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Clinic in the Park and Shalimar Learning Center: A Case Study on a One-Stop Model for Public Health

University of California, Irvine: School of Medicine and School of Social Sciences; UC Irvine Health; and Clinic in the Park, OneOC fiscal project

Background: Clinic in the Park is a pediatrician-led large health collaborative and a Federal Healthy Tomorrows Partnership for Children project with the American Academy of Pediatrics. It is a one-stop shop neighborhood health initiative targeting low income children to connect/refer/navigate to public benefits/resources; perform safety net screenings; and deliver health education and safety equipment. We partnered with a nonprofit, Shalimar Learning Center (Think Together) which provides family services. Goals & Objectives: 1. Establish baseline needs survey of families at Shalimar. 2. Implement pilot Clinic to determine whether Clinic can meet self-reported needs. Methodology: Bilingual Clinic in the Park volunteers conducted needs surveys with a convenience sample of families (n=34) at Shalimar. The survey assessed 1) demographics; 2) access to medical/community services, and 3) health education/safety equipment needs and included 11 key informant interviews. Results: 3/4 have an annual income of <$24,600; 57% < hs education; 22% food insecurity. Needs included child bike helmets (38%), dental exams/oral health education (38%), vision exams (22%), literacy tools/free books (38%), and nutrition education (36%). Interviews with parents showed the need for support on drug/alcohol abuse prevention; CPR classes, mental health services, and connections to low-cost clinics. The Clinic in the Park, 8 weeks later, provided 1,756 services to 165 visitors. Services included, but were not limited to bike helmets (47), dental exams & education (30,82), vision screenings (50) and nutrition (191). Conclusion: Clinic in the Park one-stop shop model of Family Health Days brings resources into low income communities otherwise not available to children. Clinic in the Park/Shalimar Learning Center partnership was able to leverage resources and provide services identified as need. Unmet needs such as medical care within walking distance and adult services require new strategies.

Keywords: One-stop-shop; public health; primary care

Poster Location: 53

Al-Dubaisi,Rehab,MD; Weiss,Lan, MD., PhD.; Eis, Peggy, PhD.; Kathy Hall; Sumit Parikh;Mary Kay Koenig; Andrew Maclean; Sha Tang; Anton N. Hasso; Janneke Balk; Elizabeth Chao; Eli Hatchwell; Virginia Kimonis

Mitochondrial studies in a novel disorder associated with NUBPL-associated mitochondrial Complex I deficiency in patients with global developmental delays, ataxia, cerebellar and pons hypoplasia

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The NUBPL gene (MIM 613621) was first reported as a cause of mitochondrial Complex I deficiency syndrome (MIM 252010) in 2010, and only seven families have been reported worldwide. We now report clinical features of 5 patients in 4 families, representing the largest number of patients diagnosed worldwide with NUBPL Complex I deficiency (CID). Patients were diagnosed using Whole Exome Sequencing (WES) and all were found to be compound heterozygous for a NUBPL (NM_025152) splicing mutation (c.815-27T>C) that is common in the population (~1% frequency), plus a rarer non-synonymous or splicing mutation (in trans) as follows: c.311T>C (p.L104P) in families 1 (cases 1 and 2) and 4 (case 5), c.693+1G>A in family 2 (case 3), and c.545T>C (p.V182A) in family 3 (case 4). We note that in 3 of 4 families (all except family 1), the c.815-27T>C mutation is present in cis with c.166G>A (p.G56R), whose pathogenicity remains in question. Primary clinical features of the CID patients, who are presently ages 3-19 years, include onset of neurological symptoms at ages 3-18 months, global developmental delay, ataxia, nystagmus, speech articulation difficulties, and cerebellar dysfunction (brain MRIs show progressive cerebellar and pons hypoplasia) and Leigh like phenotype in one individual. Importantly, despite having a diagnosis of CID, most of the patients tested normal in an electron transport chain assay (fibroblast or muscle), including for Complex I activity. Functional studies in yeast (Yarrowia lipolytica) were performed and confirmed the pathogenicity of the non-synonymous NUBPL mutation leading to the L104P substitution. Biochemical assays in patient fibroblasts showed mitochondrial functional differences, and differentiated neurons are being utilized to screen for and identify novel therapies for these patients. In summary we present clinical features of a unique new NUBPL-associated mitochondrial complex 1 disorder identified by WES and promising treatment studies in yeast.

Keywords: NUBPL; Mitochondrial complex 1; Cerebellum atrophy; Therapy

Poster Location: 19

Bhatnagar,Caleb, Student; Shah, Jeet, Student; Ramani, Bhumi, Student; Caiozzo, Vince, PhD; Pham, Hoang; Knight, Margaret; Weiss, Lan, M.D.; Kimonis, Virginia, M.D.

