Medical & Dental Student Research Day 2019

The Effect of Maternal Smoking During Pregnancy on AOP by Gestational Age

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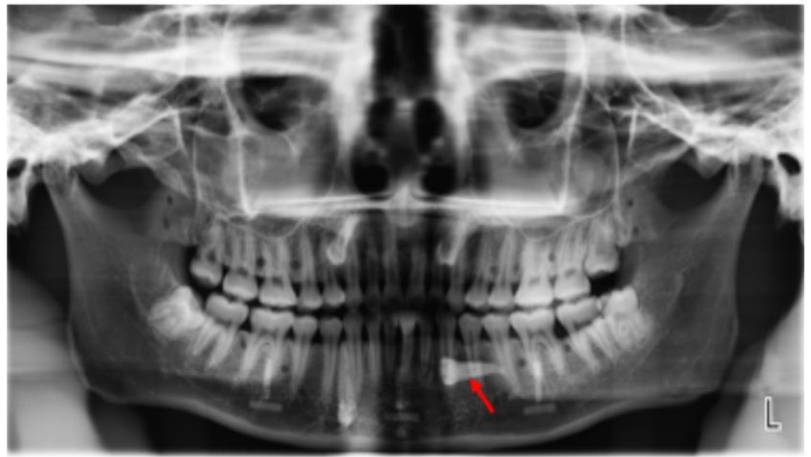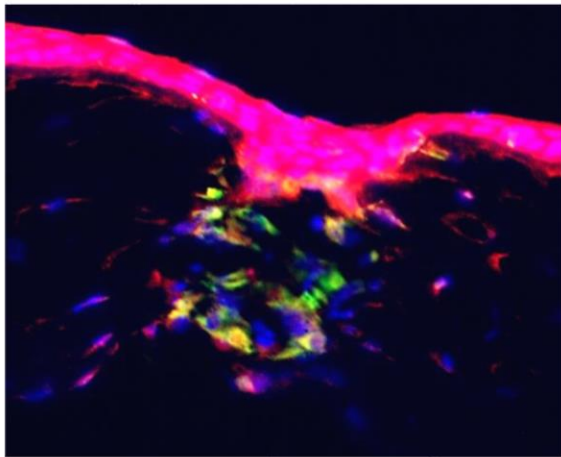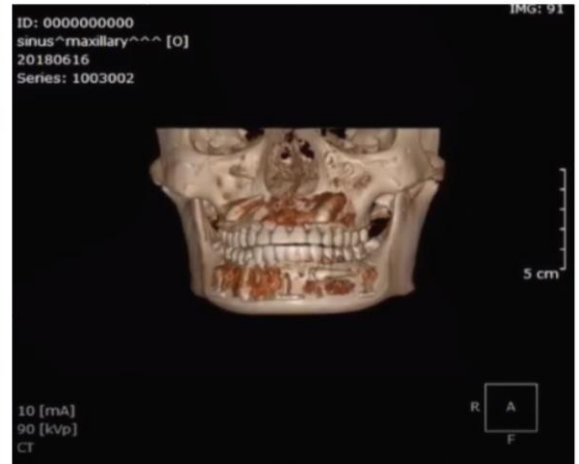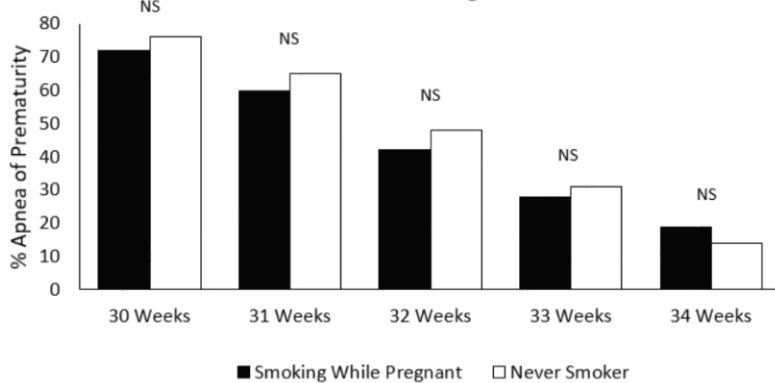SCHOOL OF DENTAL MEDICINE
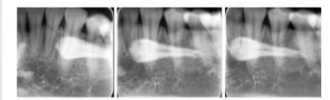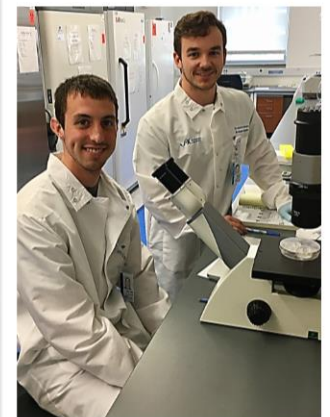
Schedule of Events

February 25, 2019

TALKS
9:00 – 11:45AM   Academic Rotunda

KEYNOTE SPEAKER
12:00 – 1:00PM   Academic Rotunda

POSTERS
2:00 – 4:30PM   Academic Rotunda

KEYNOTE ADDRESS

"Does Oral Health Matter"

Raul I. Garcia, DMD, MMedSc, FACD

Raul I. Garcia is Professor and Chair, Department of Health Policy and Health Services Research at Boston University Henry M. Goldman School of Dental Medicine. He is also the Director of the Northeast Center for Research to Evaluate and Eliminate Dental Disparities, supported by the National Institutes of Health. The Center's aims are to design, test and implement community-based interventions to eliminate oral health disparities. He has investigated the role that oral conditions play as risk factors for systemic health outcomes. In the area of health policy, his department has implemented new programs to enhance access to oral health care by under-served populations and to recruit students from under-represented groups to enter the oral health professions. He is a Past-President of the Hispanic Dental Association, the national organization whose primary mission is to improve the oral health of Latinos in the U.S. Dr. Garcia is a 1981 graduate of the Harvard School of Dental Medicine, where he received the D.M.D. degree summa cum laude. He completed his specialty training in Periodontology in 1984, and went on to receive a Master of Medical Sciences degree from Harvard in 1985.

Raul I. Garcia

Oral Presentations

TALKS

9:00 – 11:45AM   Academic Rotunda

Session 1: 9:00am – 10:15am

9:00: **An Analysis of Oral Health Related Quality of Life in End Stage Renal Disease Patients**
Andrea Geffin, Megyn Clement, Sharon Sternberg, Ruchir Trivedi, Efthimia Ioannidou

9:15: **The Role of Insurance Type on the Presentation of Cubital Tunnel Syndrome**
Christopher Cheng, Craig M. Rodner

9:30: **Evaluation of the Reliability of a New Low Dose CBCT Acquisition Protocol in Diagnosing Impacted Canines: An Ex-vivo Imaging Study.**
Ayesha Ejaz, Sumit Yadav, Aditya Tadinada

9:45: **Blood Prestin Levels as a Biomarker of Noise-Induced Hearing Loss in Mice**
Nicholas Haberli, David Martinelli, Kourosh Parham

10:00: **Isocitrate Dehydrogenase Mutatant Low-Grade Gliomas Regulate Their Immune Environment Through Methylation of the cGAS Gene Promoter**
Summit Singhaviranon, Juan Vasquez, Ranjit Bindra

Session 2: 10:30am – 11:45am

10:30: **Tobacco Use and Infantile Apnea, Is it Time to Reconsider the Relationship Between Apnea and Sudden Infant Death Syndrome?**
Christian Schaufler, Naveed Hussain

10:45: **The Role of WNT-Pathway on High Molecular Weight (HMW) Fibroblast Growth Factor 2 and Fibroblast Growth Factor 23 on Dentin and Alveolar Bone Mineralization.**
Satpal S. Jutla, Marja Hurley

11:00: **Engineered Human Cardiac Microtissues to Study Genetic and Allelic Heterogeneity of Dilated Cardiomyopathy**
Robert Romano, J. Travis Hinson

11:15: **The Identification Of Serine And Phosphorylated Dihydroceramide Lipids On Extracted Human Primary Teeth**
Elena Carrington, Frank Nichols, Yu-Hsiung Wang

11:30: **A Survey Study of Resident Experiences of Sexual Harassment during Dermatology Training**
Madeline DeWane, Sarah Mattessich, Rong Wu, Diane Whitaker-Worth

Poster Presentations

POSTERS
2:00PM – 3:15PM Odd #s; 3:15PM – 4:30PM Even #s Academic Rotunda

Dental Student Poster presentations (#20 - #31)

Student:	Ashley Arthur	#20 Rotunda
Mentor:	Dr. J. Robert Kelly	
Title:	Pumping Efficiency of an Artificial Salivary Gland	

Student:	Laura Borodic	#21 Rotunda
Mentor:	Dr. Aditya Tadinada	
Title:	Reliability of Panoramic Radiographs in the Prediction of the Mandibular Third Molar Eruption	

Student:	Ethan Cope	#22 Rotunda
Mentor:	Dr. David Banach	
Title:	Antibiotic Prescribing in Outpatient Dental Practice	

Student:	Steven Cosgrove	#23 Rotunda
Mentor:	Dr. Frank Nichols	
Title:	Recovery of Lipid 342 from Murine Bone Marrow Macrophages after Treatment with Lipid 654: a Potential Virulence Factor of Porphyromonas gingivalis	

Student:	Njeri Dodson	#24 Rotunda
Mentor:	Dr. Linda S. Cauley	
Title:	Altered Development of SMAD4-deficient Dendritic Cells	

Student:	Evan Fox	#25 Rotunda
Mentor:	Dr. Patricia I. Diaz	
Title:	Evaluation of the Antibacterial Effect of the Chemotherapeutic 5-Fluorouracil Against Oral Microorganisms	

Student:	John Gehlbach	#26 Rotunda
Mentor:	Dr. Marion E. Frank	
Title:	Investigating Contact Sports and Accurate Identification of Odors and Tastes	

Student:	Taleen Kalajian	#27 Rotunda
Mentor:	Dr. Efthimia Ioannidou	
Title:	Gender Inequity in United States Dental Academia: An Analysis of the Wage Gap	

Student: Julia Lafen   #28 Rotunda
Mentor: Dr. Rajesh Lalla
Title: Investigating Factors that Contribute to Dental Disease Severity in Head and Neck Cancer Patients prior to Radiation Therapy

Student: Kenneth MacCormac   #29 Rotunda
Mentor: Dr. Carol Pilbeam
Title: Parathyroid Hormone Regulates RANKL and OPG in Primary Osteoblasts via Calcium and NFATc1 Pathway

Student: Yingying Zhang   #30 Rotunda
Mentor: Dr. Efthimia Ioannidou
Title: Assessment of Clinical Periodontal Parameters on Inflammatory Burden in End-Stage Renal Disease (ESRD)

Student: Marina Zoghbi   #31 Rotunda
Mentor: Dr. Marion E. Frank
Title: Comparison of Effects of Peridex (Chlorhexidine) on Tastes of Chloride, Benzoate and Saccharin Sodium Salts on the Anterior Tongue

Medical Student Poster presentations (#1 - #19: Community, Public Health; #32 – #50: Clinical; #51 - #67 Laboratory; #68 - #69: Educational)

Student:	Irini Agaraj	#1 Rotunda
Mentor:	Dr. Kevin Dieckhaus	
Title:	Social and Cultural Determinants of Diabetes Management among Adults in Peru	

Student:	Savannah Alvarado	#2 Rotunda
Mentor:	Dr. Kevin Dieckhaus	
Title:	The Relationship Between General Hygiene and Rates of Helicobacter Pylori: Might Access and Education Correlate with Prevalence Patterns?	

Student:	Michael Bowe	#51 Lobby
Mentor:	Dr. Kourosh Parham	
Title:	Changes in Serum Levels of an Inner-Ear-Specific Biomarker, Otolin-1, in Ovariectomized Rat Model of Estrogen Deficiency	

Student:	Kelsey Boyne	#3 Rotunda
Mentor:	Dr. Kevin Dieckhaus	
Title:	Barriers Contributing to Delayed Antenatal Care in Guam	

Student:	Kristin Bumsch	#32 Lobby
Mentor:	Dr. L. John Greenfield, Jr.	
Title:	Effect of Seizure Auras on Mood in Epilepsy: the ESAME Survey	

Student:	David Chiu	#33 Lobby
Mentor:	Dr. Mohamad Halawi	
Title:	Psychological Distress Independently Predicts the Need for Inpatient Admission after Primary Total Joint Arthroplasty	

Student:	Ryan Ciarlo	#4 Rotunda
Mentor:	Dr. Adam Perrin	
Title:	Understanding Provider Attitudes and Knowledge of the HPV Vaccine and Their Perceived Barriers to HPV Vaccine Initiation	

Student:	Alexandra Clement	#5 Rotunda
Mentor:	Dr. Janine Caira	
Title:	Prevalence of *Toxocara canis*, *Toxocara cati*, and *Baylisascaris procyonis* in Public Playgrounds in Hartford, Connecticut	

Student:	Lauren Colburn	#52 Lobby
Mentor:	Dr. Srdjan Antic	
Title:	Cellular Specification of Connexin 45 in the Developing Human Fetal Brain	

Student: Justin De La Guerra   #6 Rotunda
Mentor: Dr. Nayo Williams
Title: Emergency Department Usage Prior to Pregnancy is Associated with Use
             Postpartum

Student: William Doemland   #68 Lobby
Mentor: Dr. David Rosenthal
Title: Use of Digital Fundoscopic Retinal Image Data Sets in the Development of
             Predictive Health Analytics and Machine Learning

Student: Jonathan Fetene   #53 Lobby
Mentor: Dr. Clemens Bergwitz and Dr. Sampada Chande
Title: Intact Mouse Model To Determine Bioavailability of Phosphorus From
             Infant Formulas

Student: Lilah Fones   #34 Lobby
Mentor: Dr. Robert A Colbert and Dr. Fatemeh Navid
Title: CHOP Depletion Reduces IL-23 Expression and Increases Autophagy in
             HLA-B27+ Macrophages

Student: Samantha Goldburg   #35 Lobby
Mentor: Dr. Marc Dinkin
Title: Optic Nerve Cupping in Patients with Retrograde Trans-synaptic
             Degeneration

Student: Elisa Gonzalez Cuevas   #36 Lobby
Mentor: Dr. David Steffens
Title: Anxiety, Neuroticism and Late-Life Depression

Student: Christian Gronbeck   #7 Rotunda
Mentor: Dr. Mohamad Halawi
Title: Predicting Inpatient Status After Total Hip Arthroplasty in Medicare-Aged
             Patients

Student: David Guirguis   #37 Lobby
Mentor: Dr. Kourosh Parham
Title: Pilot Investigation of the Correlation Between Blood Levels of Otolin-1 and
             Abnormal Vestibular Evoked Myogenic Responses

Student: Jennifer Hale   #69 Lobby
Mentor: Dr. Alyssa Bennett
Title: Current Adolescent Perspectives on School-Based Sex Education

Student: Salem Harry-Hernandez   #8 Rotunda
Mentor: Dr. Dustin Duncan
Title: Gender Dysphoria, Mental Health, & Poor Sleep Quality Among
             Transgender & Gender Non-Binary Individuals: A Qualitative Study in New
             York City

Student: Abigail Healy   #54 Lobby
Mentor: Dr. Alan R. Morrison
Title: Macrophage Non-Muscle Myosin IIA (NMMIIA) is Required for
             Atherosclerotic Calcification

Student: Samantha Hill   #55 Lobby
Mentor: Dr. Lisa Mehlmann
Title: Development of Endoplasmic Reticulum-Plasma Membrane Contact Sites
             and their Role in Calcium Uptake during Oocyte Meiotic Maturation

Student: Walter Jongbloed   #38 Lobby
Mentor: Dr. Mohamad Halawi
Title: Patient Dissatisfaction after Primary Total Joint Arthroplasty: The Patient
             Perspective

Student: Chinaka Joseph   #39 Lobby
Mentor: Dr. David Steffens
Title: Association Between White Matter Hyperintensities, Frontal Brain Volumes
             And Neuroticism In Late Life Depression

Student: Rebecca Joseph   #56 Lobby
Mentor: Dr. David Raizen
Title: New Ideas in Sleep Research

Student: Shalmli Joshi   #57 Lobby
Mentor: Dr. Simon Dunham and Dr. Bobak Mosadegh
Title: Development of Patient-Specific 3D-Printed Coronaries for Non-Invasive
             Assessment of Coronary Artery Disease (CAD)

Student: Christine Kohn   #9 Rotunda
Mentor: Dr. Craig Coleman
Title: Comparative Risk of Major Bleeding With Rivaroxaban and Warfarin:
             Population Based Cohort Study of Unprovoked Venous Thromboembolism

Student: Meghan Kulak   #58 Lobby
Mentor: Dr. Robert Clark and Nicholas Wasko
Title: The in Vitro Effects of TLR2 Tolerance on Mouse-Derived Microglia

Student: Subin Lee   #59 Lobby
Mentor: Dr. Caroline Dealy
Title: Characterization of A Novel EGFR Splice-Site Knockout Mouse Model In
             Search of An Alternative Therapeutic Option For Rheumatoid Arthritis

Student: Vikram Lyall   #40 Lobby
Mentor: Dr. Mohamad J. Halawi
Title: Re-Evaluating The Utility of Routine Postoperative Laboratory Tests After
             Primary Total Knee Arthroplasty

Student: Sindhu Mannava   #41 Lobby
Mentor: Dr. Gyula Acsadi
Title: A Pilot Study Investigating Clinical Mobility Indicators in Pediatric Spinal
              Muscular Atrophy (SMA) Patients Undergoing Spinraza (Nusinersen)
              Treatment

Student: Kelly McKenna   #60 Lobby
Mentor: Dr. Kourosh Parham
Title: Does Primary Hyperparathyroidism Affect the Inner Ear?

Student: Timothy Miett   #10 Rotunda
Mentor: Dr. Kevin Dieckhaus
Title: Self-Reported Health Practices and Anti-H. Pylori Serum IgG Status in the
              Cuzco Region

Student: Deandra Momah   #61 Lobby
Mentor: Dr. Cato Laurencin
Title: A Critical Analysis of Adipose- Derived Stem Cell Secretome and its Role in
              Regenerative Engineering

Student: Anzhela Moskalik   #42 Lobby
Mentor: Dr. Roel GW Verhaak
Title: Clinical and Molecular Factors Predictive of Overall Survival in Recurrent
              Glioblastoma

Student: Jeffrey O'Brien   #43 Lobby
Mentor: Dr. Daniel Roberts
Title: Mutational Analysis of the NF2 Gene from Paired Tumor-normal Genome
              Sequence Data

Student: Margaret O'Neill   #11 Rotunda
Mentor: Dr. Kevin Dieckhaus
Title: Sexually Transmitted Infections in Underinsured Pregnant Women in Guam

Student: Rashmi Pashankar   #12 Rotunda
Mentor: Dr. Jennifer Schwab and Dr. Rocio Chang-Angulo
Title: Extended Screening Increases Prevalence of Postpartum Depression in a
              Pediatric Clinic

Student: Gabriel Paul   #13 Rotunda
Mentor: Prof. Judy Lewis
Title: Men's Health-Seeking Behavior, Cancer Knowledge And Awareness, And
              Willingness To Support Female Partners In Jérémie, Haiti

Student: Julia Plourde   #14 Rotunda
Mentor: Dr. Mohamad Halawi
Title: Routine Postoperative Laboratory Tests Are Not Necessary After Primary
              Total Hip Arthroplasty

Student: Molly Potter   #62 Lobby
Mentor: Dr. Bruce White
Title: Upregulation of Phosphoserine Aminotransferase 1 (PSAT1) following
             Epithelial-Mesenchymal-Transition of the MCF7 Invasive Breast Cancer Cell
             Lineage

Student: Candice Quarella   #15 Rotunda
Mentor: Dr. Kevin Dieckhaus
Title: Evaluation of Maternal Syphilis in Cyanika, Uganda

Student: Kimberly Rebello   #44 Lobby
Mentor: Dr. Agnes Kim
Title: Cardio-Oncology Service: Our Experience at the University of Connecticut

Student: Aaliyah Riccardi   #63 Lobby
Mentor: Dr. Bhama Rankhelawon and Dr. Michele Silvestro
Title: Characterization of Megakaryocyte Homing and Platelet Biogenesis in
             Pulmonary Parenchyma

Student: Matthew Sagnelli   #64 Lobby
Mentor: Dr. Yingqun Huang
Title: A Novel lncRNA H19 Mediated Pathway for Aberrant Hepatic
             Gluconeogenesis in Type II Diabetes

Student: William Santiago   #45 Lobby
Mentor: Dr. Thomas Manger and Dr. Satyarani Tallapureddy
Title: A Curious Case of Transient Binocular Vision Loss in a Patient with Lupus
             Induced Supraventricular Tachycardia

Student: Abigail Schrang   #16 Rotunda
Mentor: Dr. Kevin Dieckhaus
Title: The Determinants Of Helmet Use Among Motorcycle Drivers In The
             Dominican Republic

Student: Gwendolyn Schultz   #65 Lobby
Mentor: Dr. Royce Mohan and Dr. Paola Bargagna-Mohan
Title: A New Vision for Wound Healing in the Eye: Myofibroblast Differentiation
             from Schwann Cells in Corneal Injury

Student: Morgan Smith   #17 Rotunda
Mentor: Dr. Courtland G. Lewis
Title: Correlation Between Preoperative Patient-Reported Outcome Measures
             and Major Post-Operative Complications and Hospital Readmissions for
             Total Joint Arthroplasty Patients.

Student: Katherine Spiegel   #66 Lobby
Mentor: Dr. Kourosh Parham
Title: Biomarker for Benign Paroxysmal Positional Vertigo: A Prospective Study of
             Otolin-1 Levels in Serum

Student: Andrew Stone   #46 Lobby
Mentor: Dr. Mohamad Halawi
Title: Medicare Coverage Is An Independent Predictor of Prolonged
             Hospitalization After Primary Total Joint Arthroplasty

Student: Bethany Sullivan   #47 Lobby
Mentor: Dr. Mohiuddin Cheema
Title: To Evaluate the Prognostic Significance of High Risk Clinical Features in
             Long Term Development of Aortic and Vascular Complications in Patients
             who Present with Acute Type A Aortic Dissections

Student: Joseph Testa   #48 Lobby
Mentor: Dr. Benjamin T. Ristau
Title: Is Gadolinium Really Necessary? Moving From Multiparametric To
             Biparametric Prostate MRI

Student: Kelly Tomasevich   #49 Lobby
Mentor: Dr. Mandeep Kumar
Title: The Impact of Atrial Fibrillation and Anticoagulation in Elderly Hip Fracture
             Surgery Patients

Student: Jessica Weeks   #18 Rotunda
Mentor: Dr. Jean Schensul
Title: The Link between Loneliness and Depression in the Elderly Male Urban
             Senior Housing Population and Implications for Primary Care Physicians

Student: Michelle Williamson   #67 Lobby
Mentor: Dr. Nadia Ameen and Dr. Leandra Figueroas
Title: Localization of DRA and NKCC1 Ion Transporters in Human Derived
             Intestinal Enteroids

Student: Shaharyar Zuberi   #50 Lobby
Mentor: Dr. Charles Rutter
Title: Retrospective Analysis Of Clinical Outcomes For Patients With Brain
             Metastases Receiving Linear Accelerator Based Radiosurgery And
             Hypofractionated Radiotherapy

Student: Micaella Zubkov   #19 Rotunda
Mentor: Dr. Kevin Dieckhaus
Title: A Study On Water Quality, Hygiene Practices, and Attitudes Toward Water
             Sourcing in Kisoro, Uganda

Social and Cultural Determinants of Diabetes Management among Adults in Peru

Irini Agaraj[1], Kevin Dieckhaus[1, 2]
[1]University of Connecticut School of Medicine, UConn Health, Farmington, CT
[2]Division of Infectious Diseases, UConn Health, Farmington, CT

Background/Objectives: The prevalence of diabetes mellitus and obesity in Peru has been measured at 7% and 17.5%, respectively [1]. In the past twenty years due to Peru's economic growth, there has been a nutritional transition to a more westernized diet contributing to increasing obesity. However, little has been done in response making Peru vulnerable to the economic burden of health related issues resulting from obesity, including diabetes. Undiagnosed diabetes ranges from 30-40% and diabetes prevalence is highest in urban, coastal areas which have adapted a more westernized lifestyle. After controlling for sociodemographic factors however, individuals living in higher altitudes have a higher risk of developing diabetes [2, 3]. This study aimed to provide insight on diabetes management and nutrition beliefs among adults living in the Andes region of Peru.

Methods: 101 adults with diagnosed diabetes were surveyed in medical brigades, free clinics, and an ophthalmology clinic in the department of Cusco. Participants provided demographic information and finger stick Hemoglobin A1c (HbA1c) point of care testing. HbA1c values were transformed into categories with values ≤ 7.0% indicating adequate glucose control and values >7.0% indicating inadequate glucose control, following American Diabetes Association guidelines. Three surveys were verbally administered: a diabetes knowledge questionnaire, the Diabetes Self-Management Questionnaire (DSMQ), and a diabetes diet questionnaire. 70 participants completed all surveys/HbA1c testing.

Results: Mean HbA1c was 7.7% and 41.4% of participants were in the uncontrolled category (HbA1c >7%). There were no statistically significant differences in demographics, DSMQ total scores, and diabetes diet questionnaire total scores between HbA1c categories. When individual items of the diabetes diet questionnaire were examined, 0% of participants in the uncontrolled category and 15% of participants in the controlled category correctly answered a question on carbohydrate serving sizes (p=0.03). Additionally, 52% of participants in the uncontrolled group knew that diabetes could be prevented compared to 76% of participants in the controlled group (p=0.04). 35.7% of patients had received diabetes management education.

