (Clustered Regularly Interspaced Short Palindromic Repeats) is the latest gene-editing technology that focuses on using a pre-designed RNA sequence to direct the Cas9 (CRISPR Associated Protein 9) nuclease to a targeted sequence for cutting. Five sgRNAs have been designed to increase knockout probability. These sgRNAs will be ligated into the Cas9 vector, transfected into lung cancer cells, and assayed for miR expression. TALENS (Transcription Activator-Like Effector Nucleases), ZFNs (Zinc Finger Nucleases), and CRISPR all have comparable levels of target-specificity, however TALENS is cytosine methylation-sensitive, which could erroneously interfere with gene silencing. ZFNs and CRISPR-Cas9 function similarly in that they both use a nuclease for deletion, however ZFNs lack the high on-target specificity of CRISPR-Cas9 for a comprehensive stretch of nucleotides. Through the use of CRISPR- Cas9, non-coding microRNA will be targeted and deleted, which is expected to lead to a decrease in malignancy in lung cancer cells.
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167-Trae Compton

Does increased access to care using telemedicine improve outcomes?

Rural south Alabama lacks specialized health care providers for many of the residents. Sumter County, population 10,000, has several small clinics, one hospital, and four doctors. Specialized care is referred to larger cities like Tuscaloosa, Birmingham, or Mobile. Doctor referrals range in patients having to travel over an hour and up to three hours seeking medical attention. Patients seeking specialized care benefit from access to telemedicine services 24 hours a day and 7 days a week at rural hospitals and clinics. The use of the telemedicine program in rural south Alabama could enhance patient care. Telemedicine use would potentially communicate the type of illness earlier, allowing services to be arranged quicker, and provide instant patient access in support of specialized care. The research question under investigation for this study is: Does increased access to care using telemedicine improve outcomes?

168-Cristhian Gutierrez

High salt intake alters ETB receptor expression in visceral adipose

N/A