Conclusions: Glycemic control (HbA1c) did not differ based on participant demographics and study location (within the department of Cusco). Overall, there was limited nutrition knowledge and little diabetes management education among study participants. The ability to enroll patients in the study was limited by many patients never having been tested for diabetes indicating a need to increase diabetes screening in this region.

References:
1. Villena, J. E. (2015). Diabetes Mellitus in Peru. *Annals of Global Health*, 81(6), 765-775.
2. Seclen, S. N., Rosas, M. E., Arias, A. J., Huayta, E., & Medina, C. A. (2015). Prevalence of diabetes and impaired fasting glucose in Peru: Report from PERUDIAB, a national urban population-based longitudinal study. *BMJ Open Diabetes Research & Care*, 3(1).
3. Bernabé-Ortiz, A., Carrillo-Larco, R. M., Gilman, R. H., Miele, C. H., Checkley, W., Wells, J. C., . . . Miranda, J. J. (2016). Geographical variation in the progression of type 2 diabetes in Peru: The CRONICAS Cohort Study. *Diabetes Research and Clinical Practice*, 121, 135-145.

The Relationship Between General Hygiene and Rates of Helicobacter Pylori: Might Access and Education Correlate with Prevalence Patterns?

Savannah Alvarado[1], Kevin D. Dieckhaus[2]
[1]*University of Connecticut School of Medicine, UConn Health, Farmington, CT*

There is a significant discrepancy between *Helicobacter pylori* infection rates in developed and developing countries (40 and >70% respectively),[1,2] and this discrepancy may be related to personal hygiene and access to sanitary living environments. Given that 89% of gastric cancer diagnoses in Central and South America are related to H. pylori, this discrepancy must be addressed.[3] The goal of this study is to analyze whether correlations can be made between general hygiene and test results on a whole blood rapid antibody test for *Helicobacter pylori.* 278 participants recruited from the waiting area of community health clinics in The Sacred Valley and Chumbivilcas, Peru (72 male; 201 female) were administered a 31 question survey and a whole blood rapid antibody test for *Helicobacter pylori*. In addition to demographic information (age, gender, education level, employment), the survey obtained information on household factors (household crowding, type of flooring, type of toilet, and water source) and the participants' experience of gastrointestinal symptoms (nausea, vomiting, diarrhea, and abdominal pain). 54% of participants yielded a positive rapid antibody test result. 57% of participants reported mild gastrointestinal symptoms and 24% reported significant symptoms. It remains challenging to formulate conclusions regarding lifestyle factors that have a significant relationship with a whole blood rapid antibody test results for *Helicobacter pylori*.

References:
1. Brown, L. M. "Helicobacter Pylori: Epidemiology and Routes of Transmission." Epidemiologic Reviews 22, no. 2 (2000): 283–97.
2. Porras, Carolina, Jesse Nodora, Rachael Sexton, Catterina Ferreccio, Silvia Jimenez, Ricardo L. Dominguez, Paz Cook, et al. "Epidemiology of Helicobacter Pylori Infection in Six Latin American Countries (SWOG Trial S0701)." Cancer Causes & Control: CCC 24, no. 2 (February 2013): 209–15. https://doi.org/10.1007/s10552- 012-0117-5.
3. Sierra, Monica S., Patricia Cueva, Luis Eduardo Bravo, and David Forman. "Stomach Cancer Burden in Central and South America." Cancer Epidemiology 44 Suppl 1 (September 2016): S62–73. https://doi.org/10.1016/j.canep.2016.03.008.

Pumping Efficiency Of An Artificial Salivary Gland

Ashley Arthur[1], Eric Kolb[2], J. Robert Kelly[1]
[1]University of Connecticut School of Dental Medicine, UConn Health, Farmington, CT
[2]Kolb Consultants, Sandy Hook, CT for Engineering Design Support

Background: Xerostomia is linked to changes in saliva composition and/or flow and known to affect approximately 20% of the U.S. population[1]. Saliva is crucial for the maintenance of oral homeostasis, prevention of dental caries and oral infections, promotion of remineralization of early carious lesions, and buffering acids generated by oral bacteria[1]. It also participates in initial formation of the food bolus, and early digestion[1]. In clinical studies, the only clear association was between the amount of caries and volume of salivary flow[1]. Oral complications related to chronic reduction in salivary flow rates include swallowing difficulties, decreased/ altered taste, and aggravation of conditions like gastroesophageal reflux disease[1].

Objective: The project goal is mechanical testing of a dental implant prototype to treat Xerostomia. The implant design is to pump filtered fluid in response to force magnitudes related to tooth contact and mastication. The purpose of this project is to test the primary prototype internal pumping mechanism efficiency using simple technique under the following criteria for pumping efficiency: fluid flow per stroke and fluid volume generated for a specified time and interval.

Methods: Initial prototypes fabricated at scale (2.5x) from plastic and metal using three-dimensional printing processes (ProtoLabs). Use of clear plastic enables visualization of moving parts and fluid flow, facilitating performance evaluation. A wax spout is built around the collar and below the grooves of the crown. An open cellblock of 30 PCF is drilled to accommodate the prototype and a second hole is created to hold a small test tube to capture the water pumped out. The open cellblock is similar to trabecular bone composition that is found in the maxilla and mandible. Millipore water is used to eliminate buildup of ions and films on parts.

Results: Although no measurable results regarding fluid flow and volume, so far, material selection and product design discussions are in progress to fix some of the issues found. The perforated holes at the bottom of the implant needed to be blocked off to allow enough pressure to generate inside the implant to displace the fluid. Accomplishments include, appropriate saw bone density selection, fabrication of the implant and water collecting system, and reassembling of the crown portion of the implant.

Conclusion: The device is not fit for extensive pumping as planned for the summer; rather several areas of weakness in design are identified. Material selection is a big issue at this stage, the correct fits and finishes are needed at precise specifications to prevent parts from moving and sealing off liquids.

Future Directions: Continued work on the development of machined parts for the implant.

References
1. Atkinson JC, Grisius M, Massey W. Salivary hypofunction and xerostomia: diagnosis and treatment. Dental Clinics of North America. 2005;49(2):309-26.

Reliability of Panoramic Radiographs in the Prediction of the Mandibular Third Molar Eruption

Laura Borodic, Christy Lottinger, Aadarsh Gopalakrishna, Alan Lurie, Aditya Tadinada
University of Connecticut School of Dental Medicine, Farmington, CT

Background: Third molars are the last teeth to erupt in the human dentition and vary greatly in size, position, and path of eruption.[1] Third molars are also the more commonly impacted teeth and are often extracted. Due to the location of third molars and proximity to critical anatomic structures, it is important to determine the position and the possibility of either eruption or impaction and plan for extraction if necessary. Panoramic radiographs are used to evaluate the position of third molars and impaction risk[2]. Dentists recommend third molar extraction to help prevent possible future complications and associated pathology. The rate of post-surgical complications increases with age and the depth of the impaction. Moreover, the difficulty of surgical extraction increases with root development and age.[3] Previous studies have identified predictors of eruption on radiographs including tooth inclination and space between the ramus and mandibular second molar. However, there is little evidence concerning the prediction of third molar eruption prior to complete root development.

Objectives: The objective of this retrospective study is to determine if the path of eruption of mandibular third molars can be predicted using panoramic radiographs.

Methods: This retrospective study was conducted by evaluating 105 panoramic radiographs. Patients with three or four panoramic radiographs taken sequentially at different time points were used to assess mandibular third molar eruption over the course of root development. Ages ranged from 12 to 19, with the last panoramic time point being at least 18 years old. The evaluation of a senior board certified oral radiologist was considered as a gold standard for determining eruption/impaction. An oral surgeon and a general dentist individually evaluated the position of the mandibular third molars and predicted impaction using the panoramic radiographs from the first two time points. The radiograph taken at the latest time point was used to determine eruption or impaction. A second evaluation session was performed using the same radiographs but with space analysis done by making ramus-to-second molar measurements marked on the radiographs taken at time point one and two.

Results: The raters evaluated position type and prediction of eruption for 70 mandibular third molars. The raters accurately predicted eruption or impaction 47 times (67%) when they did not have space analysis and 48 times (68.5%) when they had space analyses. While the evaluators did not agree on all the questions, the overall kappa analysis showed good agreement.

Conclusions: Eruption of developing mandibular third molars cannot be accurately predicted in all case scenarios using panoramic radiographs.

Future Directions: Based on this is pilot study, a larger data set with more evaluators could help in understanding if the eruption/impaction pattern can be predicted to facilitate early intervention when needed.

Supported by: The School of Dental Medicine's Summer Research Program

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Changes in Serum Levels of an Inner-Ear-Specific Biomarker, Otolin-1, in Ovariectomized Rat Model of Estrogen Deficiency

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Benign paroxysmal positional vertigo (BPPV) is a significant cause of falls and fractures in elderly patients.[1] BPPV is believed to result from degeneration of otoconia in the inner ear. Recently, our lab proposed and offered proof of concept to support the use of an otoconia scaffolding glycoprotein, otolin- 1, as a serum biomarker for otoconia degeneration.[2] A strong association between osteoporosis and BPPV has been reported, however, due to high prevalence of osteoporosis, the significance of this association is not clear.[4-8] To investigate the relationship between osteoporosis and otoconia degeneration, we hypothesized that otolin-1 levels are influenced by estrogen deficiency. To test our hypothesis we used the well-established ovariectomized (OVX) rat model. Twenty-four adult female Wistar rats were randomly subjected to receive bilateral ovariectomy (OVX, n=12) or a sham operation (SHAM, n=12). Four groups of rats separated into two cohorts; cohort A (OVX, n=6; SHAM, n=6) was euthanized at three weeks post-surgery and cohort B (OVX, n=6; SHAM, n=6) was euthanized at six weeks post-surgery. Several metrics were used to assess the success of OVX in rats including uterine weight and bone density. We found significant changes in dry uterine weight (mg) between animals at three weeks (OVX= 78 +/- 21, n=6; SHAM= 125 +/- 9, n=6) as well as at six weeks post-surgery (OVX= 33 +/- 4, n=6; SHAM= 114 +/- 8, n=6). In addition, the femur BMD (g/cm3) showed significant changes between animals at three weeks (OVX= 0.189 +/- 0.004, n=6; SHAM= 0.198 +/- 0.005, n=6) as well as six weeks post-surgery (OVX= 0.186 +/- 0.007, n=6; SHAM= 0.197 +/- 0.006, n=6). The results of our ELISA were of particular interest. Average serum otolin-1 levels (pg/mL) decreased from baseline (OVX, n=12, 215.5; SHAM, n=12, 215.8) to the three weeks post-surgery (OVX, n=6, 153.7; SHAM, n=6, 136.6). Average otolin-1 levels also decreased from baseline to the six weeks post-surgery (OVX, n=6, 184.9; SHAM, n=6, 156.8). Otolin-1 levels were higher in OVX rats than SHAM rats at three weeks and six weeks post-surgery, and levels increased during those three weeks more in OVX (31.2 pg/mL increase) than SHAM rats (20.1 pg/mL increase). The main finding of this study is that otolin-1 levels of both OVX and SHAM subjects decreased at 3 and 6 weeks, postoperatively. These results suggest that estrogen deficiency may not be the main factor that influences otoconia status and that other, yet to be identified, factors may be contributing to the changes in otolin-1 blood levels. Elucidating these influences will help better understand the pathophysiology of BPPV and eventually its management.

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Barriers Contributing to Delayed Antenatal Care in Guam

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Background: Antenatal Care (ANC), an essential component to a healthy pregnancy, is most effective when initiated within the first trimester. Guam ranks lower than the US national average for timely initiation of antenatal care, with 56% of patients at public health clinics in Guam receiving delayed ANC. This number was found to be even higher in specific island populations, such as the Chuukese with a rate of 60% not receiving ANC until at least the second trimester [1].

Methods: To determine the specific barriers that are contributing to this discrepancy, a verbal questionnaire was administered over a 2 month period at the Northern Regional Health Community Clinic in Guam, the site that provides a majority of health care for low income and at-risk women. A Likert-based instrument focused on four broad categories of barriers that have been shown to have impact on ANC rates: structural, maternal attitudes, maternal knowledge and societal barriers. Additionally, there was open-ended questions to dialogue about the patient's knowledge of antenatal care.

Results: 98 women of reproductive age, both pregnant and non-pregnant participated, 46% of which were Chuukese and 77% had been pregnant previously. When discussing past pregnancies, societal barriers were reported to be the biggest contributor to delayed ANC, specifically transportation (35%) and financial constraints (15%). Structural barriers were reported to most likely hinder future access to ANC, especially cost of treatment (35%) and language barriers (21%). Women reported confidence in their knowledge about the importance of antenatal care and of the interventions involved in ANC. However, this was contradicted by 17.9% of respondents disagreeing with the statement "Going to the doctor while pregnant stops mothers from passing diseases to their babies". Additionally, significant gaps in understanding were identified through qualitative opened-ended questions. When comparing the Chuukese to non-Chuukese patients there was significant difference in maternal knowledge ($p=0.05$) and structural barriers ($p=0.022$), specifically the language barrier patients face ($p<0.001$).

Conclusions: These results suggest that minority women requiring ANC services in Guam have high rates of structural and societal barriers preventing appropriate timing of ANC. Minority women may have misperceptions of the appropriate time to seek ANC. A major point of concern relates to a limited understanding of STD risks to the infant and high rates of STDs among the island population. One limitation of this study was a language barrier that was only partially breached with family interpreters due to low health literacy. Based on these findings, Guam's public health clinics may best address antenatal care outcomes by focusing interventions on access to transportation, structural barriers including language and cost of treatment, and educational campaigns to bridge knowledge gaps that patients may often not be aware.

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Effect of Seizure Auras on Mood in Epilepsy: the ESAME Survey

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Since the time of Hippocrates, the association between epilepsy and psychiatric comorbidity has been well documented[1]. Current scientific literature suggests that between 5.9 and 64.1% of persons with epilepsy (PwE) have at least one psychiatric comorbidity[2]. Among these, depression has the highest prevalence[3]. Many patients will experience a sensory or experiential warning preceding their seizure. This is known as an aura[4]. Uncertainty and fear are noted as the two largest stressors associated with epilepsy and have a negative impact on quality of life[5]. Therefore, this study aims to determine whether the presence of seizure auras is related to psychiatric comorbidity and quality of life in PwE. We hypothesized that an aura would reduce uncertainty and improve mood as compared to PwE who do not experience auras. The study was conducted at UConn Health Neurology Clinic. Adult patients with self-identified epilepsy who presented for treatment were offered an anonymous survey. Forty open and close-ended questions addressed demographics, seizure and aura characteristics, and headache auras. Psychiatric and quality of life screens included PHQ-9, GAD-7, PRIME and QOLIE-10. The study was approved as exempt research by the UConn Health Institutional Review Board. Data was collected on paper and entered in the REDCap database for statistical analysis in SAS. Differences were considered significant at $p < 0.05$. The first 36 responses were reviewed. Median age was 33; 17 were women. Seizures had been present for a mean of 15.5 years. Four patients reported non-epileptic seizures in addition to epilepsy. Reported seizure types included generalized (8), focal (4), other (3) and "don't know" (14). 25/34 (73.5%) reported an aura prior to their seizure. 17/25 (68%) reported an aura most of the time or every time prior to a seizure, and 21/25 (84%) reported auras without seizures. 11/25 (44%) reported they could sometimes prevent seizures from happening after an aura. 14/24 (58%) were more anxious a seizure would occur after an aura, while 20/24 (83%) reported that auras were sometimes helpful. Presence of an aura did not correlate with PHQ-9, GAD7, PRIME or QOLIE-10 scores. Overall, this data suggest that while auras were common in our epilepsy clinic population, they did not correlate with established screening indicators of depression, anxiety, psychosis or epilepsy-related quality of life.

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The Identification Of Serine And Phosphorylated Dihydroceramide Lipids On Extracted Human Primary Teeth

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Background: Permanent human carious teeth with pulpal necrosis or periodontal disease teeth have been shown to be contaminated with serine lipids (Lipid 654 and Lipid 430) and other dihydroceramide lipids, which are produced by *P. endodontalis* and *P. gingivalis*. These lipids may be important in the bone loss associated with endodontic and periodontal diseases[1,2].

Objective: This investigation sought to determine whether these bacterial lipids could be recovered on primary human teeth.

Methods: For this project, 25 exfoliated primary human teeth served as control teeth, and 75 primary teeth extracted due to caries were collected and divided between 3 tubes. Three permanent teeth were included: one with a prosthetic crown and no apparent subgingival calculus or attachment loss, and two additional permanent teeth with abundant subgingival calculus on the root surfaces. Total lipids were extracted from these teeth using a neutral phospholipid extraction procedure of Bligh and Dyer followed by re-extraction with chloroform after adjusting the pH of the aqueous phase to approximately 3.0 with the addition of acetic acid. The lipid extracts were combined and dried under nitrogen, then aliquots of each lipid sample (1 mg) were dissolved in 100 µL of methanol and analyzed using a Waters Acquity™ system, including a UPLC® interfaced to an electrospray-MS/MS system (LC-ESI-MS). For comparison, the total lipids of *P. gingivalis* were extracted using the Bligh and Dyer phospholipid extraction method and the *P. gingivalis* total lipids were fractionated using semi preparative HPLC; an aliquot of each HPLC fraction was evaluated with LC-ESI-MS for the characteristic novel lipids of *P. gingivalis* and Bacteroidetes bacteria.

Results: The primary bacterial lipid recovered in primary teeth was Lipid 654 and the teeth were also contaminated with phosphoethanolamine dihydroceramide (PE DHC). The permanent tooth with a prosthetic crown and no apparent subgingival calculus was not significantly contaminated with bacterial lipids; however, the permanent teeth laden with subgingival calculus were contaminated with substantial amounts of unsubstituted phosphoglycerol dihydroceramide lipids (unsub PG DHC) compared to substituted (sub) PG DHC lipids. In the HPLC fractions of *P. gingivalis* lipids, sub PG DHC lipids were more prevalent than the unsub PG DHC. All other bacterial lipids were recovered in minor amounts on permanent teeth with subgingival calculus. The PG DHC lipids were not recovered in substantial amounts on primary teeth.

Conclusions: These results suggest that the organisms recovered on primary teeth do not make the bacterial lipids characteristic of those recovered on periodontitis-afflicted teeth laden with calculus. Furthermore, these results suggest that either the organisms associated with subgingival calculus or mammalian enzymes may be responsible for converting the sub PG DHC lipids to unsub PG DHC lipids.

Future Directions: Future research will be directed toward understanding why specific bacterial lipids of Bacteroidetes bacteria accumulate with specific distributions on periodontally diseased teeth.

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The Role of Insurance Type on the Presentation of Cubital Tunnel Syndrome

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Purpose: Despite significant progress in increasing access to health care services, barriers continue to exist. [1,2] The obstacles are multifactorial, of which health insurance status has been cited as an important factor. In the setting of cubital tunnel syndrome (CuTS), delays in diagnosis can have potentially permanent and devastating effects including sensory loss, muscle weakness, and atrophy of intrinsic hand muscles. [3] This study sought to evaluate the role of insurance type as a contributing factor to CuTS severity. We hypothesized that publically insured patients will have delayed presentation to the orthopedics office and more significant lesion severity.

Methods: Retrospective chart review was conducted for patients who underwent ulnar nerve decompression with or without subcutaneous anterior transposition at the elbow between December 2013 and January 2018 by a fellowship-trained orthopedic hand and upper extremity surgeon at our tertiary referral center. Insurance type, demographics, and measures of CuTS severity based on physical exam findings and electrodiagnostic testing were compared.

Results: The final study group consisted of 89 patients. Patients with public insurance had a 3.0 fold increased risk (95%CI 1.6-5.7, $p<0.01$) of presenting with advanced CuTS of at least McGowan Stage 2A compared to those privately insured. Motor and sensory amplitudes across the elbow were diminished, at 5.8±3.7μV and 18.8±13.0μV, in publically insured patients compared to 8.5±2.4μV and 32.9±23.2μV in privately insured patients ($p<0.01$, $p=0.02$). Patients with public insurance were symptomatic for longer prior to initial visit, on average 72.4±88.6 weeks, compared to 38.3±24.4 weeks for patients with private insurance ($p=0.03$). Publically insured patients received significantly more expeditious recommendation for surgery (13.7±17.6 weeks) as compared to privately-insured patients (25.2±32.2 weeks) ($p=0.03$).

Conclusion: Publically insured patients were significantly delayed in seeing an orthopedic surgeon for evaluation and treatment of CuTS compared to privately insured patients. This was likely a major contributing factor to their more severe clinical and electrodiagnostic findings. Insurance type therefore likely has clinically meaningful influence on the timely management of CuTS. Follow-up investigation is required to further elucidate contributory underlying socioeconomic barriers that publically insured patients with CuTS face.

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Psychological Distress Independently Predicts the Need for Inpatient Admission after Primary Total Joint Arthroplasty

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Abstract: Background: An important challenge in the evolving trend toward outpatient total joint arthroplasty (TJA) is appropriate patient selection. The purpose of this study was to investigate the effect of psychological distress on hospital length of stay (LOS) in modern day fast-track TJA. Hospital LOS represents a critical factor in controlling the cost of care and determining the admission status (inpatient vs. outpatient).

Methods: A retrospective of 863 patients who underwent primary TJA at a single tertiary academic center was performed. Two groups were compared: patients with or without psychological distress as previously defined using the Short Form-12 mental component summary. The primary outcome was the rate of hospital LOS exceeding 2 days. Secondary outcomes were rates of in-hospital complications and 90-day emergency room (ER) visits and readmissions. Univariate and multivariate logistic regression analyses were performed.

Results: The prevalence of psychological distress was 23%. The mean LOS was 2.44 days. Patients with psychological distress were younger ($p < 0.0001$) and more likely to have depression ($p < 0.0001$), lower educational attainment ($p < 0.0001$), smoke tobacco ($p = 0.003$), be Hispanic ($p = 0.001$), live alone ($p = 0.001$), and have higher rates of non-primary osteoarthritis ($p < 0.0001$). After adjusting for these differences psychological distress was an independent predictor of LOS > 2 days ($p = 0.013$ and 0.006 for THA and TKA respectively). There were no differences in the rates of in-hospital complications ($p = 0.534$ and 0.774 for THA and TKA respectively), ER visits ($p = 0.547$ and 0.348 for THA and TKA respectively) or readmissions ($p = 0.534$ and 0.774 for THA and TKA respectively)

Conclusion: Psychological distress is an independent predictor of prolonged hospitalization after primary, unilateral TJA. The SF-12 MCS is a good screening tool for identifying patients with poor mental health who may not be appropriate candidates for outpatient TJA. Efforts to address psychological distress before surgery are warranted.

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Understanding Provider Attitudes and Knowledge of the HPV Vaccine and Their Perceived Barriers to HPV Vaccine Initiation

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Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the world,[1] and it causes large percentages of common cancers [2]. Despite a safe and effective vaccine, HPV vaccination rates are below targets[3]. The uptake of the HPV vaccine has been one of the most perplexing challenges facing primary care providers in the US. Despite the fact that the vaccine has been proven safe and effective, coverage of the HPV vaccine among American adolescents is still only at 50% for females and 38% for males of the goals set by Healthy People 2020[3]. Studies have shown that a strong provider recommendation is the most effective method for increasing HPV vaccine uptake, and all current techniques recommended to increase uptake rely on providers changing the way they approach the conversation surrounding the HPV vaccine [4]. Additionally, there is evidence that beliefs held by providers regarding barriers to vaccination impact the vaccination rate of their patients. There remain barriers to implementing sustained, standardized changes to the nature of the discussion around HPV vaccination in outpatient clinics[5,6], and barriers to vaccination perceived by providers may prevent actual vaccination[7]. Since 81% of new HPV infection-associated cancers could be prevented by HPV vaccination [2], there is an urgent need to close the gaps between HPV vaccination rates and their targets. While there is much known about parental knowledge gaps around the HPV vaccine and their means of motivating HPV vaccination decisions[8,9], the perception of barriers by providers is not well-studied.

This research study aims to reveal some of the most common barriers perceived by providers against HPV vaccine initiation. We will survey a broad group of providers serving a diverse array of patients in pediatrics, family medicine, and adolescent medicine practices across the state of Connecticut. With knowledge of the most commonly perceived barriers to HPV vaccination, we will be able to more effectively target HPV training and education for providers. We will also conduct a retrospective chart review of patients seen by the providers who respond to the survey to determine if there is any association between the perception of certain barriers by a provider and actual vaccine initiation rate of his/her patients. We hypothesize that there will be associations between certain perceived barriers and vaccine initiation rate. The goal is to help focus provider education efforts to most effectively improve HPV vaccination rates.

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References: For full list of references, please scan QR code below.

Prevalence of Toxocara canis, Toxocara cati, and Baylisascaris procyonis in Public Playgrounds in Hartford, Connecticut

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Introduction: Toxocara canis, Toxocara cati, and Baylisascaris procyonis are nematodes carried by Canidae (dogs), Felidae (cats), and Procyonidae (raccoons), respectively. Hosts defecate, releasing roundworm eggs into the soil. Juvenile worms cause significant disease when humans ingest eggs.1 Toxocara infection has been linked to diminished lung function, increased asthma risk, cognitive changes, and adverse neuropsychological effects.1 Nearly all human infections of baylisascariasis have resulted in death or permanent neurological sequelae.2 Children are particularly vulnerable to infection as soil is often contaminated in areas where children frequent, such as playgrounds. Toxocara spp. eggs in urban public parks are common in most countries regardless of the development status. The National Health and Nutrition Examination Survey (NHANES) found increased seropositivity to be associated with lack of health insurance among children.3

Methods: Soil samples were collected from 13 public playgrounds in Hartford, CT from June through August 2018. Samples were tested by a centrifugation and flotation technique. Eggs were examined under light microscopy to determine whether Toxocara or Baylisascaris was present in the sample. The sample was considered positive if one Toxocara or Baylisascaris egg was present. Playgrounds for sampling were chosen by overlaying playgrounds, as provided by the superintendent of parks for the city of Hartford, on a map of median income by 2010 census block group created using Geographic Information System (GIS). Playgrounds were selected in a range of income levels and to cover all areas of the city.

Results: Toxocara and Baylisascaris eggs were not identified from any playground samples. Nematodes that are non-pathogenic to humans were identified in 13/13 (100%) of playgrounds. Nematode eggs were identified in 24/44 (55%) of samples with 21/44 (48%) of samples containing free-living nematodes.

Conclusion: Toxocara and Baylisascaris are important human pathogens and are of particular concern to young children. Although these nematodes were not isolated in this project, the results demonstrate that it is possible to isolate nematode eggs from a playground soil sample. The study provides a methodology that can be followed for future investigations into the presence of nematodes in environmental samples. A future study with more robust sampling of the playgrounds will provide a more accurate understanding of the presence of Toxocara and Baylisascaris in public playgrounds in Hartford, CT.

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Cellular Specification of Connexin 45 in the Developing Human Fetal Brain

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Lifelong neurodevelopmental disorders, such as autism, schizophrenia, and cerebral palsy, may be brought on by suboptimal spontaneous electrical activity in the embryo or fetal brain [1-3]. Initial spontaneous depolarizations of postmitotic neurons in the fetal brain precede the sustained plateau depolarizations necessary for the development of adult patterns of neuronal connectivity and function [4,5]. The precise mechanism of these initial spontaneous depolarizations is unclear, but recent evidence suggests that connexin (Cx) hemichannels play a key role [5]. The primary aims of this study were to (1) determine the antigen specificity of human subplate (SP) neurons for Nurr1, (2) characterize the distribution, localization, and orientation of Nurr1- and Cx45-positive cells and (3) determine the percentage of Nurr1-positive cells that express Cx45 in five cortical zones between 16-23 gestational weeks (gw). I performed IHC on paraformaldehyde-fixed brain sections. The first group of sections, obtained at 16-23 gw, were co-labeled against Nurr1 and neuronal marker Neun to identify the ontologically oldest (pioneer) SP neurons. Sections from the same human subjects were then labeled against neuronal/glial markers (Nurr1/Vimentin) and connexin isoforms Cx45 or Cx26. Imaging was done with confocal or apotome microscopy. The mean number of cells per unit of surface area and S.E.M. was calculated for each cell type in each zone at each gestational age. Cell location, morphology, Nurr1 and Neun coexpression revealed the identity, distribution and density of pioneer subplate neurons (Aim 1). Nurr1 expression was greatest in the lower subplate (SP-l) at 16 gw and in the upper subplate (SP-u) at 17-18 gw. Cx45 expression was greatest in the SP-u at 16-18 gw and in the cortical plate (CP) at 22-23 gw (Aim 2). The percentage of Nurr1-positive cells expressing Cx45 was greatest in the CP at 16 gw and in the intermediate zone (IZ) at 17-18 gw (Aim 3). The coexpression of Cx45 and Nurr1 in the IZ at 17-18 gw supports the theory that connexins contribute to neuronal migration, while the high expression in the CP at 16 gw supports our hypothesis that Cx45 contributes to spontaneous depolarizations in the CP. Future studies should investigate the expression of Cx45 and other hemichannel-forming isoforms, such as Cx26 and Cx36, in several cell subclasses (excitatory pyramidal neurons, inhibitory interneurons, radial glia cells and astrocytes) to explore the role of connexin isoforms in neuronal migration and spontaneous depolarizations.

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Antibiotic Prescribing in Outpatient Dental Practice

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Objective: Antibiotic prescribing has received increasing focus in recent decades due to rising antimicrobial resistance and recognition of adverse drug events 1. Research efforts have proven effective for targeting antibiotic stewardship interventions among physicians 2. Few studies have been published describing antibiotic prescribing in an outpatient dental practice setting 3. Our goal was to describe the prescribing practices of dental providers within the University of Connecticut Outpatient Dental Clinics and identify potential opportunities to improve prescribing.

Methods: A retrospective descriptive analysis of all antibiotic prescriptions by dentists over a three-month period was performed. Manual chart review was used to collect information on prescriptions, including: Prescription specifics, therapy duration, patient comorbidities, presenting symptoms, diagnosis, and dental interventions.

Results: Of the 616 unique prescriptions reviewed, 449 (72.9%) were prescribed for treatment and 167 (27.1%) for prophylaxis. Among all prescriptions, penicillin class antibiotics were prescribed most frequently, consisting of 366 (82%) and 147 (88%) prescriptions for treatment and prophylaxis respectively. The mean prescription duration was 7 days (range 3 – 21 days) for treatment, and 4.36 days (range 1 – 10) for prophylaxis indications; with 7 days the most frequently prescribed therapy duration. 220 (49%) treatment prescriptions were prescribed in conjunction with a dental intervention that day, with extractions being the most common intervention (126, 57.23%). 105 (37.5%) treatment prescriptions without a dental intervention received a referral to the appropriate healthcare provider. A little over a quarter of treatment prescriptions (124 ,27.62%) did not receive an intervention nor a referral at the time of prescribing. Antibiotic allergies were frequently observed with beta-lactam allergies being the most common. How a patient reacts to an allergen however, was not routinely documented. Clindamycin was the second most commonly prescribed antibiotic (74 prescriptions). Of these prescriptions, 20 (27%) did not have a documented penicillin allergy, and only 9 of those 20 prescriptions clarified the decision to prescribe clindamycin.

Conclusions: Dentists are frequent prescribers of antibiotics in outpatient settings. While 7 days was the most common therapy duration, there was significant variability. Clindamycin was frequently prescribed, including among patients without a documented penicillin allergy and details regarding antibiotic-related allergies were limited. There may be opportunities to improve provider prescribing and allergy documentation. The variability of duration of antibiotic prescribing for prophylaxis and treatment highlight the need for more prescribing guidelines for dentists.

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Recovery of Lipid 342 from Murine Bone Marrow Macrophages after Treatment with Lipid 654: a Potential Virulence Factor of Porphyromonas gingivalis

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Background: Chronic periodontitis is a progressive disease that is characterized by an inflammatory response to bacterial products resulting in the loss of periodontal tissue attachment and alveolar bone. It has been previously shown that the total lipid extract of the periodontal organism Porphyromonas gingivalis inhibits osteoblast-mediated bone formation and can promote osteoclast mediated bone resorption, and these effects require Toll-like receptor 2 (TLR2) engagement (1). The serine/glycine dipeptide lipids, including Lipid (L)654, L567, L430, and L342, named by their respective masses, have been identified in Prophyromonas gingivalis. Previous unpublished experiments have shown the L342 stimulates TNF-α release from murine bone marrow macrophages through engagement of TLR2.

Objective: Since L342 levels are substantially elevated in diseased periodontal tissues, the present investigation sought to determine whether murine bone marrow macrophages hydrolyze L654, L567 and L430 precursor lipids to form L342.

Methods: Murine bone marrow macrophages (BMM) isolated from either wild type or TLR2 knockout animals were treated for 24 hr with the following lipid extracts from P. gingivalis: total lipid extract, L654, L567 and L430. After 24 hr of lipid treatment, the cells and their respective media samples were extracted for lipids using an acidic chloroform:water (1:1, v/v, pH 3.0) extraction method. The isolated lipids were derivatized to form pentafluorobenzyl ester, trimethylsilyl ether derivates which were subsequently analyzed for L342 levels using negativeion gas chromatography mass spectrometry (GC-MS). After establishing the normalcy of the data, the results were analyzed using an ANOVA with pairwise comparisons (Fischer LSD).

Results: L342 was significantly elevated in media samples when BMM were treated with L654 or L567, and the elevated recovery of L342 was not dependent upon the TLR2 expression. The BMM cells treated with either the total lipid extract or L430 showed slightly increased release of L342, but the effect was not statistically significant. Culture medium supplemented with L654 or L567 without BMM cells, as well as cultures containing BMM cells not treated with bacterial lipids, were negative for Lipid 342. These results show that murine BMM can hydrolyze specific serine/glycine dipeptides to L342, and this process is not dependent upon TLR2 activity.

Future Directions: Future experiments will determine whether human gingival epithelial cells, gingival fibroblasts, and macrophages differentiated from peripheral monocytes hydrolyze L654 and L567 into L342 as a mechanism to explain the elevated levels of L342 in diseased periodontal tissues.

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Emergency Department Usage Prior to Pregnancy is Associated with Use Postpartum

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Introduction

Improvements of care during the 90days postpartum ("4th trimester") is needed. Only 50% of women return for their postpartum visit. Several factors are associated with suboptimal postpartum care. We evaluated what factors are associated with Emergency Department usage during the 4th trimester.

Methods

We compared women who visited the ED within 90 days postpartum (cases) to women who did not visit the ED (controls) from an urban hospital-based clinic. Variables evaluated include: age, marital status, race, gestational age, parity and visits to the ED during the year prior to conception. We performed regression analysis to determine independent variables associated with ED usage 90 days postpartum.

Results

There were 190 cases (14.8% of 1297); of cases, 47.3% visited the ED during the first 3 weeks postpartum for primarily nonemergent diagnoses. Two variables were significant ($P=<0.05$). Women with cesareans were more likely (OR=1.77, 95% CI: 1.29-2.42) to visit the ED 90 days postpartum. Women who visited the ED in the year prior to conception were 2 times more likely (OR=2.00, 95% CI: 1.45-2.75) to have any ED visit in the 90 days postpartum compared to controls. Furthermore, frequent ED users (defined as ≥3 visits/yr) were 3 times more likely (OR=2.94, 95% CI: 1.84, 4.62) to visit the ED postpartum.

Conclusion/Implications

We established that women who are frequent ED users prior to pregnancy are more likely to continue that usage during the postpartum period. Understanding individual risk factors is important as initiatives and care plans are developed during pregnancy for preemptive education and follow-up planning.

References:

A Survey Study of Resident Experiences of Sexual Harassment during Dermatology Training

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Objective: Sexual harassment encompasses a wide range of verbal and nonverbal behaviors, including gender harassment, unwanted sexual attention, and sexual coercion.1 It is a widespread problem in academic medicine2 and occurs across all specialties.3 However, there is limited data on sexual harassment in dermatology specifically. Our objective was to assess attitudes towards and experiences of sexual harassment among current U.S. dermatology residents.

Methods: We developed an anonymous, online survey addressing 16 behaviors adapted from the previously validated National Academies of Sciences Engineering and Medicine/Administrator-Researcher Campus Climate Collaborative Campus Climate Survey.1 IRB approval was obtained prior to distributing the survey via the Association of Professors of Dermatology listserv. Listserv members were asked to forward the survey to their residents, and all current U.S. dermatology residents who received the survey were eligible to participate. Multivariable logistic regression was performed to model the impact of demographic variables on sexual harassment.

Results: 106 surveys were received. 55/99 respondents (55% [95% CI = 0.44, 0.65]) felt that sexual harassment was "definitely" or "probably" a problem within dermatology residency programs, and 60/105 (57% [95% CI = 0.47, 0.67]) reported experiencing at least one of the behaviors addressed in the survey. Controlling for race and age, the odds of experiencing sexual harassment were 3.5 times higher for women than men (Adjusted OR = 3.5 [95% CI = 1.4, 8.8]). Of 154 incidents reported in the survey, 99 (64% [95% CI = 0.57, 0.72]) involved sexist hostility/gender harassment, 40 (26% [95% CI = 0.19, 0.34]) involved sexual hostility/crude gender harassment, and 15 (10% [95% CI = 0.03, 0.18]) involved unwanted sexual attention. The majority of incidents involved patients (99/154 incidents, 64% [95% CI = 0.57, 0.72]) and faculty or fellow residents (31/154, 20% [95% CI = 0.13, 0.28]). Only 8/95 (8% [95% CI = 0.04, 0.16]) events of sexist hostility/gender harassment were reported, despite almost half of residents (46/99, 46% [95% CI = 0.36, 0.57]) indicating they were negatively impacted.

Conclusions: Similar to other specialties, sexist hostility and gender harassment during dermatology training are prevalent and underreported. Harassment events in our survey disproportionately affected women and were rarely reported to an authority figure, despite almost half of residents reporting a negative impact. Surprisingly, harassment by patients was widespread. Despite a small sample size, we believe this study is a valuable preliminary look at sexual harassment during dermatology training and reveals key areas of focus for future research.

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Altered Development of SMAD4-deficient Dendritic Cells

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Objective: The goal of this study is to gain further understanding of the role of signaling pathways used by members of the TGF-beta cytokine family play in development and functioning of dendritic cells. Previous studies have shown that TGF-beta is important for retention of resident memory CD8+ T cells in the lung by inducing CD103 expression (alpha E beta-7 integrin) and it may also affect dendritic cell functioning. The hypothesis states that, without proper functioning of the TGF-beta signaling pathway, dendritic cells will undergo spontaneous maturation and development.

Methods: The methods will involve knocking out the dendritic cell's ability to respond to the TGF-beta signal to determine the resulting effects on dendritic cells in mice. SMAD4 or ALK5 were removed in knockout mice using the Cre-Lox system under the CD11c promoter, which is expressed in all dendritic cells. The effects on the dendritic cells in knockout mice were analyzed using flow cytometry.

Results: SMAD4 and ALK5 ablation both caused significant defects in dendritic cell development, showing changes in development of dendritic cell subsets expressing CD103 and CD11b. Analysis of the markers for maturation showed phenotypes of only partial maturation of the mutant cells.

Conclusions: TGF-beta plays a significant role in the development of dendritic cell subsets, as well as for normal maturation.

Future Directions: These experiments were preliminary, as they were carried out on small cohorts of mice (2-3). Replication of the above methods on larger cohorts would allow for statistically significant conclusions on the role of TGF-beta signaling on the development of dendritic cells.

Evaluation of the Reliability of a New Low Dose CBCT Acquisition Protocol in Diagnosing Impacted Canines: An Ex-vivo Imaging Study.

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Background: Permanent canines are the second most commonly impacted teeth after third molars with females being affected twice as much as males (Grover et al.). Impacted canines can be located buccal, palatal or mid-alveolar and further be placed mesially, distally, horizontal, or inverted. Traditionally, permanent canines are radiographically localized using Clark's method where a straight periapical radiograph of the area of interest/canine is taken, then the tube is shifted either mesial or distal to take a second radiograph. Another approach to localize an impacted canine could use a panoramic radiograph. Both of these 2D methods do not adequately depict the location of the tooth. To be able to localize the canine correctly is important for surgical exposure for further orthodontic treatment. More adequate imaging is 3D imaging in which a 360 degree Cone Beam CT (CBCT) is generally used, however, a different protocol using a 180 degree technique can reduce the radiation dose by 40%. This is important as it would limit the exposure of radiologically sensitive organs in the head and neck region.

Objective: The objective of this study is to evaluate the location of the impacted canine by comparing a low dose 180 degree CBCT protocol and a conventional 360 degree acquisition protocol.

Methods: Thirteen dentate or partially dentate human skulls provided fifty sample sites for impacted canines. Impaction of canines was simulated by attaching natural human teeth to the bone. Soft tissue simulation was done by lining the bone with Play-doh prior to any imaging to simulate a real life clinical scenario. All skulls were imaged using four imaging modalities: periapical radiograph, panoramic radiograph, 180 degree CBCT, and 360 degree CBCT. One oral and maxillofacial radiologist and an orthodontist analyzed the images for the location of the canines. True gold standard was a master list that had the actual position/location of the impacted tooth.

Results: Three-dimensional imaging was more reliable at predicting the location of the impacted tooth when compared to both the 2-D imaging methods. There was no significant difference between the low dose 180^0 CBCT protocol and the conventional protocol in evaluating the location of impacted canines. Inter rater reliability was calculated using kappa analysis and there was a very high inter rater agreement.

Conclusions: In this ex-vivo study using a small sample size, 3-D imaging using the modified low dose CBCT protocol was reliably able to predict impacted canines.

Future Directions: Future studies could look at the use of this low dose 180^0 CBCT protocol in evaluating patients with canine and molar impactions.

Supported by: The School of Dental Medicine's Summer Research program.

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Intact Mouse Model to Determine Bioavailability of Phosphorus From Infant Formulas

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Introduction: A recent retrospective review identified more than 50 infants and children with hypophosphatemia who had taken Neocate.[1] In nearly all cases reduced renal Pi (Pi) excretion was evident, indicating appropriate renal conservation of Pi; marked elevations in alkaline phosphatase activity (and development of overt rickets in some cases) is evidence for appropriate release of Pi stores from bone matrix. Thus, compromised gastrointestinal Pi absorption appears to have occurred in a small number of children with complicated disease who were fed Neocate. Although underlying disease appears to be a factor, the positive response to formula changes in 25% of the cases led to the hypothesis that bioavailability of Pi may be impaired in Neocate under certain conditions. This summer research sought to determine, whether a new Neocate formula is able to reverse hypophosphatemia induced with low-phosphate diet (LPD), whether calcium, sodium and potassium salts of phosphoric acid show differences in bioavailability, and whether bioavailability is influenced by treatment of mice with antacids.

Method: We developed a mouse model to evaluate Pi bioavailability using parameters of Pi homeostasis. 45-day old males (n=45) were fed an egg-white based low Pi diet (LPD) containing 0.6%Ca, 0.02%Pi ad libitum for two weeks. At 60 days of age, 15 mice continued LPD, 15 mice were switched to egg-white based control diet (COD, 0.6%Ca, 0.3%Pi), and 15 mice were switched to an amino acid-based diet (AAD, 0.6%Ca, 0.4%Pi) and administered the proton pump inhibitor pantoprazole (40 mg/Kg/d). Diets were matched for caloric content. Spot urines were collected at 60, 64, 67, 70 days of age, and at day 74. Mice were sacrificed for urine and terminal blood collections.

Result: Pi/creatinine was not significantly different among the three groups. Urine Pi/creatinine peaked at day 70 in AAD and COD fed mice, with little change in LPD fed mice. At day 74, AAD and COD comparably restored plasma Pi and urine Pi/creatinine (table). Mice gained less weight on AAD and LPD when compared to COD diet. Pantoprazole expectedly raised stomach pH in mice. Our findings suggest that Pi bio accessibility measured in our in vitro models translates well into Pi bioavailability in mice.

Conclusions: The amino acid-based formula tested could restore parameters of phosphate homeostasis even with neutralized stomach PH.

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CHOP Depletion Reduces IL-23 Expression and Increases Autophagy in HLA-B27+ Macrophages

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Spondyloarthritis (SpA) is an immune-mediated inflammatory disease of the axial skeletal, skin, gut, and eyes affecting 1% of the population. Current treatment with TNFα-inhibitors is effective in treating the disease-associated inflammation, but does not prevent structural disease progression to spinal fusion. Studies on the genetic susceptibility for SpA indicate that ninety percent of patients are positive for the MHC class I allele HLA-B27. The HLA-B27 protein has a tendency to misfold and accumulate in the endoplasmic reticulum (ER) and on the cell surface as disulfide-linked dimers. ER accumulation can generate stress resulting in an unfolded protein response (UPR), while cell surface complexes have been implicated in triggering killer immunoglobulin receptors (KIRs) on CD4+ Th17 T cells. The UPR promotes pro-inflammatory cytokine production and may be critical for disease development. A transcription factor in the UPR, CHOP (C/EBP (CCAAT/enhancer binding protein) homologous protein), promotes cell death via promoting oxidative stress, inflammation, and proapoptotic factor production. In this study we investigate the effect of CHOP knockout in HLA-B27 positive MCSF-derived rat macrophages on the inflammatory response, UPR, and autophagy. Following stimulation with LPS, Thapsigargin, and IFN-γ, PCR was used to evaluate inflammatory response via IL-23 expression and UPR via Bip expression and Xbp1 splicing. Western blot was used to measure change in LC3B-II expression, a surrogate for autophagy, following stimulation with Bafilomycin A1 or Rapamycin. Results indicate that CHOP depletion result in a decrease in IL-23 expression and UPR when stimulated via Thapsigargin and LPS, as well as an increase in activated, but not steady-state, autophagy. Together these results suggest that CHOP inhibition might be a new therapeutic tool for treatment of SpA.

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Evaluation of the Antibacterial Effect of the Chemotherapeutic 5-Fluorouracil Against Oral Microorganisms

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Background: 5-fluorouracil (5-FU) is an anti-metabolite drug widely used either alone or as a foundational therapeutic in combination treatment regimens for a range of cancers. 5-FU exerts its anticancer effects through inhibition of thymidylate synthase (TS) and incorporation of the drug metabolites into RNA and DNA. Previous work from our laboratory showed chemotherapy decreases bacterial load in saliva and changes the composition of the oral microbiome. These changes were associated with the total dose of 5-FU and with the development of oral mucositis, with the microbiome emerging as a potential contributor to mucositis pathophysiology.(1) Therefore, it is important to better understand the causes of loss of homeostasis between the oral microbiome and the adjacent mucosa during cancer treatment.

Objective: The aim of this study was to explore whether oral microbiome disruption during chemotherapy could be related to a direct antibacterial effect of 5-FU. It is hypothesized that 5-FU exerts a direct antibacterial effect on microorganisms seen as depleted during chemotherapy.

Methods: The following microorganisms depleted during chemotherapy were tested for their in vitro susceptibility to 5-FU: Streptococcus salivarius ATCC 13419, Streptococcus salivarius ATCC 25975, Streptococcus salivarius ATCC 9222, Streptococcus parasanguinis F0449, Veillonella atypica ATCC 17744 and Veillonella rogosae F0412. The strain Fusobacterium nucleatum ATCC 49256 was chosen to represent a species enriched during chemotherapy and therefore potentially resistant to 5-FU. Microorganisms were grown to mid-exponential phase. Normalized cultures containing approximately 108 cells/mL were exposed to 7.7uM, 77uM, and 770uM and their viability assessed after 2 hours via serial dilution and plating, in comparison to a control (vehicle). The longitudinal growth of Streptococcus salivarius ATCC 9222 and Fusobacterium nucleatum ATCC 49256 in the absence and presence of 5-FU was also evaluated by measuring change in Optical Absorbance (600 nm) over time.

Results: After a 2-hour incubation with 5-FU, only V. atypica and a strain of S. salivarius showed decreased viability. Other commensals depleted during chemotherapy were resistant to killing by 5-FU even at high drug concentrations. F. nucleatum showed susceptibility to killing by 5-FU at the 77uM, and 770uM concentrations. Evaluation of the ability of 5-FU to inhibit the growth of S. salivarius and F. nucleatum showed that even high concentrations of 5-FU did not completely inhibit S. salivarius, while the growth of F. nucleatum was inhibited by all concentrations tested.

Future Directions: Future research will use fluorescently stained tissue sampled to quantify cellular apoptosis rates after exposure to 5-FU treatments.

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Analysis of Rate Monitor and Flow Control Devices for Gravity-Fed Intravenous Infusions

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Background: Delivery of precise doses of intravenous (IV) medication infusions is of particular importance for patient safety. It is well established that there are inaccuracies associated with gravity IV infusion systems (1-4). Notably, After an IV drip is initially set, the flow rate can fall out of its intended parameters (1,4). Infusion pumps are a "gold standard" for setting a constant flow rate for IV infusions, but their cost can be limiting for many organizations. Several affordable devices exist which are adjuncts to gravity-fed IV systems without pumps.

Objective: The goal of this study is to determine the reliability of the DripAssist infusion rate monitor (Shift Labs, Seattle, WA) and the Stat2 IV gravity flow control device (Conmed, Utica, NY), compared with a gravity fed IV set alone.

Methods: Saline solution was run through gravity-fed IV systems in three groups: gravity fed alone (control group), Stat2, and DripAssist. Each system was set to run at 120mL/hour for 30 minutes, with adjustments made as needed every 10 minutes. The outcome measure was the total amount of fluid collected over 30 minutes. Our sample of 34 trials for each system was set to achieve 80% power to detect a medium effect size.

Results: Target fluid collection was 60 mL for each group. Mean total volumes collected were: gravity alone 56.21 mL; Stat2 59.03 mL; DripAssist 59.03 mL. Analysis of Variance (ANOVA) revealed that there was a statistically significant difference between groups ($F_{(2,99)}=17.42$; $p<0.001$). Post-hoc testing by Tukey HSD revealed significant differences between Stat2 and control ($Q=7.229$; $p<0.01$); and between DripAssist and control ($Q=7.229$; $p<0.01$); but there was no significant difference between Stat2 and DripAssist ($Q=0.000$; $p=0.899$).

Conclusion: Our data suggest that both DripAssist and Stat2 were significantly more accurate at achieving the targeted IV infusion rate than gravity-fed IV sets alone. We did not find a significant difference between Stat2 and DripAssist. Although there was statistical significance, this may not translate to a clinical significance unless the systems were running over many hours or days.

Future Directions: The preliminary data presented here will be useful for future work evaluating these devices in prehospital transport settings where moving components may affect reliability.

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An Analysis of Oral Health Related Quality of Life in End Stage Renal Disease Patients

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Objectives: Periodontal disease is a significant problem in patients with End Stage Renal Disease (ESRD). [1,2] This study aims to examine how ESDR patients perceive their oral health related quality of life (OHRQoL). OHRQoL is a patient-based outcome that measures patient perception on how oral conditions affect various aspects of life; periodontal disease has been shown to negatively affect OHRQoL.[3] This study is designed to test the hypothesis that ESDR patients perceive their oral health as being poor, which we aim to correlate with clinical measures of periodontal disease.

Methods: The OHIP-14, a standardized questionnaire assessing oral health using an ordinal scale of never to always, was used to record the baseline OHRQoL scores of ESDR patients receiving periodontal treatment. Each patient also received a periodontal exam that evaluated clinical measures such as probing depth, presence of plaque, and bleeding on probing. For each question on the OHIP-14, the proportion of subjects answering never, sometimes, fairly often, very often and always, was calculated. Each of these ordinal answers was assigned corresponding values of 0-4, with higher scores indicating a perception of worse OHRQoL. Clinical measures were assessed by calculating the proportion of sites (6 sites per tooth) that had probing depth ≥ 5, presence of plaque, and bleeding on probing. Spearman's Correlation analysis was used to look for associations between OHIP scores and clinical measures.

Results: 24 patients were included in this study. Patients had an average of 25.3 teeth. The average proportion of sites with probing depth ≥ 5 was 0.19, the average proportion of sites with bleeding on probing was 0.26, and the average proportion of sites with plaque was 0.70. The average total OHIP score was 4.47, with 56 as the highest possible score. The majority of OHIP items negatively correlated with clinical measures, but had no significance.

Conclusions: Despite poor oral health by clinical measures, patients did not perceive poor OHRQoL as determined by the OHIP-14. Therefore, based on preliminary analysis, the OHIP-14 might not accurately reflect oral health perception in this population.

Future Directions: This preliminary data could be used as part of a larger study, examining if these patients perceive a change in their OHRQoL as they receive further periodontal treatment. The methods of administering the OHIP-14 may additionally be re-evaluated, or a different method of evaluating OHRQoL may be chosen.

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Investigating Contact Sports and Accurate Identification of Odors and Tastes

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Objective: The study of human chemosensory receptions is a complex and fascinating area of study. Taste and smell are vital functions enabling humans to respond to their environment.[1] In the world of contact sports, injuries to the face and head are unfortunately common.[2] This investigation explores the possibility that taste and smell have diagnostic relevance. We hypothesize that subjects with a history of contact sports will demonstrate diminished gustatory and olfactory accuracies.

Methods: Our methodology involves 24 human subjects performing a series of taste and smell tests, which we expect will be useful in tracing patient recovery from chronic traumatic encephalopathies. Volunteers among ages 23-28, all with varying experience in contact sports, perform accuracy tests based on the following stimuli: tasting salt, sugar, and 1:1 mixture solutions along with smelling juicy-fruit, spearmint, and 1:1 mixture smell stimuli. The results of the trials were recorded and examined for patterns or commonalities among the subjects. Statistical tests, including *t*-tests, were employed to analyze the quantitative results, compare the efficacy of salt and sugar as taste stimuli, and compare the efficacy of juicy-fruit and spearmint as smell stimuli.

Results: Across the subject population, 87.5% engaged in any form of sports while 66.7% specifically demonstrated a history of contact sports. Exactly 33.3% of subject respondents indicated a history of at least one previously diagnosed concussion. We found that individuals with a history of playing any sport had similar accuracy outcomes compared to those without a history of playing any sport. Though the average number of correct taste and smell identifications was marginally higher for those not playing any sports (100% accuracy vs. 95% accuracy), this difference was not found to be statistically significant. Moreover, when comparing the taste stimuli, both sugar and salt displayed correct response rates within a 1% difference. However, for the smell stimuli, spearmint was associated with a higher rate of correct subject responses when compared to juicy-fruit.

Conclusions: This investigation demonstrates the adaptability of human taste and smell abilities in that even those with a history of contact sports fared well in terms of test accuracy. Data surrounding the efficacy of these stimuli support that sugar, salt, spearmint, and juicy-fruit have value in correctly assessing taste and smell respectively. Lastly, former participation in sports or contact sports remains prevalent among the subject population.

Future Considerations: Exploring taste and smell has significant applications for medicine. Results from this investigation are useful in terms of developing sensory abilities as a metric to understand brain function. Further research could develop more sensitive taste and smell tests based on trinary component mixtures. Selecting subjects with documented dysgeusia or dysomia would provide more pronounced differences in terms of taste and smell accuracy.

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Optic nerve cupping in patients with retrograde trans-synaptic degeneration

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Introduction: Retrograde trans-synaptic degeneration (RTSD) refers to the atrophy of retinal ganglion cell layer (GCL) and retinal nerve fiber layer (RNFL) following injury to corresponding post-geniculate neurons. RTSD in adults has recently been demonstrated using optical coherence tomography (OCT)[1,2], but corresponding morphological changes in the optic disc have not yet been demonstrated. Optic disc cupping has been associated with periventricular leukomalacia in children and attributed to RTSD[3,4]. We investigated the amplitude of RTSD in relation to latency since post-geniculate injury, and assessed cup size in patients with adult-onset RTSD.

Methods: Charts from 2010-2018 of patients with homonymous defects were reviewed. 149/451 had undergone OCT. After excluding patients with pregeniculate disease, including glaucoma, 71 remained. Latency from time of post-geniculate injury was determined. OCTs were reviewed to obtain cup-to-disc ratios (CDR). A normalized asymmetry score (NAS) was calculated for each eye, with a positive NAS indicating GCL thinning on the side of the retina ipsilateral to the injury. Patients with bilateral positive NAS in the direction of the homonymous defect were considered to exhibit RTSD. OCTs were obtained in 42 controls within the same age range.

Results: 47/71 (66%) subjects demonstrated bilateral GCL thinning versus 10/42 controls (p<0.0001). The amplitude of GCL thinning was significantly greater in cases compared to controls (Mean NAS=0.15 vs. 0.03 OD; 0.13 vs. 0.04 OS; p<0.0001 OU). The 47 subjects felt to have RTSD had a significantly greater CDR than controls (OD: 0.49 vs. 0.42, p=0.03; OS: 0.49 vs 0.40, p=0.014). GCL thinning correlated with latency from time of injury (r=0.42, p<0.0001 OD; r=0.49, p<0.0001 OS).

Conclusion: The positive correlation between RTSD and latency following post-geniculate injury reaffirms that RTSD is a slow, progressive process. Increased CDR in cases compared to controls suggests a structural correlate to RTSD that is potentially observable on fundoscopy.

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Anxiety, Neuroticism and Late-Life Depression

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Introduction: Late-life depression (LLD) is associated with psychiatric comorbidities that may worsen mood outcomes in older adults, yet these comorbid conditions remain underdiagnosed and understudied in LLD. Anxiety and neuroticism have been independently associated with depression, but the interplay between these traits in older adults is uncertain and may be key to understanding the development and important mood and cognitive outcomes of LLD. In this study, we analyzed this relationship and hypothesized that higher anxiety measures would be associated with: (1) higher depression severity, (2) higher neuroticism, (3) lower cognitive scores at baseline, and (4) cognitive decline.

Methods: Older non-demented adults who were either depressed or never depressed (controls) were recruited. Anxiety, neuroticism, depression and cognition were assessed using the State-Trait Anxiety Inventory (STAI), NEO Personality Inventory (NEO PI), Montgomery-Asberg Depression Rating Scale (MADRS) and the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) cognitive battery, respectively. A study psychiatrist confirmed or ruled out diagnosis of depression, and followed a guided treatment algorithm in which sertraline was initially offered to all subjects at baseline. A sub-group analysis was performed on sertraline intention to treat (ITT) subjects. Subjects in the depression group were followed every two weeks by the psychiatrist, who made dosing adjustments and administered the MADRS.

Results: Baseline results were obtained from a sample of 121 older depressed subjects and 39 controls. Longitudinal results were obtained from 93 depressed subjects for 3-month outcomes (3M), and 57 subjects for 12-month outcomes (12M). The sertraline-ITT analysis was performed for 51 subjects for 3M and 36 subjects for 12M. At baseline, state and trait anxiety scores were highly associated with depression scores in both study groups ($p < 0.0001$). Higher anxiety scores were associated with lower baseline cognition scores in the control group, ($r=-0.54$, $p=0.0003$), and less so in the depressed group ($r=-0.20$, $p=0.03$). Baseline total neuroticism was associated with higher anxiety, and depression scores in both groups. For longitudinal results, baseline trait anxiety was a predictor of 3M ($p=0.0097$) and 12M ($p= 0.0054$) depression scores in the depressed group, but there were no significant predictors of change in cognition.

Conclusion: These results highlight a differential effect of anxiety on cognition between non-depressed older adults and adults suffering from LLD. There is a complex interplay between mood and personality traits in older adults, and studies that include a longer follow-up are needed to identify important predictors of mood and cognitive outcomes in LLD.

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Predicting Inpatient Status After Total Hip Arthroplasty in Medicare-Aged Patients

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Background: Although total hip arthroplasty (THA) has historically been performed as an inpatient procedure, outpatient THA is increasingly appealing in today's healthcare system alongside the emphasis for value-based care delivery [1,2,3]. As a result, the Centers for Medicare and Medicaid Services has solicited comments regarding the removal of total hip arthroplasty (THA) from its inpatient-only list. There exists concern that, when produced in the outpatient setting, THA procedures may face lower reimbursement and that surgeons may need to more frequently justify their rationale for inpatient admissions [4,5]. The goal of this study is to develop and internally validate a risk stratification nomogram to aid in the identification of optimal inpatient candidates in the Medicare–aged population.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database was utilized to identify all patients >65 years of age who underwent primary THA between 2006 and 2015. Inpatient stay was the primary outcome measure, as defined by stay >2 days in length. The impact of numerous demographic, comorbid, and perioperative variables was assessed through a multivariable logistic regression analysis to construct a predictive nomogram.

Results: In total, 30,587 inpatient THAs and 17,024 outpatient THAs were analyzed. Heart failure (odds ratio [OR] 2.11, P = .001), simultaneous bilateral THA (OR 2.47, P < .0001), age >80 years (OR 2.91, P < .0001), female gender (OR 1.90, P < .0001), and dependent functional status (OR 1.89, P < .0001) were the most influential determinants of inpatient status. The final prediction algorithm showed good accuracy, excellent calibration, and internal validation (bias-corrected concordance index of 0.69).

Conclusion: Our model enabled accurate and simple identification of the best candidates for inpatient admission after THA in Medicare-aged patients. Given the increasing feasibility of outpatient THA coupled with the likelihood of THA being removed from the Centers for Medicare and Medicaid Services inpatient-only list, this model provides a framework to guide discussion and decision-making for stakeholders.

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Pilot Investigation of the Correlation Between Blood Levels of Otolin-1 and Abnormal Vestibular Evoked Myogenic Responses

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Degeneration of otoconia is a common cause of dizziness. The most common manifestation is benign paroxysmal positional vertigo (BPPV), characterized by onset of vertigo with head movement.1 BPPV occurs when otoconia composed of calcium carbonate crystals dislodge from otolithic organs, primarily the utricle, and enter semicircular canals.1 Before entering the semicircular canals, otoconia cause otolith organ-specific vestibular dysfunction (OSVD). OSVD is poorly recognized and difficult to diagnose because it does not present with rotary vertigo, but with vague dizziness. Diagnosis is made with vestibular evoked myogenic potentials (VEMPs).2 Presently, there is no treatment addressing the underlying cause, otoconia degeneration. The long-term goal of our lab is to determine the efficacy of inner-ear specific proteins in circulation as surrogate biomarkers to investigate pathological processes and develop novel treatment. We are exploring otolin-1 – an otoconia framework protein, as a serum biomarker of otoconia degeneration.2 Our main objective in this study is to determine if levels of otolin-1 correlate with VEMPs, a measure of otolithic organ function. Our study is currently in progress. As a first step, we have prospectively recruited normal controls (n=16) from the otolaryngology clinic at the University of Connecticut to establish baseline measures. VEMP recruitment was constrained by difficulty recognizing OSVD patients and exclusion criteria including subjects who are under 18 years old, pregnant, unable to consent, vulnerable (prisoners, etc.) or unable to complete VEMP testing. We recruited three subjects with cervical VEMP-verified OSVD, defined as any abnormality in latency or amplitude. Blood samples were collected at enrollment for all subjects and measured levels of otolin-1 were compared between normal controls and patients with abnormal VEMPs. Otolin-1 levels were quantified using the enzyme-linked immunosorbent assay technique. One hemolyzed VEMP sample was excluded. Otolin-1 levels ranged from 37.2 to 472.7 pg/mL with mean otolin-1 (± SEM) level of 132.9 ± 27.7 pg/mL. The two VEMP subjects had levels of 52 and 62.6 pg/mL. Although it is too early to draw conclusions, VEMP subjects tend to have low otolin-1 levels. This is promising, as it implies chronic degeneration of otoconia. Moving forward, we will maintain stringent criteria for recruitment of VEMP subjects, but given the wide range of otolin-1 levels in controls, we will compare those with normal VEMPs and absent history of dizziness to those with abnormal VEMPs. Our continued effort may offer a useful, easy to measure biomarker for diagnoses of OSVD, identification of those at risk for BPPV and a target for development of novel therapeutics.

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Blood Prestin Levels as a Biomarker of Noise-Induced Hearing Loss in Mice

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Introduction: Hearing loss is a disability experienced by 20% of those above age 12. Current literature suggests that this problem is only becoming more prevalent in our society, suggesting a need for innovation in hearing loss detection [1]. Current modalities of assessing hearing loss generally rely on the presentation of a patient after they are symptomatic, prohibiting pre-symptomatic care which could prevent disability. Prestin is an inner-ear-specific molecule which is expressed in the outer hair cells (OHCs) of the cochlea. We have previously proposed and demonstrated that the presence of prestin in blood has the potential to act as a biomarker for cochlear injury and hearing loss [2,3]. We thus attempted to correlate the concentration of blood prestin to the amount of hearing loss experienced in a murine model: utilizing amplitude-modulation following response (AMFR) and distortion product otoacoustic emissions (DPOAE) to quantify hearing loss.

Methodology: A total of 36 C57bl/6 mice were raised to 8 weeks and exposed to acoustic trauma for variable time lengths (0, 1.25, 2.5, 5, 10, 15, 20, 25, 35, 40, 50, or 60 minutes) in exposure groups of size n=3. 16 days following exposure, hearing was quantified using DPOAE and AMFR modalities. AMFR was recorded in response to narrow band noise (0.33 octave) modulated at 42.9 Hz. Sound levels from 0-90 dB sound pressure level (SPL) were tested in 5 dB steps to determine the threshold of hearing. DPOAEs were recorded using an ER10B+ Low Noise DPOAE microphone with acoustic stimuli delivered by two calibrated MF-1 speakers in closed-field configuration. DPOAEs were recorded at fixed stimulus levels (L1=L2=70 dB SPL), with an f2/f1 ratio of 1.2. The 2F1-F2 DPOAE responses were recorded at F1 and F2 frequencies with geometric means of 4, 8, 16, 24 and 32 kHz. Mice were subsequently sacrificed the following day (day 17), and blood was collected via cardiac puncture and promptly centrifuged. Serum prestin concentration was determined using ELISA, and OHCs counted following cochlear harvesting.

Results and Conclusion: There was no significant difference in the mean blood prestin concentration between the noise exposure groups. However, blood samples were frozen as whole blood, and hemolysis noted in our samples. Interestingly, it was noted that OHCs were present, but likely dysfunctional, following acoustic exposure up to 40 minutes. We are unsure if the absence prestin findings is due to sample handling error, unexpected OHC survival, or both. Further studies are needed to examine the relationship between prestin and hearing loss, as well as a relationship between prestin and OHC survival after noise-induced trauma.

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Current Adolescent Perspectives on School-Based Sex Education

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Background: Adolescents and young adult's ages 15 to 24 years old account for approximately 50% of new sexually transmitted disease (STD) cases each year1. School-based sex education has been shown to increase safer sex practices in adolescents, but the number of adolescents in the United States who report receiving formal sex education has been declining2,3. Furthermore, the content of sex education may not accurately reflect current adolescent sexual practices4. Objective: This study aims to describe the type of sexual behaviors covered in sex education curricula and to assess whether adolescents prefer more or less time dedicated to STD-related education.

Design/Methods: We conducted a cross-sectional study of 34 full-time students ages 13 to 17 years old presenting to an urban pediatric emergency department. During a single study visit, participants completed a 17-item semi-structured interview and a 29-question self-administered electronic survey.

Results: School was the most common source of sex education (67.6%), followed by parents (55.9%) and friends/peers (47.1%). Half of the participants reported learning about vaginal sex during their school-based sex education, whereas 44.1% and 26.5% of participants acquired knowledge about oral sex or anal sex, respectively. The majority of participants (82.4%) learned about sex between a male and female during sex education, but only 14.7% obtained information about sex between 2 males or 2 females. Out of the 28 respondents, 26 thought that the amount of time learning about STDs in school should stay the same (35.7%) or increase (57.1%).

Conclusions: Adolescents describe school-based sex education that focuses predominantly on heterosexual relationships and vaginal sex. Adolescents are interested in spending more time learning about STDs as part of their sex education. Given potential gaps in school-based sex education, medical providers should discuss all types of sexual behaviors and STD prevention strategies with their adolescent patients.

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Macrophage Non-Muscle Myosin IIA (NMMIIA) is Required for Atherosclerotic Calcification

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Coronary artery disease (CAD) caused by atherosclerosis remains the leading cause of morbidity and mortality in the world. Calcification of atherosclerotic plaque is associated with total atherosclerotic burden and all-cause mortality. Inflammation is critical to atherosclerosis and atherosclerotic calcification, but our understanding of the molecular mechanisms regulating this process is limited. Our group has identified a Rac-dependent pathway that promotes IL-1β-driven atherosclerotic calcification. The protein NMMIIA promotes Rac1 activation and signaling through scaffolding of the Rac-GEF family of Rac activators. We sought to understand the role of macrophage NMMIIA in progressive atherosclerosis and atherosclerotic calcification. The hypothesis is that macrophage NMMIIA is required for Rac-mediated IL-1β expression, leading to progressive atherosclerotic calcification. Using a myeloid specific knock down model of the NMMIIA heavy chain (Myh9) crossed on an atherosclerosis prone mouse model (ApoE-/-), we found knockdown of macrophage NMMIIA to be associated with reduced atherosclerotic calcification. The reduction in atherosclerotic calcification was associated with decreased systemic IL-1β levels. MyH9-deleted bone marrow derived macrophages demonstrated reduced Rac1 activation and IL-1β expression in response to inflammasome priming and activation. The results were specific to IL-1β as other general markers of inflammation, including TNF-α and IL-1α, were not affected by the Myh9-deletion. We anticipate this line of investigation leading to identification of macrophage NMMIIA as a novel therapeutic target for inhibiting progressive atherosclerotic calcification given that inhibitors of NMMIIA have been developed.

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Gender Dysphoria, Mental Health, & Poor Sleep Quality Among Transgender & Gender Non-Binary Individuals: A Qualitative Study in New York City

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Background: Good sleep has been established in the literature as a critical element of overall health. A vast amount of research has demonstrated the numerous adverse health risks of short sleep duration and poor sleep health among the general population, and increasing studies have been conducted among lesbian, gay, and bisexual (LGB) individuals. However, poor sleep health is disproportionately experienced by sexual and gender minority populations, and little research has examined sleep disparities or sleep quality among transgender and gender non-binary (TGNB) individuals specifically. To date, no studies have delved into a wide range of sleep characteristics in transgender populations to determine salient risk factors for poor sleep quality. The purpose of this study was to use qualitative methods to explore the association between factors such as gender identity, mental health, and substance use and sleep health among a sample of transgender and gender non-binary individuals in New York City.

Methods: Forty in-depth interviews were conducted among an ethnically diverse group from July to August 2017 who identified as transgender and gender non-binary. All interviews were transcribed, coded, and analyzed for emerging themes, including mental health affecting sleep, gender identity, and various coping mechanisms to improve overall sleep.

Results: Our research found that 60% (n=24) of participants described various behaviors to improve sleep hygiene, including the use of either prescription or over-the-counter (OTC) sleep medication such as benzodiazepines, selective serotonin reuptake inhibitors (SSRIs), and antipsychotic pharmaceuticals. Additionally, 35% (n=14) of participants reported that gender identity related concerns contributed to disruptive sleep, including gender dysphoria, self-consciousness about their physical body, stress and anxiety of identifying as transgender, and gender transition (hormonal therapy and gender-affirming surgery). Poor sleep health was also associated with mental illness, specifically anxiety and depression.

Conclusions: Sleep health promotion interventions should be developed for transgender and gender non-binary people, which would promote positive mental health, reduce the risk of pharmaceutical adverse events, and help alleviate psychosocial stress in this target population.

Development of Endoplasmic Reticulum-Plasma Membrane Contact Sites and their Role in Calcium Uptake During Oocyte Meiotic Maturation

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Calcium release at fertilization starts the process known as "egg activation", a series of events that occurs between sperm-egg fusion and the first embryonic cleavage, which leads to the recruitment of maternal mRNA for protein synthesis, completion of meiosis, and hardening of the zona pellucida to prevent polyspermy [1]. In preparation for fertilization, during oocyte maturation, there is a dramatic rearrangement of the calcium store, the endoplasmic reticulum (ER), to the region just under the plasma membrane (PM), as well as an influx of extracellular calcium that fills the store [2]. However, the formation of ER-PM junction sites during oocyte maturation and its contribution to calcium release is poorly appreciated. Our investigation was two-fold: (1) examine the development of ER-PM contacts sites during in vitro maturation of mouse oocytes and (2) examine how increased ER-PM contacts sites correlate with calcium stores during maturation. For objective one, mouse oocytes were injected with an RNA encoding a fluorescent tag, called MAPPER, which labels ER-PM junctions. We used a confocal microscope to visualize the ER-PM contact sites every two hours during in vitro oocyte maturation. For objective 2, we co-expressed a fluorescent calcium indicator, Rhod3, with MAPPER RNA. To measure calcium stores, we placed eggs in calcium free medium and recorded calcium release on the microscope while adding the SERCA pump inhibitor, thapsigargin, which drains calcium out of the ER. We found that during oocyte maturation, there is reorganization of the ER-PM contact sites such that after germinal vesicle breakdown (GVBD), there is a slight decrease in the number of ER-PM junction sites two hours later, followed by an increase in the number of ER-PM contact sites six hours later. These results demonstrate that there is indeed reorganization of the ER to the PM after GVBD. Moreover, eggs with a greater number of ER-PM junctions exhibited greater calcium release, suggesting that ER calcium stores are linked to these junctions. Further research will be aimed at examining the proteins that are involved in the formation of the ER-PM contact sites that allow for calcium influx.

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Patient Dissatisfaction after Primary Total Joint Arthroplasty: The Patient Perspective

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Despite improvements in surgical technique and implant longevity, some patients continue to report dissatisfaction following total joint arthroplasty (TJA) [1-5]. As patient satisfaction is increasingly used as a quality metric, the objective of this study was to gain better understanding of satisfaction with TJA from the patient perspective. 551 primary total hip and knee arthroplasties (THA and TKA) with a minimum of 1-year follow-up and were responsive to a satisfaction survey were analyzed. The incidence, predictive factors, and subjective reasoning for patient dissatisfaction were assessed. Univariate and multivariate logistic regression analyses were performed. Patient satisfaction was 89% for THA and 88% for TKA reported satisfaction. Hispanic race was the most significant predictor of dissatisfaction (p=0.037). The most common reasons for dissatisfaction following THA were persistent pain (N=14, 41%), functional limitation (N=12, 35%), surgical complication/reoperation (N=4, 12%), staff or quality of care issues (N=2, 6%), and slow recovery (N=2, 6%). The most common reasons for dissatisfaction following TKA were persistent pain (N=19, 41%), functional limitation (N=12, 26%), surgical complication/reoperation (N=8, 17%), staff or quality of care issues (N=5, 11%), and unmet expectations (N=2, 4%). While persistent pain and functional limitation are the two leading reasons for dissatisfaction in both TKA and THA, a subset of patients view satisfaction as an evaluation of the process by which care is delivered. Patient satisfaction is not solely a reflection of surgical outcome and should be interpreted with caution. Potential for incomplete pain relief or full functional recovery should be discussed during preoperative counseling. Empathic care is also important and should be encouraged to enhance the overall patient experience.

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New Ideas in Sleep Research

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Many of the physiologic benefits of sleep are not well understood, but model organisms such as *Trichoplax adhaerens* and *Caenorhabditis elegans* may hold some of the keys to unlock this mystery. Investigating sleep in *Trichoplax*, an ancient metazoan commonly described as the simplest animal[1], may offer clues into why sleep evolved and therefore help uncover the most fundamental advantages sleep provides. Using the NCBI Nucleotide Blast online program, promising orthologs of circadian rhythm genes, including Bmal1, PARbZip, and Rev-erb-α were found in the *Trichoplax* genome. The similar protein domains between these Trichoplax genes and those of other animals, including humans, were confirmed using the online SMART protein data base tool. This bioinformatics data will support future sleep research endeavors in this up-and-coming model organism.

Caenorhabditis elegans were found to sleep in 2008[2] and have since been an important model organism in sleep research. *C. elegans* exhibit two kinds of sleep: developmentally timed sleep (DTS) controlled by an internal clock that is similar to circadian sleep seen in most animals, and stress induced sleep (SIS) that is analogous to sleep other animals display in response to disease[3]. SIS is controlled by a single neuron in *C. elegans* called the ALA neuron. ALA induces quiescence in the animal when environmental stressors (heat, infection, etc.) trigger the production of epidermal growth factor (EGF), which binds to EGF receptor (EGFR) on the neuron[4]. To contribute to the understanding of the SIS pathway in *C. elegans*, a genetic screen was designed to find genes necessary for ALA-dependent sleep upstream of EGF. Transgenic worms with dysfunctional ALA and a fluorescently labeled (red) rescue extrachromosomal array with imperfect transmittance were used for this screen. Without a functioning ALA neuron, non-red worms (lacking the rescue transgene) were not able to exhibit SIS, while red worms were. These worms were mutagenized with ethyl methanesulfonate (EMS), and red F2 generation worms were screened for slow growth (as compared to their non-red clones), the expected phenotype in worms with constituently active EGF[5]. Studying these mutants may reveal a new gene in the SIS pathway. This screen is still ongoing, but the fast lifecycle of the *C. elegan* allows for efficient experiments, so the search for a newly described gene integral to the *C. elegan* SIS pathway remains a promising endeavor.

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Association Between White Matter Hyperintensities, Frontal Brain Volumes And Neuroticism In Late Life Depression

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Introduction: The neurobiology of neuroticism in late life depression (LLD) is understudied. Previous structural imaging research has linked both smaller hippocampal volumes and greater volume of vascular white matter changes to LLD. We hypothesized older depressed subjects scoring high in measures of neuroticism would have smaller hippocampal volumes compared with non-neurotic older depressed subjects and with non-depressed controls.

Method: Non-demented subjects were recruited and were either depressed with high neuroticism, depressed with low neuroticism or not depressed (control). Neuroticism was assessed using the NEO PI. A study psychiatrist confirmed or ruled out diagnosis of depression for depressed and control subjects. Brain MRIs were performed.

Results: The study sample consisted of 128 older depressed subjects and 36 never depressed controls. Subjects had a mean age of 72 and were 70% female. 50% of depressed subjects scored high on the NEO-PI neuroticism measure.

For outcomes focusing on white matter changes, we found that non-neurotic depressed subjects had a higher volume of white matter vascular change than did neurotic depressed subjects and non-depressed controls.

For imaging outcomes focused on volumetric analyses, we several frontal lobe regions for which depressed subjects with high neuroticism scores had smaller volumes compared with non-neurotic older depressed subjects and with non-depressed controls, controlling for age and gender. These regions included frontal pole, medial orbitofrontal cortex and left pars orbitalis. We did not find significant between-group differences in hippocampal volume.

Discussion: In late-life depression hippocampal volume was not associated with depression or neuroticism. Our finding that those depressed subjects low in neuroticism had higher white matter vascular change volumes is consistent with prior literature on "vascular depression." However, our finding that those high in neuroticism had similar white matter vascular change to controls implies that there may be a different neurobiological mechanism in older neurotic depressed group. This notion is supported by our finding that several frontal lobe structures were smaller in patients who scored high in measures of neuroticism than in non-neurodepressed subjects and in non-depressed controls. Our results suggest that multiple biological pathologies that can lead to different clinical expressions of LLD.

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Development of Patient-Specific 3D-Printed Coronaries for Non-Invasive Assessment of Coronary Artery Disease (CAD)

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Introduction: Coronary artery disease (CAD) is the single most common cause of mortality in the United States, accounting for 610,000 deaths annually.[1] Early, accurate, and cost-effective diagnosis of CAD is tremendously important.[2] CAD results from the buildup of cholesterol plaque in arterial walls, which leads to reduced oxygen-rich blood-flow to the heart muscle. Current invasive coronary angiography utilizes fractional flow reserve (FFR - the ratio of average aortic pressure distal (Pd) and proximal (Pa) to a stenosis at hyperemia) as the gold standard for detecting ischemia. Complementary to that, cardiac exercise stress-testing utilizes physical activity of the patient to determine the extent and severity of ischemia.[3] There is a need for a single, integrative method of detecting CAD that both non-invasively visualizes the patient's coronary anatomy and assesses the severity of ischemia. Here, we aim to create such an integrative method by using non-invasive Cardiac Computed Tomography Angiography (CCTA) to 3D model/print patient coronaries, and then conduct in-vitro testing under simulated coronary circulation.

Method: For this study, we randomly chose 5 CAD patients from a large sample of those who previously had invasive FFR of their left anterior descending coronary artery (LAD) and non-invasive CCTA scans. We used CCTA scans to segment and model each patient's LAD using 3 softwares: Mimics, Geomagic, and SolidWorks, followed by 3D-printing with rigid material. Our previously developed physiological coronary circulation system, which reflected true stenosis and variable downstream resistance, allowed for testing of these LADs in-vitro. We attained hemodynamic measurements for the pressure drop ($\Delta P = Pa - Pd$) and the pressure ratio (Pd/Pa), as done at the cardiac catheterization laboratory. The in-vitro data was coupled with pressure–flow relationships from clinical data to calculate in-vitro FFR, and further statistical studies were conducted.

Results: There was no significant difference in the mean values between in-vitro (non-invasive) and invasive FFR values (0.75±0.14 and 0.74±0.16, respectively; p=0.92). Statistical studies using Pearson's coefficient of correlation showed positive correlation (r= 0.78, p=0.11) between the non-invasive and invasive FFR. Analytical chemistry technique of Bland-Altman analysis further showed mean differences between non-invasive and invasive FFR to be 0.01±0.1 (95% limit of agreement -0.1169 to 0.1369).

Conclusions: We estimated non-invasive FFR with good correlation and concordance to that of "gold standard" invasive FFR. Therefore, this study suggests that 3D-printed patient-specific models can be further developed for use in a non-invasive in-vitro environment to accurately assess coronary artery ischemia.

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The Role of WNT-Pathway on High Molecular Weight (HMW) Fibroblast Growth Factor 2 and Fibroblast Growth Factor 23 on Dentin and Alveolar Bone Mineralization.

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X-linked hypophosphatemia (XLH) presents with increased fibroblast growth factor 23 (FGF23), and clinically presents as rickets and osteomalacia in both humans and mice. We previously reported that transgenic mice overexpressing the high molecular weight (HMW) isoforms of Fibroblast Growth Factor 2 (FGF2) in osteoblast linage cells phenocopy XLH and the Hyp mouse model of XLH including increased production of FGF23. Our lab previously showed dental phenotypic changes associated in hypophosphatemic transgenic HMW mice, including decreased predentin width and increased FGF23 expression in serum and bone. FGF23 is thought to regulate multiple intracellular downstream messages including the WNT/β-catenin pathway. The role of HMW in regulating WNT/β-catenin signaling in dental tissues is not known. Based on a previous study on HMWFGF2 modulation of FGF23 and Wnt signaling (1), we hypothesize that FGF23 mediated increased Wnt proteins signaling contributes to alterations in predentin in HMWTg mice.

The use of mice was approved by the Institutional Animal Care and Use Committee (IACUC) and maintained by Veterinary Services at UConn Health. Development and phenotypic characterization of Vector and HMWTg mice was previously described (2). The study was performed in 1) Col3.6-HMWTgFgf2-IRES-GFPsaph mice in which a 3.6 kb fragment of type I collagen promoter (Col3.6) drove the expression of only the HMW isoforms of FGF2 (HMWTg) with green fluorescent protein-sapphire (GFPsaph) as well as 2) Vector mice (Col3.6-IRES-GFPsaph, Vector) that did not harbor the FGF2 transgene. Two month old female mice were used in this study. The mandibles of sacrificed mice were fixed in 4% PFA. The mandible arches of mice from each group were decalcified using 15% EDTA for 14 days and verified via x-rays before being embedded in paraffin. The mandible arches were sectioned and stained using Immunohistochemistry using ImmPRESS REAGENT KIT (Vector Labs) and DAB Peroxidase Substrate Kit (Vector Labs) protocols and mounted with Permount solution.

Immunohistochemistry visualization for phospho-Lipoprotein Receptor 5 (LRP5), an important Wnt co-receptor, showed increased staining in the pulp content and odontoblasts of the transgenic HMW group which supports our hypothesis that the downstream signaling of FGF23 is carried out by the WNT/β-catenin pathway.

In order to conclusively establish a role of Wnt signaling we need to stain and visualize the expression levels of other WNT/β-catenin proteins, including: Wnt inhibitor SOST, WNT5a, pGSK3β (active), LEF1, and non-phospho-β-catenin (active).

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Gender Inequity in United States Dental Academia: An Analysis of the Wage Gap

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Background: Despite increasing rates of women working in dentistry, they are still relatively underrepresented[1] and underpaid in comparison to men colleagues at almost every level.

Objectives and Hypothesis: The objective of this study is to quantify the representation of women and men in dentistry at all academic and leadership ranks in various U.S. dental schools. With this information, the study aims to assess potential proportional differences in salary wages, benefits, and occupational statuses between genders. We hypothesize that women are underrepresented and receive less guaranteed basic and total compensation in academic dentistry.

Methods: To achieve our objectives, we extracted faculty information from the ADEA Dental School Faculty Salary publications from 2010-2016[4]. Based on these data, we obtained summary statistics of both guaranteed annual salaries and total compensations for full-time faculty members in different positions and departments, such as administration, basic/clinical sciences, and research, at U.S. dental schools. The data was entered into Microsoft Excel spreadsheets to analyze mean differences between men and women salaries for respective positions and benefit package amounts at comparative faculty appointment ranks; graphic charts were generated to visually represent this information using Microsoft Excel.

Results: Based on the existing evidence in dentistry and medicine, we expected to confirm our hypothesis in that women are underrepresented in academic dentistry. We were unable to quantify these differences through statistical calculations due to limitations placed by ADEA, thus preventing statistical analysis of any raw data. Despite this statistical hindrance, the descriptive statistics based on the collected summary data indicated that there are indeed more men than women in academic dentistry. On average, men dental academicians are paid more than their women colleagues, especially in higher-level administrative positions. As an example, the total compensation for men Deans was consecutively higher than women Deans from 2010-2016, ranging from an average of $60,089.00 USD during 2014-2015 to $95,443.00 USD during 2010-2011. The 2010-2016 ADEA data demonstrates that the salary differences between men and women have either remained relatively stable or have further increased, depending on the academic department and primary occupational appointment.

Conclusions: The participation of women has increased as of recent; however, the data and literature suggest that women in dental academia receive lower salaries, tenure status, and presidential administrative positions while also being expected to meet higher standards than men colleagues[2, 3]. The significance of this work is to be a pioneer in researching disparities in dentistry at the provider level to recognize women as a minority within dentistry. Through raising awareness of this gender gap[3], the goal is to stimulate conversation amongst dental professionals and to better understand barriers for women in dentistry.

Future Directions: Future survey research should be conducted on academicians and/or dentists in private practice to evaluate attitudes towards gender equity, to seek explanations for this gender gap, and to assess potential for future interventions.

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Comparative Risk of Major Bleeding With Rivaroxaban and Warfarin: Population Based Cohort Study of Unprovoked Venous Thromboembolism

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Introduction: American College of Chest Physician (ACCP) guidelines recommend the use direct-acting oral anticoagulants (DOACs) preferentially over vitamin k antagonist (VKA) therapy (except in active cancer patients) for the acute treatment and secondary prevention of venous thromboembolism (VTE) [1]. In the pooled EINSTEIN analysis, rivaroxaban was found to be noninferior to enoxaparin/vitamin K antagonist in preventing recurrent VTE, while reducing patients' risk of major bleeding by 46% [2].

Objectives: To compare the risk of major bleeding, including bleeding subtypes, between rivaroxaban and warfarin patients with unprovoked VTE.

Methods: Using US MarketScan claims data from 1/2012-12/2016, we identified patients who had ≥1 primary hospitalization/emergency department visit diagnosis code for an incident unprovoked VTE, newly initiated on rivaroxaban or warfarin within 30 days after the VTE and ≥12 months of continuous insurance coverage prior to the VTE. Differences in baseline covariates between cohorts were adjusted using inverse probability of treatment weights based on propensity scores (with residual absolute standardized differences <0.1 achieved for all covariates after adjustment).

Outcomes included any major, gastrointestinal, genitourinary, intracranial and other bleeds. Patients were followed for up to 12 months or until outcome occurrence, index OAC discontinuation/switch (30 day permissible gap), insurance disenrollment or end of follow up.

Results: We identified 10,489 rivaroxaban and 26,364 warfarin patients treated for an unprovoked VTE. Median (interquartile range) of patient age was 56 (46, 67) years, median time on treatment was 5 (3, 7) months and 47% had pulmonary embolism. Upon Cox regression, rivaroxaban reduced patients' hazard of major bleeding by 27% vs. warfarin. Both gastrointestinal and intracranial bleeding were observed less frequently in rivaroxaban vs. warfarin users. Rivaroxaban significantly reduced patients' risk of recurrent VTE vs. warfarin.

Conclusions: In the real-world treatment of unprovoked VTE, rivaroxaban reduced patients' risk of major bleeding and most major bleeding subtypes compared with warfarin in routine practice.

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The in Vitro Effects of TLR2 Tolerance on Mouse-Derived Microglia

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Multiple sclerosis (MS) is a central nervous system (CNS) autoimmune disease characterized by both inflammatory demyelination and impaired remyelination. While most MS therapeutics target adaptive immunity, studies indicate that toll-like receptor 2 (TLR2) signaling contributes to both the inflammatory component and defective remyelination in MS. We recently reported that significantly diminishing TLR2 signaling in innate immune cells by inducing TLR2 tolerance attenuates the mouse model of MS, adoptively transferred experimental autoimmune encephalomyelitis (1). Previous studies also suggest that TLR2 signaling can inhibit myelin repair and that inducing TLR2 tolerance in vivo by repeated low dose administration of the TLR2 ligand P2C enhances remyelination through effects on microglia (2). The present study further confirms the effects of TLR2 on microglia by showing that murine microglia can be tolerized to TLR2 in vitro using P2C. Furthermore, we provide evidence that P2C traffics into the CNS when provided via peripheral injection, suggesting that TLR2 tolerance may be directly induced in microglia in vivo. We established mixed glial cultures from P1-3 wild-type (WT) mouse pups. After 12-18 days in culture, non-adherent cells (microglia) were harvested and either directly plated for testing or plated after further purification by FACS-sorting. The microglia were then designated as either "non-stimulated" (received no P2C), "stimulated" (received 1µg/mL P2C only after 24 hours), or "tolerized" (received 1µg/mL P2C both at the initiation of culture and again after 24 hours). After 48 hours, supernatants were harvested and assayed for TNF-α, IL-6, and IL-10 via multiplex ELISA. Results showed a greater than 50% reduction in both TNF-α and IL-6 in the tolerized relative to stimulated conditions ($p < 0.05$, Mann-Whitney). In addition, we found a 2 fold increase in IL-10, although this was not statistically significant. These results suggest that microglia can be tolerized to TLR2 ligands in vitro and that this tolerance induces a shift from a pro-inflammatory to an anti-inflammatory, pro-repair phenotype. To assess P2C trafficking, biotinylated P2C was IV injected into WT mice. 1 hour later the brains were harvested and stained with GFP conjugated streptavidin. Images demonstrated a notable increase in GFP in the corpus callosum of P2C injected mice compared to PBS controls.These results indicate that peripheral TLR2 ligands can traffic into the CNS, and thus would be capable of directly tolerizing microglia. This study adds to the growing body of evidence implicating TLR2 in the pathogenesis of MS, and may influence future therapeutic approaches to the disease.

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Investigating Factors that Contribute to Dental Disease Severity in Head and Neck Cancer Patients prior to Radiation Therapy

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Background: Head and neck cancer (HNC) refers to cancerous lesions located in the oral cavity, pharynx, larynx, nasal cavity and esophagus. It is usually treated with radiation therapy (RT) which commonly leads to oral side-effects including xerostomia, oral mucositis and severe caries. It is known that those who begin RT for HNC with any degree of dental disease have more severe post-treatment manifestations compared to those starting RT without dental disease. The Clinical Registry of Dental Outcomes in Head and Neck Cancer Patients (OraRad) is a 2-year ongoing multi-site study that is investigating how to standardize pre-RT dental care in an effort to minimize the severity of oral complications post-RT. This project investigated which factors contribute to more severe baseline dental disease in patients from the UConn Health data set, in an effort to ultimately minimize post-RT complications in the head and neck region.

Objectives: The objectives of this study were to describe the dental disease status of HNC patients at baseline prior to RT and to examine associations of various social and clinical factors with dental disease levels at baseline.

Methods: This study analyzed baseline information of the 53 participants that were enrolled in the OraRad study at UConn Health. In order to be included in the study, the participant had to have been diagnosed with one of the conditions below, and planned to receive at least 4,500 centigray for curative treatment to the respective area: head and neck squamous cell cancer (SCC), salivary gland cancer (SGC) or non-SCC or a non-SGC malignancy of the head and neck. Further inclusion requirements were: had at least 1 natural tooth remaining after baseline dental procedure recommendations and no prior curative RT for HNC.

Results: As age increased, number of teeth declined (p=0.008) and DMFS scores increased (p=0.000). There was a negative association between public medical insurance and number of teeth at baseline (p=0.003), and a positive association between public insurance and DMFS (p=0.0310), % sites with PD ≥ 4mm (p=0.0162), % sites with CAL ≥ 3mm (p=0.0498) and plaque index (p=0.016). There was a positive association between routine dental cleaning and number of teeth at baseline (p=0.002).

Conclusion: These results indicate that age, type of medical/dental insurance and routine dental care all had an impact on oral health of baseline HNC patients at UConn Health. Enhancing dental benefits within public health insurance and encouraging routine dental care may lead to improvements in baseline oral health status of HNC patients, resulting in fewer oral complications after RT.

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Characterization of A Novel EGFR Splice-Site Knockout Mouse Model In Search of An Alternative Therapeutic Option For Rheumatoid Arthritis

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Introduction: Rheumatoid arthritis is a chronic, debilitating disease associated with multiple systemic complications and early death. Because the exact etiology of the disease is poorly understand and complete remission is rare, RA poses numerous clinical challenges. All current therapies target the immune system but do not address the local inflammation and cellular changes that occur in the joints themselves. Recent evidence points to the central role that fibroblasts in the synovium, a membrane lining the joint spaces, play in mediating the local inflammation and destruction. Fibroblasts in RA patients express EGFR, a receptor tyrosine kinase important for normal cellular proliferation and differentiation, and increased activation of this receptor has been associated with synovium hyperplasia and recruitment of inflammatory cells/cytokines. Soluble isoforms of EGFR ("s-EGFR") are normally expressed in the human body and function as a negative regulator of this receptor activation. In this regards, the natural protein offers promise as an adjuvant therapy to directly target the joints. Therefore, this study aims to better delineate the functioning of sEGFR in the normal and RA states, and ultimately, to assess the validity of this protein as a potential therapeutic target.

Method: A novel knockout mouse model, lacking a splice site within the *EGFR* gene, was generated, and their serum samples were analyzed with real-time PCR, ELISA, and cytometric bead assay. These mice were then subjected to partial menistectomy and ACL transection in the left knee, and the response to this damage was evaluated by performing Safranin-O staining and immunohistochemistry to examine EGFR activation in the joint tissue sections. Statistical analysis was made using unequal variances t-test to compare mouse models.

Result: The validity of our novel knock-out mouse model was confirmed. Both the sEGFR RNA transcript and protein were undetectable in the serum of our mouse model compared to wild type controls. Further characterization was made by assessing the cytokine profile of our mouse model. No difference in the serum levels of TNFα, IL-6, and IL-17A, which are cytokines commonly implicated in RA disease pathogenesis[1], were found between our mouse model and control. Evaluation of joint tissue sections reveals the persistence of cartilage thickness before and after surgery in the knockout compared to control, suggesting that sEGFR may be involved in regulating joint tissue proliferation.

Conclusion: Our new EGFR splice-site knockout mouse model will serve as an important tool in investigating the role of sEGFR in the normal and diseased states. Further research is needed to determine the therapeutic potential of this protein in rheumatoid arthritis.

Re-Evaluating the Utility of Routine Postoperative Laboratory Tests after Primary Total Knee Arthroplasty

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Background: While advancements in surgery and reduced complication rates have made total knee arthroplasty (TKA) one of the most successful and cost-effective procedures in orthopaedic surgery, routine postoperative laboratory tests are still being ordered without evidence as to their necessity.[1-3] With expansion of the bundled payment models, there may exist an opportunity to cut overall costs while maintaining quality of care by eliminating unnecessary interventions. The objective of this study was to examine the utility of routine postoperative laboratory tests in TKA. Methods: A retrospective review of 319 TKAs performed at a single institution over a 2-year period was performed. The primary outcomes were the rates of acute blood loss anemia requiring transfusion, acute kidney injury (AKI), electrolyte abnormalities, and 90-day emergency department visits and readmissions. Multivariate logistic regression analysis was also performed to identify the risk factors associated with abnormal laboratory values. Results: 89 patients (27.9%) had abnormal postoperative laboratory results, of which 78% were exclusively due to electrolyte (sodium or potassium) abnormalities. The rates of AKI and blood transfusion were 3.8% and 1% respectively. Factors associated with electrolyte abnormalities were abnormal baseline electrolyte levels (p = 0.002 and = 0.006 for sodium and potassium respectively) and anemia (p = 0.049). Factors associated with blood transfusion were ASA score ≥ 3, preoperative anemia, and no tranexamic acid use. Factors associated with AKI were chronic kidney disease or having at least two of the following: age > 65 years, BMI> 35, ASA score ≥ 3, diabetes, heart disease, and/or anemia. Laboratory results did not change the course of care in 305 of 319 patients (95.6%). There was no increased risk for 90-days ED visits or readmissions with abnormal laboratory values (p=0.356). Conclusion: With increasing pressure for cost containment in an era of bundled payment models, the very low rate of laboratory associated interventions suggest that routine postoperative laboratory tests is not justified. Obtaining laboratory after primary, unilateral TKA should be driven by patients' risk factors.

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Parathyroid Hormone Regulates RANKL and OPG in Primary Osteoblasts via Calcium and NFATc1 Pathway

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Background: Parathyroid hormone (PTH) is secreted from the parathyroid gland and is a critical regulaor of calcium and bone homeostasis. PTH acts on osteoblast lineage cells to increase both bone formation and bone resorption (1-4). PTH increases bone resorption by increasing receptor activator of nuclear factor kappa-B ligand (RANKL) expression on the surface of osteoblasts and decreasing osteoprotegerin (OPG) (1,5). RANKL interacts with RANK receptors on bone marrow macrophages (BMMs) to differentiate BMMs into osteoclasts, the bone resorbing cells, thereby increasing bone resorption (6,7). OPG is a decoy receptor for RANKL and prevents RANKL from interacting with its receptor on BMMs. Previous work in our lab demonstrated that PTH stimulated bone formation is dependent on the Gαs/PKA/cAMP pathway, however bone resorption acts via an independent pathway. The goal of this study is to determine Gαq/PKC/calcium pathway's role in the stimulation of RANKL and OPG expression, critical regulators of bone resorption. There are two specific aims: first, to determine the role of calcium/calcineurin/NFAT pathway on RANKL increase and OPG decrease; second, to determine what role the MAP kinases play in regulation of RANKL and OPG expression.

Methods: Primary osteoblasts (POBs) were isolated from neonatal mouse calvaria and then cultured in differentiation media for five days. POBs were then treated with calcium/calcineurin/calmodulin Kinase (CAMK) inhibitors or Mitogen Activated Protein kinase (MAPK) inhibitors for 45 minutes before induction with PTH for 2 hours. RNA was extracted and then quantified by qPCR. NFAT nuclear translocation was studied by treating POBs with PTH and then visualized with western blot.

Results: OBs treated with PTH alone showed a significant increase in RANKL expression and a concurrent decrease in OPG expression. Treatment with calcium/ calcineurin/CAMK inhibitors yielded no effect alone but showed a down regulation in RANKL expression and no decrease in OPG expression when treated with PTH. Contrastingly, POBs treated with MAPK inhibitors showed no significant change in PTH stimulation of RANKL or downregulation of OPG expression. NFAT nuclear translocation was observed as early as 30 minutes after PTH induction.

Conclusions: Our findings conclude that PTH works via the calcium-calcineurin pathway to increase RANKL expression while simultaneously inhibiting OPG expression. Additionally, PTH treatment leads to nuclear translocation of NFATc1. Preliminary data also suggest that MAP kinase pathway does not have a role in PTH stimulation of RANKL or decrease OPG expression. These novel findings suggest that the pathways leading to bone formation and resorption are uncoupled and may be manipulated independently.

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A Pilot Study Investigating Clinical Mobility Indicators in Pediatric Spinal Muscular Atrophy (SMA) Patients Undergoing Spinraza (Nusinersen) Treatment

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Spinal Muscular Atrophy (SMA) is a rare genetic disease that results from a mutated survival of motor neuron (SMN) gene, causing varying degrees of muscle weakness and atrophy as well as respiratory complications [1]. In December of 2016, the Food and Drug Administration (FDA) approved Spinraza (nusinersen), the very first drug developed for the treatment of SMA [2]. The current method for measuring mobility changes under this treatment encompasses functional motor scales, walking tests, and quality of life questionnaires. However, the significant variation within the four subtypes of SMA and age of treatment induction has posed a challenge for establishing a consistent measurement modality [3]. In this pilot study, we gathered qualitative data from interview responses, medical charts, and physical therapy (PT) records of six pediatric participants (ages 2-19) with SMA of varying types. The goal of this study is to inform the future design of a mobility scale that can more closely cater to the unique needs of this treatment group. From our data, we gathered that most families of patients feel there is a need for a definitive quantitative tool to help track their child's mobility under Spinraza treatment. PT evaluations and goals varied significantly based on the functional status of the six participants including use of wheelchair, walker, leg bracing, and spinal rod placement. Our conclusion is that a much broader approach must be taken in quantifying the mobility outcomes for SMA patients undergoing Spinraza treatment. Further research should be directed toward creating a mobility scale that can accommodate and adjust for variation in both SMA presentation and response to treatment while providing a reliable tool for patients and families.

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Does Primary Hyperparathyroidism Affect The Inner Ear?

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Introduction: Primary hyperparathyroidism (PHPT) causes systemic calcium disturbances by targeting organs which depend on calcium for normal structure and function. Parathyroid hormone (PTH) is normally under tight feedback control and secreted only in response to hypocalcemia. In the setting of PHPT, elevated and constant PTH levels result in hypercalcemia. In addition, the condition has major effects on the skeletal system as PTH increases calcium levels by promoting bone catabolism (1). We hypothesize that the integrity of calcium-based structures of the inner ear such as the sacuule and utricle may also be affected by PHPT calcium dysregulation. Otoconia in the saccule and utricule are formed from calcium carbonate deposited on a protein framework which includes otolin-1, a protein proposed as an inner ear biomarker (2,3). To test this hypothesis, we measured serum otolin-1 levels in PHPT patients and compared their levels to healthy subjects with no history of PHPT or otologic pathology.

Methods: Subjects were patients with PHPT and controls with no otologic history. All patients were recruited from UCONN Health's otolaryngology clinic from June to November, 2018. PHPT was diagnosed based on a history of hypercalcemia, elevated PTH and successful response to parathyroidectomy. The ELISA method was used to measure serum levels of otolin-1, a framework protein of otoconia, which was proposed as an inner ear biomarker (2,3).

Results: Mean otolin-1 (± SEM) levels were 132.9 ± 27.7 and 94.12 ± 24.1 pg/mL in the control (n = 16) and PHPT (n = 7) subjects, respectively. This difference was not statistically significant (p=0.39). However, there existed a very strong positive correlation between PTH and otolin-1 levels in the PHPT group (r2 = 0.85). A correlation between otolin-1 and ionized or total calcium was not found. Microsoft Excel was used for statistical analysis.

Conclusions: Our preliminary results support the hypothesis that PHPT may affect the inner ear structure. Based on these results, we predict increased prevalence of otolithic vestibular disorders in PHPT patients. Additional data is needed to better understand the impact of calcium dysregulation on the inner ear.

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Self-Reported Health Practices and Anti-H. Pylori Serum IgG Status In the Cuzco Region

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Introduction: Helicobacter Pylori (H. Pylori) affects nearly half of the world's population, with a higher prevalence seen in developing countries [1]. Despite its title as most prevalent bacterial infection on the planet, its exact route of transmission is not fully understood [2]. It is most likely spread between humans via fecal-oral and oral-oral routes. Environmental reservoirs (such as contaminated water supplies) are another proposed source of infection [3]. Several risk factors for infection have been identified, including low family income, low education level, living in a rural area, living in crowded homes, and having contaminated sources of drinking water [2]. Risk factors vary based on geographic, cultural, social and genetic make-up of a population. This study investigated the relationship between general hygiene and H. Pylori infection amongst the population living in the Cuzco Region of Peru. Study design consisted of a researcher created survey assessing primary outcome variables of health and hygiene practices, health and hygiene beliefs, as well as basic demographic information. Fingerprick serum IgG antibody (Ab) tests were used to detect exposure to H. Pylori.

Methods: Interested adults were consented and enrolled at several locations within the Sacred Valley in Cusco, Peru. The study consisted of patients seeking care at a healthcare clinic in Pisac, an ophthalmology clinic in Cusco, and several medical brigades in rural areas. Fingerprick blood samples were collected and allowed to run for results (~15 minutes), while the researcher administered the survey orally in Spanish. The survey included demographic information, questions about living conditions, questions on hygiene practices and beliefs, presence or absence of GI symptoms, and a series of yes/no questions about health history. Upon completion of survey and serum antibody test, participants were informed of their serum antibody results.

Results: 273 participants were enrolled throughout eight weeks, with 151 participants seropositive for Anti-H.Pylori Ab for an overall prevalence of 55.3%. No differences by H. Pylori status across demographic information were found. Primary outcome variables were not significantly different by H. Pylori status.

Conclusions: No associations can be made between health and hygiene practices and H.Pylori infection status amongst this population. Future studies might target one or only a few risk factors for infection, and use objective measures for assessing risk versus a self-report survey. Intensive surveying of one town might contain different infection patterns than this wider assessment of the region. Several hygiene risk factors did trend towards significance, and might serve as potential risk factors to examine in the future.

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A Critical Analysis of Adipose- Derived Stem Cell Secretome and its Role in Regenerative Engineering

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Native tissue repair is a complex process mediated by many growth factors, signaling pathways and cell types. In the context of injury, such healing mechanisms can be compromised due to tissue degeneration and reduced cellular activity. Of particular interest is the study of articular cartilage, as this tissue is hypocellular, avascular, and aneural, with limited regenerative ability. When left untreated, lesions to articular cartilage can lead to osteoarthritis, a disease of inflammation and joint deterioration due to degradation of cartilage and subchondral bone. The high frequency of articular cartilage injury, in conjunction with the complexities of native tissue repair, has stimulated research to develop functionally and morphologically similar tissue for injury repair. Previous research has focused on using stem cells for tissue regeneration, but stem cell therapy presents issues that complicate treatment, including the need for cryopreservation to maintain cell properties, tissue rejection or immunogenicity in recipient patients. Importantly, however, stem cells exert their beneficial effects mainly through secretion of regenerative factors, including growth factors, cytokines, hormones, proteins and more, collectively termed the "secretome". In the form of conditioned medium concentrate (CMC), this secretome can trigger immunomodulatory and anti-apoptotic activities, as well as modulate cell proliferation, leading to tissue regeneration. The Institute of Regenerative Engineering has investigated the application of adipose-derived stem cell (ADSC) secretomes as the basis for tissue regrowth. In this study, we evaluated chondrocyte proliferation and gene expression upon exposure to the ADSC secretome in vitro using an MTS assay and RT-qPCR. Collected data demonstrates that secretome treatment supports chondrocyte proliferation in a manner that is comparable to complete media after 1 and 2 days with or without serum starvation. Data also shows that secretome treatment upregulated levels of proliferative markers, including IGF-1 and Akt. Future goals of this project are to 1) encapsulate the secretome into polymeric microparticles with lipid-based coating and 2) to assess the release profile of key paracrine factors. Use of artificial microparticles containing the contents of the secretome is a promising means of therapy, as particles do not need cryopreservation to maintain their properties and issues of donor-recipient matching are avoided.

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Clinical and Molecular Factors Predictive of Overall Survival in Recurrent Glioblastoma

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Glioblastoma multiforme (GBM) is the most common and deadly primary malignant brain tumor in adults. Historical median overall survival is approximately 15 months. With many efforts aimed at finding a better treatment regimen, temozolomide (TMZ), radiotherapy (RT) and surgery have been the mainstay of therapy for the last decade. Bevacizumab has been approved for primary and recurrent GBM treatment and has shown increase in progression-free survival (PFS) but not overall survival (OS). There is no standard of care for recurrent glioblastoma. Surgery, radiation and systemic therapy at recurrence have been shown to increase OS, with surgery having the greatest effect. Many experimental treatments are offered but have not shown clear benefit. This study aims to analyze treatments and tumor factors predictive of OS and PRS in GBM patients treated with surgery at recurrence.

Here we present 114 GBM patients, as part of the Glioma Longitudinal Analysis (GLASS) dataset, who underwent tumor resection for initial tumor (1st tumor) as well as for recurrence (2nd tumor). To access factors correlated with OS and post-recurrence survival (PRS), univariate and multivariate models were tested using Cox Proportional Hazards Model with hazard ratios (HR) reported. Concordance values (CV) were used to represent the predictability of the models. Clinical factors accessed include age at diagnosis, gender, number of TMZ cycles and RT before and after recurrence and genomic factors were overall mutation frequency and mutations in known GBM driver genes (*IDH1, TP53, ATRX, PTEN, EGFR*). Mutations were called using GATK4 Mutect 2 on tumor samples matched to normal samples. Data analysis was performed in R Studio using the survival, survminer, dplyr and PairedData packages.

The median overall survival of the cohort is 21 months. In a univariate analysis of clinical factors the most predictive was the number of TMZ cycles received after 2nd surgery (CV 0.85) with an HR of 0.69, but was not statistically significant (p= 0.059). Number of TMZ cycles received after first surgery had a predictive value of 0.71 and an HR of 0.8 per cycle. RT after the first surgery showed significant risk reduction (HR 0.38), but it did not have a strong predictive value of OS on its own (0.517). RT after second surgery did not reach significance (p=0.321) and was not as effective at risk reduction (HR 0.73). Mutational frequency at first or second surgery was not correlated with OS. Mutational frequency at recurrence was correlated with a small decrease in PRS (HR 1.0081). *IDH and ATRX* mutations were significantly correlated with OS and interval to first recurrence. *PTEN* and *EGFR* showed a positive correlation but were not significant.

Overall survival post recurrence was correlated with TMZ cycles pre and post recurrence and age at diagnosis. *IDH, ATRX, PTEN* and *EGFR* mutations were correlated with OS but not PRS. Increase in mutational frequency at recurrence was negatively correlated with PRS but not OS.

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Mutational Analysis of the NF2 Gene from Paired Tumor-normal Genome Sequence Data

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Neurofibromatosis type-2 (NF2) is a genetic disorder that is characterized by bilateral vestibular schwannomas (VS), a non-malignant tumor caused by a proliferation of schwann cells surrounding the vestibular branch of the eighth cranial nerve. These tumors usually do not metastasize, but are very aggressive and debilitating for patients, often causing tinnitus, hearing loss, and vertigo. The inheritance pattern of NF2 is autosomal dominant, which is consistent with the functional identification of the protein product Merlin as a tumor suppressor gene [1]. The incidence has been estimated to be as high as 1:25,000 [2]. Roughly half of infants born with NF2 have a family history of the disease, with the remaining 50% of disease incidence being attributable to sporadic mutation [3]. The disease has variable age of onset, but virtually complete penetrance by age 60 for individuals harboring the mutation [4]. Whole genome sequencing has been completed for 10 patients who underwent surgery for bilateral VS associated with a diagnosis of NF2. Blood and tumor samples were sequenced separately, enabling design of analysis pipelines to detect and differentiate germline and somatic mutations. Previous analysis of this dataset has shown that there are structural variations (e.g. large indels and inversions) across the genome that may play a driving role in tumorigenesis (unpublished data). Another analysis was conducted to identify single nucleotide variants (SNVs) in the sequence data. The SNVs called in the previous analysis were questioned during the peer-review process. This report describes the analysis pipeline used to further investigate the SNV calls for these patients in the NF2 gene region (22q12.2). The pipeline consisted of HISAT alignment to the hg19, processing in samtools, and variant calling in both Freebayes and VCFtools. Mutations in the NF2 gene region were counted for each individual. Our results showed a much higher rate of mutation than what has been previously been reported in the literature, many of which are likely noise. A separate variant calling software, VarScan, seems to be superior to the two previously used [5]. It reported a far lower number of variants than the other callers in a test run on a single sample, likely due to the fact that it filters variants for significance based on a p-value threshold. Further analyses are underway to enhance the signal of calls in this dataset using VarScan, and functionally characterize the identified mutations.

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Sexually Transmitted Infections in Underinsured Pregnant Women in Guam

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Background: Pregnant women are at risk for adverse perinatal outcomes from sexually transmitted infections (STI). Despite the widely accepted standard of STI screening before 20 weeks gestation, women in Guam routinely receive substandard care. (1) Community health centers (CHC) in Guam are one of the few providers of care for underinsured women on the island. Underinsured pregnant women are at highest risk for missed STI screening. The rate at which women in Guam receive prenatal care and STI screening is not well understood.

Methods: Retrospective chart review of 200 pregnant women who obtained care at a publically funded CHC in Dededo, Guam in 2017. Data collected included maternal age, insurance type, race, ethnicity, number of prenatal care visits, gravidity, parity, prenatal screening for STI, gestational age when screening was completed, and follow-up for positive screening. Institutional review board approval was obtained from the University of Connecticut School of Medicine and the University of Guam.

Results: Study demographics include mean age of 28.8 (standard deviation [SD] 6), majority Chuuk ethnicity (63.0%), and English (60.5%) or Chuukese (33.2%) language. Multiparity was common, with mean gravida 4.5 (SD 2.5), and 41.0% of women grand multiparous. Most women had public insurance, with 54.6% in the Medically Indigenous Program (MIP) and 34.9% with Medicaid. Women initiated prenatal care at a mean gestational age (GA) of 20.4 weeks (SD 8.9), with STI testing later at 22.1 weeks (SD 9.1). HIV and hepatitis B were the most frequently missed STI screenings at 9.5% each. Positive chlamydia screen was common (4.0%). In chi-square analysis, women with a positive chlamydia screen were younger than women who did not screen positive (26.4 years [SD 5.4] vs. 29.2 years [SD 5.9], p ≤ .01). Of those who screened positive, 61.5% had MIP insurance, compared to 23.5% with Medicaid, p<0.01. The association of ethnicity and GA at first prenatal care visit trended toward significance (p=0.07), with women of Chuuk ethnicity presenting to prenatal care later (21.6 weeks, SD 8.2) compared to women from Guam or other Pacific Island nations (18.6 weeks, SD 9.3).

Conclusions: The largely immigrant population at this CHC in Guam is at significant risk for late initiation of prenatal care and delayed STI screening. Women with MIP insurance screen positive for chlamydia at higher rates than women with other insurance. Efforts to improve adherence to prenatal care guidelines should focus on the Chuukese immigrant population and other patients insured through the MIP program. Further study is needed to better understand the factors involved in late presentation to prenatal care, and how to best address barriers to care for these women.

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Extended Screening Increases Prevalence of Postpartum Depression in a Pediatric Clinic

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Background: Postpartum depression (PPD), a subset of perinatal depression, affects over 10% of mothers. If PPD is untreated, it can lead to lower rates of breast-feeding, developmental delays for the child, and impaired mother-infant bonding. Despite the high incidence and significant consequences, PPD has been historically under-screened with over 60% of women going undiagnosed. Traditionally, PPD screening was performed by obstetricians at the 6-week postpartum visit; however, the American Academy of Pediatrics (AAP) guidelines recommend that pediatricians screen for PPD at the 1-, 2-, 4-, and 6-month well-child care (WCC) visits to improve diagnosis rates. Despite this recommendation, the uptake of frequent screening by pediatricians has been slow with less than half of pediatricians screening for PPD. We present our experience of extended PPD screening in our clinic.

Methods: The study was conducted at a pediatric clinic in Connecticut from June 2016 to June 2018. In the first year (June 2016-May 2017), PPD screening was done at 1-month WCC visits. Beginning in June 2017, PPD screening was increased to 1-, 2- and 6-month WCC visits. We used the 10 question Edinburgh Postpartum Depression Scale (EPDS) for screening, which takes less than five minutes to complete. Charts were reviewed pre-intervention (N= 182) and post-intervention (N = 187) to determine whether increasing screening led to an increase in the prevalence of PPD. Chi-square testing was used to compare the prevalence pre- and post-extended screening.

Results: Pre-intervention, the prevalence of PPD was 3.3% in 182 mothers at the 1-month visit. Post intervention, 187 mothers were longitudinally followed. The prevalence of PPD was 2.1% at the 1-month visit. With extended screening, we identified PPD in an additional two mothers out of 133 at 2 months and six mothers of 178 at 6 months. (Table)

PPD Prevalence	Pre Intervention	Post Intervention
1 month	3.3%	2.1%*
2 month	N/A	1.5%
6 month	N/A	3.4%
Overall	3.3%	6.4%≠

*p=0.49
≠p=0.13

Conclusions: Using extended screening increased the detection of PPD in our population from 3.3% to 6.4%. Despite the lack of statistical significance, this increase is clinically significant in improving care for both the mother and child. The screening tool is easy, free, and feasible in a pediatrician's office.

Men's Health-Seeking Behavior, Cancer Knowledge and Awareness, and Willingness to Support Female Partners in Jérémie, Haiti

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Introduction: The high relative breast cancer (BCA) fatality rate (45%) in Haiti reflects the need to encourage women to seek BCA screening and treatment upon first noticing symptoms[2,3]. Given the influence that men may have on decision-making in Haitian households, their own health- seeking behavior, as well as their knowledge and attitudes towards cancer and other non-communicable diseases could play an important role in the care seeking behaviors of their partners[1]. Therefore, the long-term goal of this study was to better understand men's health and care-seeking behaviors, and the influence this has on their willingness to support their female partners in Haiti.

Methods: This study was a cross-sectional survey. A structured questionnaire was used to conduct 120 in-depth interviews with Haitian men recruited from 5 churches of different denominations equidistant from Jérémie, Haiti. Questions investigated factors that influence men's health-seeking behaviors, overall health knowledge, and willingness to support the care seeking behaviors of their partners. Data was entered into Microsoft Excel and a quantitative analysis was performed using SPSS V.25.

Results: Mean age was 49, average household size 6, and 50% were married. 67% said they were the primary decision-makers for health care. 63% had seen a health care provider in the last year, however 70% had not sought care when sick due to cost (38%) or thinking illness was not serious (24%). 53% had blood pressure taken in past 6 months but 32% did not remember the results. Health information came from healthcare providers (34%), hospitals (27%), community health workers (23%), and radio (17%). Education level was positively associated with knowledge of general illness and disease ($r = .202$; $p<.05$). 98% knew about BCA, 50% knew someone with BCA, and 23% had a family member. Knowledge of symptoms and causes was low: .5 correct responses for symptoms, and 0 correct for causes. All men said they would support (transportation, financial, household) their partners for BCA screening and treatment.

Conclusion: Men in rural Jérémie underutilize health care themselves and have low knowledge about BCA symptoms and causes. They know community members and family with BCA and are willing to encourage their partners to get BCA screening and treatment. Men want to learn more about health for themselves and their families and more health education should be directed to them. They are important resources for BCA and many other diseases.

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Routine Postoperative Laboratory Tests Are Not Necessary After Primary Total Hip Arthroplasty

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Background: Postoperative laboratory testing has been used routinely for patients undergoing total hip arthroplasty (THA). However, with modern-day improvements in perioperative care pathways, it is unclear whether this practice remains justified. The purpose of this study was to assess the utility of routine postoperative laboratory tests in primary THA.

Methods: The electronic medical records of 351 patients who underwent primary, unilateral THA between 2015 and 2017 were retrospectively reviewed. The primary outcomes were the rates of acute blood loss anemia requiring transfusion, acute kidney injury (AKI), electrolyte abnormalities, and 90-day emergency department visits or readmissions. Multivariate logistic regression analysis was also performed to identify the risk factors associated with abnormal laboratory values.

Results: Seventy-four patients (21%) had abnormal postoperative laboratory results, of which 82.4% were exclusively due to electrolyte (sodium or potassium) abnormalities. Factors associated with electrolyte abnormalities were abnormal baseline electrolyte levels ($P < .001$ and P ¼.013 for sodium and potassium, respectively), diabetes (P ¼ .007), and lack of tranexamic acid use ($P < .01$). The rates of AKI and blood transfusion were 2.0% and 2.3%, respectively. Factors associated with blood transfusion were higher American Society of Anesthesiologists class and intraoperative blood loss _250 mL combined with either preoperative anemia or lack of tranexamic acid use. Factors associated with AKI were higher American Society of Anesthesiologists class and diabetes. Laboratory results did not change the standard course of care in 338 of 351 patients (96%). Abnormal laboratory values were not associated with increased length of stay (P ¼ .228) or emergency department visits/readmissions (P ¼ .21).

Conclusion: This study provides evidence that routine postoperative laboratory testing is not necessary in modern-day primary, unilateral THA. Instead, the decision to obtain laboratory tests after surgery should be driven by patients' risk factors.

For PDF and Full List of References:

Upregulation of Phosphoserine Aminotransferase 1 (PSAT1) following Epithelial-Mesenchymal-Transition of the MCF7 Invasive Breast Cancer Cell Lineage

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Background: In 2014, 236,968 new cases of invasive breast cancer (IBC) were diagnosed in the US and 41,211 women died of IBC (1). IBC can display epithelial phenotypes that are less invasive with a more favorable prognosis and more invasive mesenchymal phenotypes (2,3). Epithelial subtypes may undergo epithelial-mesenchymal transition (EMT), which includes downregulation of intracellular adhesions, loss of apico-basal polarity and cytoskeletal reorganization (2). Our lab has previously induced an epithelial IBC cell line, MCF7, to undergo EMT, producing corresponding post-EMT mesenchymal cell lines (termed $MCF7_{EMT}$) characterized by faster growth rate, expression of EMT markers and absence of epithelial markers (4). $MCF7_{EMT}$ cells also displayed metabolic reprogramming favoring glycolysis (Warburg effect). Proliferating cells like $MCF7_{EMT}$ cells must rapidly double their biomass before division (5). As such, they may upregulate the serine synthesis pathway (SSP), which contributes to multiple anabolic pathways. The SPP, which includes PHGDH, PSAT1 and PSPH enzymes respectively, is upregulated in multiple cancers (6). We previously demonstrated the mRNA and protein levels of PSAT1are upregulated in $MCF7_{EMT}$ cell lines compared to the parental MCF7 lines, though notably these experiments were conducted in 2-dimensional (2D) cell culture with traditional cell growth medium (7).

Aim: Replicate previous lab findings in 2D culture showing upregulation of PSAT1 mRNA and protein levels in $MCF7_{EMT}$ compared to parental cells utilizing physiological medium containing physiological levels of 4 key nutrients: glucose, lactase, pyruvate, and glutamine.

Methods: MCF7 cell line (American Type Culture Collection (Manassas, VA) and the corresponding post-EMT line $MCF7_{EMT}$ (4) were cultured in 2D culture using physiological medium with daily media changes for one week (4). Cells were isolated and processed for protein lysates or total RNA isolation as described (2). Protein levels of PSAT1 (Abcam) were assessed by Western blot, using B-actin as a normalizing control and imaged using a Gbox (Syngene). mRNA levels were assayed by qRT-PCR using a BioRad CFX Real-Time System and TATA-binding Protein 1 as a control.

Results: Protein analyses revealed significant expression of PSAT1 within the $MCF7_{EMT}$ cell line with a MW of ca. 40kDa, as anticipated. In contrast, the anti-PSAT1 antibody only detected a larger (ca. 55 kDa) protein in MCF-7 cells. The PSAT 1 mRNA levels were significantly increased within the $MCF7_{EMT}$ line as compared to parental MCF7cells.

Discussion: As predicted, we found evidence of PSAT1 upregulation within the $MCF7_{EMT}$ cell line at both the protein and mRNA level compared to the MCF7 parental line. These findings indicate an upregulation in the serine synthesis pathway, although future studies will examine the other two enzymes and serine levels in $MCF7_{EMT}$ cells, as well as the identification of the 55 kDa protein strongly expressed in parental MCF7 cells.

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Evaluation of Maternal Syphilis in Cyanika, Uganda

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Uganda ranks among the top 20 countries for highest newborn mortality rates, with a newborn mortality rate of 54 per 1,000 live births.[1] Maternal syphilis is a major cause of adverse birth outcomes, yet there is limited knowledge on the burden of maternal syphilis in Uganda.[2,3] This study aims to investigate prevalence, knowledge, and history of syphilis among pregnant and recently pregnant women in Cyanika, Uganda, as well as the relationships between various sociodemographic factors and obstetric/STI histories. 159 pregnant or recently pregnant women in Cyanika, Uganda participated in the study. Study participants were surveyed in a one on one interview about their sociodemographic information, obstetric history, knowledge of syphilis and other STIs, and personal history of STIs. Participants were subsequently offered a rapid point of care syphilis test. Data analysis revealed that 95% of participants did receive antenatal care for their most recent pregnancy, with a mean number of antenatal care visits of 3.34. However, 74.2% of these women reported not receiving a syphilis test during any of their antenatal care visits. Participants who reported not receiving a syphilis test had lower levels of STI knowledge and had less years of education than participants who reported receiving a syphilis test. 12.6% of participants reported ever having a complication with pregnancy or delivery, with a complication defined as either a miscarriage or death of the neonate during labor/delivery. We also found that 3% (n=5) of participants reported ever having an STI, and only 1.3% (n=2) of participants tested positive for syphilis. These findings demonstrate that the overwhelming majority of women who receive antenatal care in Cyanika are not being tested for syphilis. Therefore, the true prevalence of syphilis in this community may be higher than we are currently aware. There was also a widespread lack of knowledge about STIs among study participants. Further studies should be conducted to evaluate provider practices and provider knowledge regarding maternal syphilis testing/prevention during antenatal care visits in Cyanika.

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Cardio-Oncology Service: Our Experience at the University of Connecticut

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Background: The Cardio-Oncology Program at the University of Connecticut was created in January 2014 to address the needs of a growing population of patients with concomitant oncologic and cardiac conditions. We sought to describe the clinical characteristics of this patient population, track the frequency of cardiac monitoring, and assess the clinical (oncologic and cardiac) outcomes of these patients.

Methods: We conducted a retrospective chart review of 119 patients seen in the Cardio-Oncology clinic between January 2014 to June 2018. We assessed the temporal trends of clinic visits and echocardiographic strain assessment, reason for consult, referring specialties, patient characteristics, and patient outcomes.

Results: The mean age of patients was 62 years at their initial visit to the Cardio-Oncology clinic. The patient population represented a diverse background (Table 1). The average number of visits per quarter in 2014 was 4.3 visits, which has since grown to 47 visits per quarter in 2018, demonstrating a significant growth in this subspecialty (Figure 1a). During this time, the frequency of echocardiographic strain assessment has also significantly increased (Figure 1b). In 2016, the average number of echocardiograms accompanied by global longitudinal strain (GLS) analysis was 7.5 studies per quarter, which increased to 35.5 studies per quarter in 2018, an increase of 373%. The predominant referring specialty was hematology/oncology followed by internal medicine (Figure 2a). The presence of new cardiac symptoms was the leading cause for referral to the Cardio-Oncology clinic, and included development of new cardiac dysfunction, heart failure, angina, and hypertension (Figure 2b). As of June 2018, the vast majority of patients (96.2%) were able to complete or resume their chemotherapy, and 93.2% of patients were still living.

Conclusion: Cardio-Oncology services across the country are growing to meet the demands of a subset of patients who are experiencing unintended cardiac toxicities from past or current chemotherapy regimens. By describing the current state of the Cardio-Oncology service at the University of Connecticut, we hope to highlight the characteristics, strengths and weaknesses of the program.

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Characterization of Megakaryocyte Homing and Platelet Biogenesis in Pulmonary Parenchyma

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Abdominal Aortic Aneurysms accounts for at least 13,000 deaths/year in the USA (1). AAAs are associated with an increased inflammatory state and are characterized by monocytes, macrophages, neutrophils and T cells infiltrating the media of the aorta (2). The inflammatory state in AAA leads to the deterioration of the media via proteins such as MMP (3). Consequently, the wall of the aorta distends and can rupture resulting in death. It is well known that platelets and their modulating factors are critical to the balance between thrombosis and hemorrhaging (4). Recent studies have also shown that activated platelets can induce an immune response, particularly through crosstalk with leukocytes (5). Initial reports show that platelets, by way of this inflammatory response, may be involved in the initiation of AAA. . Classically, megakaryocytes are housed in the bone marrow and are responsible for platelet production. However, a novel platelet niche has been described in the lungs (6). Lefrancais et al. demonstrated that a substantial megakaryocyte population is resident in the lung, with the capability to repopulate the bone marrow in a thrombocytopenic state (6). Little is known about the factors regulating megakaryocytes homeostasis in the lung and whether lung-derived platelets have any specific biological role. Additionally, it is not understood how lung-derived platelets specifically are contributing AAA, if at all. Furthering our understanding of this mechanism could result in targeted therapies thereby reducing mortality and morbidity in AAA. Additionally further investigation of this platelet subset and of the underlying signaling mechanisms can reveal if and how this pool differs from the classically bone marrow-derived platelets. To investigate the role of the lung megakaryocytes in the context of thrombocytopenia, lungs, femur, blood and spleen tissue was extracted from FuccifloxPF4Cre+/- mice pretreated with GP1b antibodies and flow cytometry will be performed subsequently. To investigate platelet proliferation in the context of lung infection FuccifloxPF4Cre+/- mice were administered LPS to mimic the COPD disease state. Consequently cell flow cytometry was performed. This data and future studies could be monumental in prevention and treatment of AAA.

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Engineered Human Cardiac Microtissues to Study Genetic and Allelic Heterogeneity of Dilated Cardiomyopathy

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Heart failure (HF) is an epidemic that affects five million patients in the United States and has a similar mortality rate to cancer (~50% in 5 years). Dilated cardiomyopathy (DCM), a genetic condition affecting 1:250 individuals, is a predominant form of HF. DCM is characterized by heart chamber enlargement and impaired contraction leading to high morbidity and mortality. DCM is frequently caused by inheritance of autosomal dominant mutations in genes that encode for protein components of the cardiac sarcomere. Currently, it is not known how mutations in distinct sarcomere genes lead to DCM and whether mutation localization, such as mutation in distinct structural domains within the same protein, modifies disease severity, treatment response and DCM pathogenesis. For example, truncation mutations in the giant sarcomere gene titin (*TTN*) are the most common mutations identified in DCM patients, but surprisingly have also been found in the apparently normal population without cardiac disease. In addition, missense mutations in the cardiac beta-myosin heavy chain gene (*MYH7*) are also a cause of DCM, but have been associated with higher DCM penetrance compared to *TTN* mutations. Here, we hypothesize that the role of DCM genetic and allelic heterogeneity can be identified by engineering human cardiac microtissues differentiated from induced pluripotent stem (hPS) cells that have been genetically modified by CRISPR/Cas9 technology to contain human DCM sarcomere mutations in *TTN* and *MYH7*. Through a combination of cardiac microtissue physiological assays including contractility, calcium handling and structural analyses, as well as RNA sequencing and cell signaling assays, we aim to uncover new insights into DCM pathogenesis in a biomimetic three-dimensional context. Using CRISPR/Cas9 technology applied to hPS cells, we have engineered an isogenic *TTN* truncation mutation and two *MYH7* mutations located within the actin-binding and ATPase domains that are most enriched for pathogenic cardiomyopathy mutations. Our experience with generating sarcomere mutations has revealed preliminary insights into mechanisms of homologous recombination at the *MYH7* locus. Moreover, we have performed a comparative analysis of genome editing methods to identify an optimized strategy to introduce patient-specific missense mutations that have been previously technically challenging. With these novel human cell models, we can generate cardiac microtissues with DCM-associated *TTN* and *MYH7* mutations to elucidate the role of genetic and allelic heterogeneity in DCM and treatment responses within a human *in vitro* model system. Insights from this study will enhance our understanding of DCM pathogenesis, ultimately to inform precise treatment strategies for patients with heart failure.

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A Novel lncRNA H19 Mediated Pathway for Aberrant Hepatic Gluconeogenesis in Type II Diabetes

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One of the clinical hallmarks of diabetes mellitus type II (T2DM) is excessive hepatic gluconeogenesis. This dysfunction in liver physiology significantly contributes to hyperglycemia in T2DM.(1) The molecular mechanism behind this phenomenon remains poorly understood; however, recent literature has identified that elevated levels of long non-coding RNA (lncRNA) H19 is associated with T2DM in mice, and that lncRNA H19 can induce hepatic gluconeogenesis.(2) Despite this, the exact mechanisms through which lncRNA H19 is elevated in T2DM and induces hepatic gluconeogenesis are still unknown. Herein we shown that lncRNA H19 is upregulated in murine hepatocytes through the glucagon/cAMP/AKT axis, resulting in the upregulation of two critical genes in the gluconeogenic pathway, G6PC and pck1. Through in vitro assays, we found that activation of the glucagon/cAMP/AKT axis in murine hepatocytes lead to the decreased expression of micro RNA (miRNA) let7, an inactivator of lncRNA H19, which resulted in the elevated expression of lncRNA H19. The expression of lncRNA H19 was further amplified by the upregulation ot Tet3, which participates in a positive feedback loop with H19. The elevated expression of lncRNA H19 and Tet3 resulted in elevated levels of G6PC and pck1, respectivley. Additionally, the elevated levels of lncRNA H19 induced a promotor switch in HNF4a, an activator of gluconeogenesis, from the P1 gene product to the P2 gene product, which we hypothesize is responsible for the elevated levels of G6PC and pck1. Our results shed light on the complex mechanisms through which lncRNA H19 is elevated in T2DM, and through which it induces hepatic gluconeogenesis. There still remain details of this pathway to be elucidated, emphasizing the importance of continued investigation into this subject. Describing pathways involved in pathological processes, like the one outlined in this study, are particularly crucial as novel findings may provide new candidates for pharmalogical therapy in the future.

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A Curious Case of Transient Binocular Vision Loss in a Patient with Lupus Induced Supraventricular Tachycardia

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The estimated number of Americans with systemic lupus erythematosus (SLE) ranges from 322,000 to 1.05 million individuals and the clinical presentation of these patients can vary significantly1. The propensity of SLE to affect the cardiovascular system is well established with estimates around 50%2. Known cardiac sequelae of SLE includes: myocarditis, pericarditis, valvular abnormalities, coronary artery disease, and conduction/rhythm abnormalities. A literature search resulted in various case reports of patients with lupus experiencing monocular vision loss and/or binocular vision loss secondary to thromboembolic disease or neuropsychiatric etiologies, but none were found to be attributable to a cardiac arrhythmia3.

Our patient is a 30-year-old female with a history of systemic lupus erythematosus complicated by nephritis and vasculitis, presenting to the clinic with concerns of paroxysmal transient bilateral vision loss. The episodes are increasing in frequency over uncertain frame of time. The episodes last approximately 2-5 seconds, are associated with palpitations, and then her vision turns into "white-noise" just prior to total vision loss. She endorses similar symptoms in the past that were empirically treated with metoprolol. Eventually she was weaned off of the metoprolol after an extended period of being asymptomatic.

On presentation, the physical examination is benign. Initial work-up included an EEG (Normal), ECG (Normal), and 48-hour Holter-monitor with a symptom diary (Abnormal), and labs (normal for her). Her Holter-monitor revealed symptomatic paroxysmal supraventricular tachycardia. The use of a low dose beta-blocker resulted in cessation of the visual symptoms and a reduction in palpitations.

The patient symptoms have been atttributed to hypoperfusion of the retinas as a direct consequence of the supraventricular tachycardia. The supraventricular tachycardia is most likely a direct sequelae of her SLE, although this cannot be confirmed outright. A case report of a patient experiencing binocular vision loss secondary to lupus induced arrhythmia is very rare, if not completely unreported at this time. The patient's symptoms remain well-controlled on a beta-blocker and she is contemplating a surgical solution via ablation.

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Tobacco Use and Infantile Apnea, Is it Time to Reconsider the Relationship Between Apnea and Sudden Infant Death Syndrome?

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Background: Maternal tobacco smoking (MTS) during pregnancy is associated with an increased risk for sudden infant death (SIDS). It is unknown if this is linked with mechanism of AOP. Since AOP is related to gestational age (GA) at birth and almost all < 29 wk have AOP, a suitable group to study the effect of risk factors may be infants born >29 wk GA where AOP is not as common. A large cohort study of MTS and AOP in 30-34 wk GA infants has not been performed. Objective: To determine the association of maternal smoking and the incidence and duration from onset to resolution of apnea of prematurity (DORA) in infants born from 30-34 weeks gestation. Methods: Neonates (30-34 wk GA at birth) admitted to the Connecticut Children's Medical Center NICUs in Hartford and Farmington from 1/1990 to 1/2018 were studied. Apneic events and comorbidities were recorded. MTS and other pregnancy exposures were recorded from maternal history. AOP was documented based on cessation in breathing of ≥20 seconds or shorter pause with bradycardia or desaturation. Neonates with multiple congenital anomalies or incomplete records were excluded. Univariate analysis was performed to determine significance. Multiple regression analysis was used to evaluate the effect of MTS and other factors on AOP. Results: 4279 infants born at 30-34 wks GA were studied. Of these, 1598 (37.3%) were diagnosed with AOP. AOP decreased with increasing GA. Of 3774 pregnancies with data on MTS, 809 (21.4%) were born to any-time MTS and 677 (17.9%) were born to those with MTS during pregnancy. AOP incidence (p=.57) and DORA (p=.69) in MTS during pregnancy vs non-smokers was not significant even after controlling for GA at birth (Fig 1). Similar analysis of those who never smoked or those who quit during pregnancy showed no association with AOP. However other prenatal agent exposure showed significant relationships (Fig 2). Incidence of AOP was lower in infants of mothers who used alcohol during pregnancy vs infants without alcohol exposure (26% vs 39% p<0.05). AOP in infants born to mothers with pregnancy history of illicit drug use, had decreased rates of AOP (30% vs 40%, P<.02). In multivariate analyses after controlling for GA and co-morbidities there was no association of AOP and MTS during pregnancy. Conclusion: AOP was not associated with MTS during pregnancy, however a correlation was found between AOP and drug, or alcohol use during pregnancy. These relationships need to be further explored

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The Determinants of Helmet Use Among Motorcycle Drivers In The Dominican Republic
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Motorcycles cause 63% of road fatalities in the Dominican Republic (1). Traumatic brain injuries (TBIs) are the leading cause of motorcycle crash-related deaths and the most costly nonfatal injury that results from motorcycle accidents (2). Helmets are estimated to be 42% effective at preventing death and 69% effective at preventing head injury when a crash occurs (3). Due to the high preventative effectiveness associated with proper helmet use, measures to increase helmet adherence could have profound positive impacts on society and road safety. Prevalence of helmet use in the Dominican Republic is unknown. In this study, 119 adult motorcycles drivers enrolled and completed a survey exploring beliefs and practices surrounding helmet use. We collected observational data through community observation to establish prevalence of helmet use. A logistic regression model was conducted predicting frequency of helmet use. Consistent helmet use was defined as an answer of '5, Always' on a likert scale to the question, 'How often do you use your helmet?', with 39.3% (n=46) of subjects fit this parameter of helmet use. The four predictor variables included were increased age >34, having more than one child, history of severe accident, and history of paying the helmet fine. In the logistic regression model predicting 'always wears helmet', the only statistically significant variable was increased age >34 (p=0.003).Participants also reported the greatest perceived barriers to helmet use were comfort and reduced visibility. A total of 16,982 motorcycles and 24,473 riders were observed. Average overall helmet use among drivers was 32%. This number varied drastically based on time of day and type of road. Helmet use by the police station was elevated compared to all road types, even when controlling for road size and time of day (56% vs. 35% respectively, both large roads, on a weekday at 7am). Increased age appeared to be a strong predictor of frequent helmet use. This pattern suggests future educational efforts should target younger populations. The observational data suggested that history of paying the fine was an important factor though this predictor was not significant in this model. The findings of increased helmet use during ticketing hours and near the police station suggest that increased enforcement, perhaps at different times of days and on the smaller inner city roads, may increase helmet adherence and lower the rate of motorcycle accident related TBIs.

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A New Vision for Wound Healing in the Eye: Myofibroblast Differentiation from Schwann Cells in Corneal Injury

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Introduction: Though the role of Schwann cells in peripheral nerve repair has been extensively studied, little is known about the role of corneal Schwann cells (cSCs) in regeneration following corneal nerve injury. Opacity following corneal nerve injury due to trauma, corneal transplantation, or elective surgery is a vision-threatening complication that is poorly understood. While keratocytes have been extensively studied as the fibroblast-producing cell of the cornea, previous studies by the Mohan lab suggest a role played by Schwann Cells in corneal fibrosis. We tested the hypothesis that, following corneal injury, cSCs initiate a genetic repair program which causes de-differentiation into a myofibroblast phenotype.

Methods: Wild-type adult C57Bl/6 male and female mice were subjected to a penetrating stab injury under systemic and ocular anesthesia that produced a focal lesion through the epithelium, basement membrane and a significant part of the corneal stroma. Eyes were enucleated at 3, 7, or 14 days (n=3 for each time point) following injury and were processed for immunohistochemistry. Tissue cryosections were fixed and stained with antibodies against extracellular signal-regulated kinases-1,-2 (pERK1/2), glial fibrillary acidic protein (GFAP), Sox10, and α-smooth muscle actin (α-SMA). Stained tissues were examined by epifluorescence microscopy.

Results: Immunohistochemical staining revealed that, at 3 days post-injury, increased expression of pERK1/2 occurs in stromal cells proximal to the lesion site with many pERK1/2-positive cells also co-staining for GFAP, a marker of Schwann cells (SCs). Cells co-staining for pERK1/2 and Sox10, an SC transcription modulator, are also present at the lesion. Many GFAP-positive cells at the lesion between 3 and 7 days post-injury also showed expression of α-SMA, indicating that cSC de-differentiation and subsequent conversion into the myofibroblastic phenotype had occurred. At day 14, there is continued co-expression of GFAP and α-SMA demonstrating a prolonged cSC response to injury.

Conclusions: Our results are consistent with our hypothesis that cSCs de-differentiate into a myofibroblast repair phenotype following axonal injury. A temporal increase in pERK1/2 drives cSC reprogramming, followed by expression of fibrotic markers. Activation of the cSC repair phenotype is initiated as early as 3 days post injury and is maintained at 14 days post injury. This data presents new opportunities to study the potential regenerative as well as pathological roles of cSCs in corneal injury and disease.

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Isocitrate Dehydrogenase Mutatant Low-Grade Gliomas Regulate Their Immune Environment Through Methylation of the cGAS Gene Promoter

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Mutations in isocitrate dehydrogenase (IDH) 1 and 2 can lead to a mutant protein product that produces 2-hydroxyglutarate, instead of α-ketoglutarate, which causes a cascade of epigenetic changes that have been implicated in glioma tumorigenesis. One of the most prominent changes seen in IDH mutant gliomas is their immune environment (Cohen 2013). We hypothesized that these immunological changes are due to epigenetic changes of the genes involved in the cGAS-STING pathway. The cGAS-STING pathway plays a crucial role in tumor immunity by detecting cytosolic tumor derived dsDNA and producing inflammatory cytokines in response to these signals (Chen 2016). Here we show that IDH mutations in Gliomas are strongly associated with methylation of the cGAS gene promoter and decreased expression of the cGAS gene, along with decreased expression of other immunomodulatory genes leading to a more favorable immune environment. Through an analysis of the 598 patient-derived low-grade gliomas tumor samples in The Cancer Genome Atlas (TCGA), 372 samples had the mutant IDH gene and 226 samples harbored the wildtype IDH gene. Methylation and transcriptomic studies revealed 370 of the 372 (99.4%) mutant IDH tumors had methylated cGAS promoters and decreased expression of cGAS, while only 87 of the 226 (38.5%) wildtype IDH tumors had methylated cGAS promoters and decreased expression of cGAS. The decreased expression of cGAS seemed to be correlated to significant changes in immune composition, including a lower fraction of CD8+ T-Cells, and significant changes in the cytokine profile in genes such as CXCL9, CXCL10, and PD-L1. Our work demonstrates that the IDH mutation plays a favorable role in cGAS gene promoter methylation, although more experimentation is required to elucidate the mechanism by which this happens. We anticipate that an improved understanding of the association of the IDH mutation and cGAS methylation can lead to meaningful drug targets that can be used to prevent cGAS methylation, thus improving the immune-oncologic response to radiotherapy.

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Correlation Between Preoperative Patient-Reported Outcome Measures and Major Post-Operative Complications and Hospital Readmissions for Total Joint Arthroplasty Patients.

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Background: As one of the most common elective surgeries, elective total joint arthroplasty (TJA) has enormous cost reduction potential as value-based payment systems begin to financially incentivize hospitals to reduce readmission rates (1-4). Patient reported outcome measures (PROMs) have been developed to measure TJA surgical outcomes and improve upon existing practice in an attempt to improve patient outcomes, as well as reduce hospital readmission and institutional fines (4). The current literature has examined how patient characteristics can be predictors of surgical outcomes, as indicated by post-operative PROMs, but there is a lack of research showing the relationship between preoperative PROMs scores and post-operative surgical complications (5-7).

Methods: We assessed the correlations between post-operative complications in total hip and knee arthroplasty patients with their age and preoperative scores on three PROMs: HOOS Jr., KOOS Jr., and PROMIS Global Health survey.

Results: 1102 patients were included in the total sample for analysis. We found among all our patients, preoperative PROMIS global mental health score and patient age were significant predictors of postoperative complications. Among TKA patients, preoperative KOOS Jr. scores in conjunction with PROMIS Global Mental Health scores were significant predictors of postoperative complications.

Conclusion: Our study establishes the utility and predictive value of preoperative PROMs, allowing surgeons to more accurately assess a patient's surgical candidacy, mitigate risk factors, and decrease readmission rates.

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Biomarker for Benign Paroxysmal Positional Vertigo: A Prospective Study of Otolin-1 Levels in Serum

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Introduction: Benign paroxysmal positional vertigo (BPPV) is the most common cause of dizziness and has a significant negative impact on patients. BPPV has a cumulative incidence of around 10 percent by the age of 80, yet the underlying disease process is not well-understood [1]. The episodic, self-limited disease typically lasts on average around 6 weeks. Sufferers of BPPV have decreased quality of life related to health [2]. Crucially, unrecognized BPPV is more likely to cause depression, reduced scores in activities of daily living, and falls [3]. Finally, BPPV has a low recognition rate in primary care settings [3, 4]. It is hypothesized that BPPV is caused by degeneration of otoconia in the inner ear. Otolin-1 is one of the structural proteins in the inner ear on which calcium carbonate mineralizes to form otoconia. Our group has proposed using this protein as a biomarker and has demonstrated that these inner ear proteins are detectable in the blood [5]. The purpose of this study is to determine, through a prospective study, whether the serum levels of the otolin-1 are elevated in the setting of acute BPPV in adult males and females.

Methods: Clinical diagnosis of the independent variable, BPPV status, is made based upon history and physical examination. Physical examination included cranial nerve, otoscopic examination, and Dix-Hallpike maneuver with eye motion analysis to determine BPPV diagnosis. Age- and sex-matched control subjects were from the patient base of the UConn Otolaryngology clinic. They were candidates if they presented with non-acute, non-otologic complaints (e.g., allergies, hoarseness) with no history of vertigo. Blood draw was made at enrollment. Otolin-1 levels were quantified using the enzyme-linked immunosorbent assay technique.

Results: Our study is currently in progress. So far, we have prospectively recruited 16 normal controls and 9 BPPV subjects from the otolaryngology clinic at the University of Connecticut. One hemolyzed BPPV sample was excluded. The control group had mean otolin-1 (± SEM) level of 132.9 ± 27.7 pg/mL. The BPPV group had mean otolin-1 (± SEM) level of 141.7 ± 29.7 pg/mL. There was no statistically significant difference ($p > 0.05$).

Conclusions: Our preliminary results do not replicate our earlier report of significantly higher otolin-1 levels in female BPPV subjects compared to osteoporotic controls [5]. Given the low recognition rate of BPPV and otoconia degeneration in the general population, we will need to introduce more stringent recruitment criteria for the control subjects including negative Dix-Hallpike tests. Continued investigation is important because of significant implications of an easy to measure biomarker for BPPV/otoconia degeneration.

References:

Medicare Coverage is an Independent Predictor of Prolonged Hospitalization After Primary Total Joint Arthroplasty

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The Centers for Medicare and Medicaid Services (CMS) removed total knee arthroplasty (TKA) from its inpatient-only list and is currently soliciting public comments to follow the same suit for total hip arthroplasty (THA). The purpose of this study was to investigate the association between insurance type and length of stay (LOS), which is key to determining the need for inpatient versus outpatient admission.

Methods: A retrospective review of 848 patients who underwent primary, unilateral THA or TKA at a single tertiary academic center was performed. Patients were divided into three groups based on their insurance type at the time of surgery: Medicare, Medicaid, or commercial coverage. The primary outcome was the rate of hospital length of stay (LOS) exceeding two calendar days. Secondary outcomes were the rates of 90-day emergency room (ER) visits and readmissions. Univariate and multivariate analyses were performed separately for THA and TKA.

Results: The mean LOS was 2.32 ± 0.68, 2.73 ± 1.16, and 2.27 ± 0.55 for Medicaid, Medicare, and commercial groups respectively. After controlling for baseline differences between the study groups, Medicare patients had a significantly higher rate of LOS > 2 days (p<0.0001 for both THA and TKA) with a tendency for increased in-hospital complications for TKA (p=0.053). Within the Medicare group, 50.0% of patients undergoing THA and 61.5% undergoing TKA did not meet CMS' Two-Midnight Rule for outpatient surgery. There were no differences in the rates of ER visits (p=0.561 and 0.477 for THA and TKA respectively) or readmissions (p=0.053 and 0.8244 for THA and TKA respectively) among the three groups.

Conclusion: Medicare coverage is an independent predictor for need of inpatient admission after primary THA and TKA alike compared to Medicaid and commercial payer types. Risk stratification tools are needed to determine the subset of Medicare patients who are suitable for outpatient surgery. Until such stratification systems are developed and validated, arthroplasty surgeons not experienced with outpatient surgery should not be pressured to default to outpatient admission in Medicare patients.

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To Evaluate the Prognostic Significance of High Risk Clinical Features in Long Term Development of Aortic and Vascular Complications in Patients who present with Acute Type A Aortic Dissections

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Objective: Acute aortic dissections have a high acute mortality rate[1], but when caught early, surgical interventions are not only life saving, but prevent long term morbidity of aortic aneurysmal degeneration and diminished survival. An aortic dissection occurs when there is a tear in the tunica intima of the aorta, which creates a separation of the aortic media with variable longitudinal and circumferential extension[1]. The false lumen is created between the outer part of the aortic media and the adventitia, creating a flap of the tunica intima that has separated itself from the wall. Through the pressure of the blood, a double channel is formed with weakened walls, creating a greater risk of turbulent flow, thrombosis, and eventually rupture[1].

Methods: Retrospective data was collected to evaluate the long term outcomes as it relates to remodeling of true and false lumens of aortic dissection patients pre and post-surgical intervention. The data consisted of type A aortic dissections that present to the Hartford Hospital over the last 12 years. The clinical data collected included demographics, relevant medical and family history, presenting symptoms, characteristics of the dissection, surgical details, and post op symptoms and lab values. The imaging data collected included CT scan measurements of the aortic diameter, entry tear, false lumen size, false lumen thrombus, and site of primary tear as well as number of visceral vessels coming off a false and true.

Results: 81 patients had a type A dissection between the years 2003-2012 with an 84.6% 30 day survival rate. Overall, the subject mean age was 61.2 with a SD of 17.6 and 59.3% were males. Hypertension was the most common comorbidity, and 24.4% had documented controlled hypertension, where as 23.2% had poorly controlled hypertension. 77.8% of the patients presented with chest or back pain, but arm ischemia, paraplegia, and mesenteric ischemia were also common at 9.9, 14.8, and 17.3% respectively. During the surgery, a central venous cannulation with femoral arterial access was the most popular procedure. Antegrade cerebral protection was used 29.3% of the time and circ arrest was used 81.7%. Although 100% of the patients had their ascending aorta replaced, 21.9% of the patients additionally required an aortic root replacement and 28.1% needed a portion of their arch replaced. Post op, the most common complication was respiratory failure and 35.3% needed a prolonged vent of greater than 2 days. Renal failure was another common complication and 6.1% of the patients ended up on permanent dialysis. 36.6% of the patients were discharged home, 6.1% went to a long term rehab, and 34.1% went to a short term rehab. Overall, surgeries that took place greater than 12 years ago had a 30 day survival rate of 79%, between 9-12 years an 85% survival rate, and less than 9 years ago, an 89% survival rate, but with no statistical difference.

Conclusion: Type A dissections are still a chronic entity with a high mortality rate. This study produced data that is comparable to the international registry if the surgical technique and post op care are up to hospital standards. However, this disease still remains a morbid condition with high risks that need to be addressed with further research.

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Is Gadolinium Really Necessary? Moving From Multiparametric To Biparametric Prostate MRI

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Introduction and Objective: Multiparametric magnetic resonance imaging (mpMRI) has been increasingly incorporated into prostate cancer care. Traditionally, mpMRI (mpMRI) combines T2-weighted (T2W), diffusion-weighted (DWI), and dynamic contrast-enhanced (DCE) sequences.1 Recent data have challenged routine use of DCE, since these images are only helpful for peripheral zone (PZ) lesions with equivocal DWI findings.2¬ Our objective was to determine how often DCE MRI provided actionable information among men undergoing prostate mpMRI.

Methods: We performed a retrospective review of our prostate MRI database from January 2012 through January 2018. PIRADS v2 was used as standard. Patients were characterized as active surveillance (AS), biopsy naïve (BN), or prior negative biopsy (PNB). DCE sequences were considered actionable if a PZ lesion deemed PIRADS 3 on DWI was upgraded to PIRADS 4 based on contrast-enhancement. Cost data were obtained from the Medicare Physician Fee Schedule Search.

Results: 153 patients (124 AS, 15 BN, 14 PNB) were included. Median age was 64 (IQR 58-64) years and the median PSA was 7.0 (IQR 5.0-11) ng/ml. Median PSA density was 0.15 (IQR 0.11-0.23 ng/ml/cc). One hundred twenty-seven PIRADS 1, four PIRADS 2, five PIRADS 3, fourteen PIRADS 4, and three PIRADS 5 lesions were identified. DCE provided actionable information in 4 men (2.6%). Eliminating DCE sequences would have saved $121.99 per MRI or $18,664.47 for the entire cohort (Table 1) at the risk of needing to repeat MRI imaging in 4 men.

Conclusions: DCE sequences provide little additional information over T2W and DWI in the vast majority of men undergoing prostate MRI. Routine use of DCE may represent low value care.

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The Impact of Atrial Fibrillation and Anticoagulation in Elderly Hip Fracture Surgery Patients

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Introduction: Atrial fibrillation (AF) is common in the elderly and complicates management of hip fractures. Current literature does not address atrial fibrillation and the safety of anticoagulation in patients with hip fractures. In this study, we sought to describe the prevalence of AF in elderly patients with hip fractures, the outcomes associated with AF, and the safety of anticoagulation.

Methods: This is a retrospective cohort review of 861 hip fracture patients' ≥65 years in age who underwent surgery at Hartford Hospital between December 9, 2013 and April 26, 2018. Endpoints include time to surgery (TTS), length of stay (LOS), complications, 30-day readmissions, and death.

Results: AF prevalence was noted to be 28.1% (242 out of 861 patients). The AF group was older, had more men, and a higher risk of death. 120 AF patients were anticoagulated (49.6%). Among anticoagulated patients, 74 were on vitamin K antagonists (VKAs) and 44 were on direct oral anticoagulants (DOACs). AF patients, including the anticoagulated subgroup, were found to have longer LOS and TTS. Interestingly, we found that anticoagulated AF patients were less likely to experience complications (41.7 vs. 55.6%) including bleeding (29.2 vs. 43.4%) and thrombotic (0.8 vs. 6.6%) events, and, unexpectedly, were less likely to receive transfusions (29.2 vs. 43.4%). There were no differences between patients receiving VKAs versus DOACs.

Conclusions: AF is prevalent in the hip fracture population and is associated with increased mortality. For anticoagulated AF patients, while surgery was delayed and hospital stay was prolonged, fewer complications were noted. Our study suggests judicious use of anticoagulation appears to be safe even in the setting of falls resulting in hip fracture.

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The Link between Loneliness and Depression in the Elderly Male Urban Senior Housing Population and Implications for Primary Care Physicians

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This paper is based on qualitative in-depth interviews with elderly male residents living in senior housing in Hartford, CT, USA and health care workers whom provide care to this population. The residents were primary Hispanic (Puerto Rican) and Black, aged 52 to 84, and were low income. Four different sets of interviews were collected with the senior residents. The first and fourth interviews focused on the residents' understandings and definitions of mental health issues, while the second and third were reserved for the residents who screened positively for depression and whether they received the services they needed. The providers who were interviewed consisted of primary care doctors, psychiatrists, nurses, social workers/community providers, and religious figures. The provider interviewers were focused on mental healthcare in the elderly and its limitations. Thematically we will analyze the link between loneliness and depression in the elderly male population, the predictors that lead to their loneliness, and coping mechanisms which were used by the residents, all in the framework of helping primary care physician better identify mental health issues in their male, elderly patients.

With this paper we hope to clearly establish the need for questioning on loneliness when assessing elderly male patients' depression statues. Through several studies a connection has been made between loneliness, depression and increased functional decline in the older population (3). In particular, it has been shown that lower income, chronically ill, and minority older adults living in urban housing disproportionally struggle with not only depression (1) but also loneliness (2). This link between loneliness and depression has, as well, been identified during both our resident and provider interviews. When asked about the causes of depression one provider stated, "The triggers to the[ir] depression, loneliness, that is number one…With the seniors, it is loneliness." Through a deeper analysis of how patients themselves define and understand loneliness and depression and examining how patients speak about these problems with their providers we hope to aid primary care physicians in inquiring and accurately diagnosing depression in the elderly male urban population.

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Localization of DRA and NKCC1 Ion Transporters in Human Derived Intestinal Enteroids

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Background: For years, cell-line and animal models have been the primary methods for researching intestinal pathology. However, these models have several limitations and cannot always accurately represent human intestinal epithelium structurally and functionally. In 2004, Clevers laboratory introduced a new models for research: organoids. Organoids are 3D multicellular structures that model various epithelial organs, and contain key features and cell types expressed in vivo human intestinal epithelium. There are two different approaches to developing organoids: 1) differentiating induced pluripotent stem cells into the organ you wish to study (i.e. organoids) and 2) taking biopsies from patients and growing them into tissue (i.e. enteroids). Regardless of which method is used, these mini-intestines represent the human intestine epithelium both structurally and functionally, possessing an immature (crypt like) and mature (villus like) epithelium. This structural and functional accuracy makes them functional models to study the epithelial diseases in the intestine.

Objective: This project aimed to characterize immature (crypt) and mature (villus) human duodenal enteroids (hDEs) derived from healthy patient biopsies as the first step in the development of human intestine disease models. Specially, this project aimed to characterize the location of DRA and NKCC1 intestinal ion channels in enteroids

Material and Methods: The models utilized in this project were obtained from healthy human biopsies, and are thus referred to as enteroids. The growth of the enteroids required a complex media containing several different growth factors. Initially, the enteroid cells were cultured with growth factors to proliferate them and keep them in an immature (or crypt like) phase. With removal of several growth factors the enteroids stopped proliferating and differentiated into mature (villus like) intestinal cell types. Specifically, differentiation from immature to mature required withdrawal of Wnt3a, nicotinamide, and SB202190. Immunofluorescence staining for DRA and NKCC1 was done in both mature and immature enteroids to characterize the location of these ion transporters typically found in intestinal epithelial.

Results: Immunofluorescence staining showed accurate localization of the DRA and NKCC1 ion transporters. DRA was identified in the apical membrane of villi and NKCC1 was identified in the basolateral membrane of crypts.

Conclusions: Enteroids can accurately model the ion channels in human intestinal epithelia and be utilized for research of intestinal pathologies involving these channels.

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Assessment of Clinical Periodontal Parameters on Inflammatory Burden in End-Stage Renal Disease (ESRD)

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Objective: Periodontal disease is a modifiable and treatable risk for patients with End-stage renal disease (ESRD). Our study aims to investigate the effects of a method integrating prolonged oral health and behavioral treatments on ESRD patients. We hypothesize that periodontal disease control will increase serum albumin levels and correlate with better systemic outcomes in ESRD, as active inflammation has been associated with hypoalbuminemia. Low serum albumin levels have been linked to malnutrition (< 3.6 g/dL) and are considered a strong predictor of mortality (Fouque et al., 2011). Because albumin is a biomarker associated with poor oral health status, we will compare changes in serum albumin with changes in clinical periodontal parameters such as plaque score (PS), bleeding on probing (BOP), and probing depth (PD) (Ioannidou et al., 2014).

Methods: The study is a randomized controlled clinical trial (n=72 ESRD patients) with a control (single gum disease therapy without oral hygiene maintenance) and an experimental group (continuous gum disease therapy with multiple oral hygiene maintenance appointments). Subjects are followed for six months, with clinical periodontal parameters assessed and blood samples taken at baseline, 2 months, 4 months, and 6 months. This is a preliminary analysis of a small sample of the targeted population.

Results: So far, 17 participants have completed the 6 months follow up. The average baseline serum albumin is 3.77 g/dL and the average final serum albumin is 3.82 g/dL. Among the control group, the average baseline albumin is 3.63 g/dL and the final is 3.83 g/dL. Among the test group, the average baseline albumin is 3.87 g/dL and the final is 3.82 g/dL. For the control group, there is a weak negative correlation between serum albumin change vs. PD greater or equal to 5 mm change (RÇ = 0.1096). For the test group, there is a negative correlation between the serum albumin change vs. PS and BOP changes, with RÇ = 0.4987 and RÇ = 0.4403, respectively.

Conclusions: Chronic kidney disease (CKD) is associated with higher periodontitis prevalence due to higher levels of inflammation in the body (Ioannidou et al., 2006). Nonetheless, there is limited data on highly effective treatment methods to target ESRD patients. Unlike previous studies, ours attempts to show the systemic impact of repeated and systematic treatment of periodontitis in dialysis patients. So far, while our sample is still very small, the preliminary datashow that a decrease in serum albumin correlates with better clinical periodontal parameters, which supports our hypothesis.

Future directions: Our next steps focus on data extraction from biomarkers in blood samples and assessing possible correlations with clinical periodontal measures.

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Comparison of Effects of Peridex® (Chlorhexidine) on Tastes of Chloride, Benzoate and Saccharin Sodium Salts on the Anterior Tongue

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Objective: Temporary salty ageusia occurs during treatment with chlorhexidine, an antimicrobial rinse used to treat gingivitis (1). Recent research shows chlorhexidine rinse also converts the bitter taste of sodium benzoate to sweet (2), which necessitates comparisons of chlorhexidine-rinse effects on additional sodium salts. The aim of this study was to investigate chlorhexidine's effect on the taste of the three sodium salts: NaCl, Na-benzoate, Na-saccharin; at low and high concentrations. Three mixtures of sweet, salty and bitter tastes were also tested.

Methods: 13 participants were recruited for the experiment and familiarized with the tastes of 5 solutions having a salty, sweet, bitter, sour or no taste. Thereafter, each participant completed 2 sessions one week apart: first with a control water rinse and then with a 0.12% chlorhexidine rinse. After the rinse, participants sampled 12 solutions applied to the anterior tongue with a Q-tip and identified which of the tastes were perceived. Frequencies of identification of solutions as salty, sweet, bitter, sour, or no taste were determined. Identification of a quality was given a value of 1 and lack of identification of the quality given a value of 0. These data were statistically analyzed using t-tests in Excel.

Results: Following Peridex rinse, the sweet taste of Na-benzoate was detected less frequently at low concentrations compared to control (p=0.001) and identification of the sweet taste of Na-Saccharin did not differ from controls. Identification of the salty taste of 0.5 M NaCl was more frequent when presented alone than when presented in the 3-component mixture: 0.5M NaCl + 0.5M Sucrose + 1.0mM Quinine (p=0.01). In high-concentration, 2-component mixtures of NaCl and quinine, bitter taste was identified more frequently than salty (p=0.01). In the high concentration NaCl + sucrose mixture following Peridex rinse, sweet was identified more frequently than salty (p=0.01). In three component mixtures of NaCl, sucrose, + quinine, sweet was identified more frequently than bitter in control and Peridex sessions (p=0.01, p=0.0000); and sweet was identified more frequently than salty in the Peridex session (p=0.0001).

Conclusions: Following Peridex rinse, the sweet taste of Na-benzoate was detected less frequently but identification of the sweet taste of Na-Saccharin was unaffected. Also in 2-component and 3-component mixtures containing NaCl, sucrose and/or bitter quinine, the salty taste was detected less frequently than non-salty tastes after Peridex rinse.

Future Directions: Future studies should investigate the effect of chlorhexidine rinse on three component mixtures of NaCl, sucrose, and quinine with varying concentrations to determine at what threshold the unpleasant bitter quality, which may affect compliance, is identified more frequently than sweet.

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Retrospective Analysis of Clinical Outcomes for Patients with Brain Metastases Receiving Linear Accelerator Based Radiosurgery and Hypofractionated Radiotherapy

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There are currently two main modes of treatment for patients with brain metastases- surgery and radiation. Surgery is mainly reserved for lesions larger than 3-4cm or those causing neurological symptoms for the patient while stereotactic radiosurgery (SRS) is used for limited brain metastases for high performance status patients. There are currently multiple available options within the realm of radiotherapy and these can vary based on the setting- definitive or postoperative. A current technique for SRS is using a Gamma Knife (GK) radiosurgical platform, with 1-year local control rates greater than 90%. However, another technique to deliver radiosurgery to patients with brain metastases is by using a linear accelerator (LINAC) fitted with the Novalis/Exactrac platform. This can be done in both the definitive or post-operative setting to deliver SRS or hypofractionated radiotherapy. Little is known about the outcomes comparing LINAC- vs GK-based treatments for these patients. In addition, in both the definitive and post-operative setting for larger brain metastases, it is unknown whether an adjuvant single fraction of radiosurgery or hypofractionated radiotherapy provides better outcomes. Our goal is to study outcomes between patients treated with linear accelerated and gamma knife based stereotactic radiosurgery vs hypofractionated therapy in both the definitive and postoperative setting. This will be done by performing a retrospective chart review study in which we will collect data from medical records and create a database of patients from UConn Health, Hartford Hospital, and Yale-New Haven Hospital to study multiple factors on long term outcomes such as survival and toxicity. This study will lead to further insights to optimize radiotherapy for brain metastases to improve survival.

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A Study On Water Quality, Hygiene Practices, and Attitudes Toward Water Sourcing in Kisoro, Uganda

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Poor water quality, sanitation and hygiene account for approximately 1.7 million deaths per year, mainly due to diarrhea caused by infection [1]. The goal of this project is to improve our understanding of water, sanitation, and hygiene (WASH), and water security in Kisoro, Uganda. Kisoro is one of the most poverty-dense regions of Uganda, and existing WASH assessment tools generally function at a national level, and may overlook populations with the least access to WASH resources such as Kisoro [2]. Our hypotheses were that water from sources other than municipal supplies would be associated with higher levels of coliforms and E. coli, households using untreated water would have higher incidence of diarrhea, and the presence of E. coli and coliform bacteria would correlate with the incidence of diarrhea. Data was collected using a close-ended question survey. A local translator administered the survey and translated the responses from Rufumbira to English. Subjects were chosen based on the location of their home. The survey addressed socioeconomic factors, incidence of illnesses, water security, sanitary practices, and included an observation component on latrines and water storage. Water samples were collected from each home, tested for mineral content and turbidity, and cultured on #3M Petrifilms; coliform and E Coli counts were collected at 24 and 48 hours. Data was entered into SPSS v. 25 (2018), and univariate and bivariate relationships were assessed using Chi Squared and Fisher's Exact tests. 91.7% of respondents reported that they always cleanse their drinking water by boiling it, and no respondents reported cleansing water for any other use besides drinking. On average, respondents spent 45% of their monthly income on water each month. The average time required to fetch water was 64 minutes. 93.7% of water samples collected grew coliforms and more than 50% were TNTC; 44.7% of samples grew E. coli and 14.4% were TNTC. Almost 80% of respondents believed that the water they had at home was safe to drink, and no respondents who reported diarrheal illness believed it was due to the water that they drank. In fact, less than 20% of respondents reported diarrhea in their household in the past 4 weeks and 6 months. Fisher's Exact and Chi Squared did not find any statistically significant relationships among variables that were hypothesized to contribute to presence of E coli in the respondents' drinking water and incidence of diarrheal illnesses. In conclusion, this study was not able to draw any statistically significant conclusions on what may influence WASH in Cyanika, Kisoro, Uganda. However, the data paints a picture of compromised water security - respondents spend much of their income on purchasing water and travel far distances for water.

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Research Awards

SCHOOL OF DENTAL MEDICINE

ASSOCIATE DEAN'S AWARD: Awarded in recognition of an outstanding presentation in basic, clinical or behavioral science. The award consists of a complimentary meeting registration and monetary award of $500 to assist with travel for a student who will be presenting at the 2020 AADR General Session & Exhibition Washington, D.C., in March, 2020.

COLGATE-PALMOLIVE STUDENT RESEARCH AWARD: A dental student will receive a scholarship award of $1,000 in recognition of exemplary knowledge, understanding and presentation of basic and clinical dental research at Student Research Day.

CONNECTICUT HOLISTIC HEALTH ASSOCIATION: Awarded by Dr. Michael Basso, this annual award was established to recognize excellence in research in Integrative/ Complementary and Alternative Medicine. A medical student and a dental student will each receive an award of $100. Special thanks go to Dr. Michael Basso of the Connecticut Holistic Health Association.

DEAN'S AWARD: Awarded in recognition of an outstanding presentation demonstrating clinical application and technique relating to dentistry. This award consists of an expense-paid trip as the School of Dental Medicine's representative to the Hinman Student Research Symposium, held in Memphis, Tennessee; and the student's name engraved on a plaque.

DENTAL STUDENT RESEARCH SOCIETY: Presented by Dr. Arthur Hand, a monetary award of $100, for excellence in a science presentation by an undergraduate student.

DENTSPLY-SIRONA STUDENT CLINICIAN AWARD: Awarded by Mr. Joel Monteiro of Dentsply Sirona, in recognition of an outstanding presentation. Includes round-trip coach fare to the 2020 AADR General Session & Exhibition/Dentsply Sirona SCADA Program held in Washington, D.C. in March, 2020 as the School's representative; allowance for lodging, food and other expenses and a Dentsply Sirona plaque.

GUSTAVE PERL MEMORIAL AWARD: A monetary award of $100, for outstanding original research, and the student's name engraved on a plaque.

JOHNSON & JOHNSON RESEARCH EXCELLENCE AWARD: Awarded in recognition of an outstanding research project relating to the field of periodontology. This award consists of an engraved plaque to be displayed at UConn, a small plaque for the recipient, and a $150 UConn Health Bookstore gift card.

OMICRON KAPPA UPSILON-PHI CHI CHAPTER AWARDS: Two monetary awards of $150 each are given in recognition of outstanding research; the first award is given for basic science research and the second award given for clinical science research.

Research Awards

OUTSTANDING RESEARCHER AWARD: Awarded to a School of Dental Medicine Faculty member who has demonstrated outstanding research accomplishments in the previous calendar year. This award consists of a certificate and monetary award of $1,000 for academic enhancement.

SCHOOL OF MEDICINE

DEAN'S AWARD: In recognition of two outstanding medical student researchers and their faculty mentors. Awards of $250 each will be presented to the four awardees. The awards to faculty mentors will be used for travel to a scientific meeting.

DR. AND MRS. JEFFREY GROSS AWARD FOR EXCELLENCE IN RESEARCH ACHIEVEMENT: Dr. and Mrs. Jeffrey Gross established this award. Jeffrey Gross, M.D., is Professor and Chair of the Department of Anesthesiology at UCHC. Awards of $250 each will be given to two medical student researchers who presented excellent studies. One award will go to an oral presentation and one award will go to a poster presentation.

LAWRENCE G. RAISZ AWARD FOR EXCELLENCE IN MUSCULOSKELETAL RESEARCH: In honor and memory of Lawrence G. Raisz, M.D., this award of $250 will be given to a medical student researcher who presented outstanding work in the field musculoskeletal research.

WILLIAM M. WADLEIGH MEMORIAL AWARD FOR CROSS-CULTURAL AND INTERNATIONAL HEALTH RESEARCH: The award is in honor of William M. Wadleigh, PhD, anthropologist and Associate Director of the Center for International Community Health Studies in the Department of Community Medicine and Health Care, committed to global health education, who passed away from AIDS. The $250 award is given annually to the medical student whose research best exemplifies international and cross-cultural understanding of health issues.

CONNECTICUT ACADEMY OF FAMILY PRACTICE: One medical student will receive this $200 monetary gift for excellence in Primary Care Research

CONNECTICUT HOLISTIC HEALTH ASSOCIATION: Awarded by Dr. Michael Basso, this annual award was established to recognize excellence in research in Integrative/ Complementary and Alternative Medicine. A medical student and a dental student will each receive an award of $100. Special thanks go to Dr. Michael Basso of the Connecticut Holistic Health Association.

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In acknowledgment of the efforts of our Medical and Dental student researchers, their faculty mentors, the members of the Medical and Dental Student Research Committees and all those involved in making this day possible.

Medical & Dental Student Research Day Organizing Committee:

Dr. Lynn Puddington, Co-Chair, Director of Medical Student Scholarship and Research
Dr. Aditya Tadinada, Co-Chair, Director of Dental Student Research
Dr. Arthur Hand, Alternate Co-Chair, School of Dental Medicine
Christine McNally, Academic Curriculum Coordinator, School of Medicine Curricular Affairs, Stage 1 Curriculum Manager
Lisa Ramsdell, Administrative Program Coordinator, School of Dental Medicine
Darice Schroeder, Administrative Assistant, School of Medicine, Curricular Affairs
Adam Clymer, Administative Program Coordinator, Curricular Affairs
Laura Didden, Business Service Manager, School of Dental Medicine

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Dr. John Birk
Dr. Hugh Blumenfeld
Dr. Leslie Caromile
Dr. Lisa Chirch
Dr. Anne Delany
Dr. Dharamainder Choudhary
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Dr. David Steffens
Dr. Roger Thrall
Dr. Pam Taxel
Dr. Christine Thatcher
The UConn Health Postdoctoral Scholars

Dental School Reviewers/ Judges

We would like to thank the judging panel for their tremendous efforts and timely evaluations.

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Dr. Sarita Arteaga, Associate Dean for Students, School of Dental Medicine
Dr. Christine Thatcher, Associate Dean for Medical Education and Assessment
Linda Paradis, Administrative Program Assistant, Curricular Affairs

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Dr. and Mrs. Jeffrey Gross, Award for Excellence in Research Achievement
Hartford Medical Society, HMS Summer Research Fellowship
Lawrence G. Raisz Award for Excellence in Musculoskeletal Research
William M. Wadleigh Memorial Award for Cross Cultural and International Health Research
Connecticut Academy of Family Practice
Dr. Michael Basso, Connecticut Holistic Health Association

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Mr. Joel Monteiro, Dentsply-Sirona Student Clinician Award
Dr. Michael Basso, Connecticut Holistic Health Association
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Ms. Janet Finkle, Johnson & Johnson Health Care Products, Research Excellence Award
Ms. Diane S. Peterson, Colgate Palmolive Student award
Omicron Kappa Upsilon – Phi Chi Chapter Award
Dr. Arthur Hand, Dental Student Research Society Award
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Medical and Dental Student Posters

Academic Rotunda Hallway

Poster #	Last Name	First Name
1	Agaraj	Irini
2	Alvarado	Savannah
3	Boyne	Kelsey
4	Ciarlo	Ryan
5	Clement	Alexandra
6	De La Guerra	Justin
7	Gronbeck	Christian
8	Harry-Hernandez	Salem
9	Kohn	Christine
10	Miett	Timothy
11	O'Neill	Margaret
12	Pashankar	Rashmi
13	Paul	Gabriel
14	Plourde	Julia
15	Quarella	Candice
16	Schrang	Abigail
17	Smith	Morgan
18	Weeks	Jessica
19	Zubkov	Micaella

Poster #	Last Name	First Name
20	Arthur	Ashley
21	Borodic	Laura
22	Cope	Ethan
23	Cosgrove	Steven
24	Dodson	Njeri
25	Fox	Evan
26	Gehlbach	John
27	Kalajian	Taleen
28	Lafen	Julia
29	MacCormac	Kenneth
30	Zhang	Yingying
31	Zoghbi	Marina

Academic Lobby

Poster #	Last Name	First Name
32	Bumsch	Kristin
33	Chiu	David
34	Fones	Lilah
35	Goldburg	Samantha
36	Gonzalez Cuevas	Elisa
37	Guirguis	David
38	Jongbloed	Walter
39	Joseph	Chinaka
40	Lyall	Vikram
41	Mannava	Sindhu
42	Moskalik	Anzhela
43	O'Brien	Jeffrey
44	Rebello	Kimberly
45	Santiago	William
46	Stone	Andrew
47	Sullivan	Bethany
48	Testa	Joseph
49	Tomasevich	Kelly
50	Zuberi	Shaharyar
51	Bowe	Michael
52	Colburn	Lauren
53	Fetene	Jonathan
54	Healy	Abigail
55	Hill	Samantha
56	Joseph	Rebecca
57	Joshi	Shalmli
58	Kulak	Meghan
59	Lee	Subin
60	McKenna	Kelly
61	Momah	Deandra
62	Potter	Molly
63	Riccardi	Aaliyah
64	Sagnelli	Matthew
65	Schultz	Gwendolyn
66	Spiegel	Katherine
67	Williamson	Michelle
68	Doemland	William
69	Hale	Jennifer

Academic Rotunda

19

20

Medical Poster
Presentations
#1 - #19
- Community
- Public Health

Dental Poster
Presentations
#20 - #31

9

31

1   8

Academic Lobby

Medical Poster Presentations #32 - #69
- Clinical
- Laboratory
- Educational