Safety and Effectiveness of Resistance Exercise Training in Patients with Late Onset Pompe Disease - A pilot study

Pompe disease is a rare inherited progressive autosomal recessive neuromuscular disorder associated with muscle weakness and respiratory insufficiency that can affect all ages, ethnicities, and gender. While the enzyme replacement therapy (ERT) became clinically available and works very well in the cardiac muscle of patients who present in infancy with large hearts due to excessive glycogen storage, it is not as effective in patients who present after infancy with muscle weakness. Although stabilization or some improvement has been seen in patients with a later onset, it is worthwhile to investigate other therapies that may slow the progression of their condition and improve quality of life. In this context, exercise/physical activity seems like an obvious choice, because activities like resistance training (RT) are known to be anabolic and produce muscle hypertrophy and improved muscle function in normal individuals. Somewhat shockingly very little is known about the role of physical activity in mitigating the muscle atrophy associated with Pompe disease. To our knowledge, previous studies have not examined the therapeutic efficacy of using RT to blunt/prevent the loss of muscle mass and function in patients with Pompe disease. Hence, the goal of this proposal is to evaluate and document potential benefits of RT in compliant patients and describe the benefit of combining enzyme replacement therapy (ERT) with RT. In the second aim of our study we will be testing and measuring patient respiratory function. We propose analyzing the activity level of the subjects between the baseline period and the exercise study with a health and exercise monitoring device/activity tracker. Our findings were that the exercise had an overall increase in muscle and respiratory strength for our patients. Due to adverse effects, it was not easy to show improvement in every muscle group but we hope to make better concluding results as more patients go through this study.

Keywords: Pompe disease

Poster Location: 59

Birkenbeuel, Jack, BS; Khosravi, Pooya; Lehrich, Brandon; Sahyouni, Sammy; Moshtaghi, Omid, BS; Goshtabi, Khodayar, BS; Djalilian, Hamid R, MD

Induced Vestibular Dysfunction Using Oculus Rift Virtual Reality Wide-Angle Head Mounted Display: A Proof-of-Concept

UCI; Department of Information and Computer Sciences; Department of Biomedical Engineering; School of Medicine; Division of Neurotology and Skull Base Surgery, Department of Otolaryngology-Head and Neck Surgery

The vestibular system of the inner ear primarily serves as a feedback loop for orientation and rotation of the head (balance), and processes and integrates the plethora of information received from the proprioceptive and visual sensory systems to maintain stable vision and posture. Recently, the onset of virtual reality (VR) wide-angled head mounted displays (i.e., Oculus Rift, Samsung Gear VR) has emerged as a powerful platform for human-computer interactions, and has been found to have a high degree of consumer immersion in a virtual environment. Specifically, the Oculus Rift VR headset tracks spatial orientation and head movement through its integrated accelerometers and gyros. Although motion within a virtual environment, commonly known as cyberspace, can serve purposes for entertainment and educational instruction, it has been shown to result in clinical symptoms of motion sickness (i.e. nausea and vomiting) for many users (cybersickness). Although Oculus Rift has been used widely in gaming applications, we envisioned its potential medical applications. The goal of this project is to use the Oculus Rift VR headset as a platform to monitor vestibular and other associated changes in individuals immersed in cyberspace. We have integrated the Oculus Rift platform with a Microsoft Kinect and added a custom eye-tracking camera, controlled by an Arduino, to monitor balance, rapid eye-movement (nystagmus), body posture, and angular sway of individuals. To our knowledge, no other study has used Oculus Rift, an integrated Microsoft Kinect, and a custom eye-tracking camera to evaluate vestibular dysfunction in individuals in a virtual environment. Preliminary results from this study without using the NeuroSky® EEG system, have shown that our VR environment for the Oculus Rift can induce motion sickness based on our survey results from the SSQ questionnaire of multiple participants used.

Keywords: Vestibular; Dysfunction; Oculus; Virtual; Reality

Poster Location: 30

Capretz, Taylor, BA; Lin, Cyrus, BS; ; Patel, Roshan; Asplin, John; Granja, Ignacio; Jiang, Pengbo; Osann, Kathryn; Landman, Jaime; Clayman, Ralph V.

Can Coconut Water Consumption Potentially Prevent Kidney Stones?

UC Irvine Health, Department of Urology Litholink Corporation, Laboratory Corporation of America Holdings

INTRODUCTION AND OBJECTIVES: Coconut water has long been touted for its medicinal qualities including natural hydration. We sought to determine whether its consumption would induce changes to urinary lithogenic factors beyond changes in urine volume. METHODS: After Institutional Review Board approval, volunteers with no prior history of nephrolithiasis were recruited. Each participant was randomized initially to either the coconut water or water phase of the study. Participants kept meticulous food and fluid intake logs during the first phase of the study and were asked to replicate that diet for the second phase. For each phase the participant consumed 2L of either Taste of Nirvana® pure coconut water or tap water daily for four days. Participants were not restricted to consume additional fluid of their choice during their assigned study phase. During days 3 and 4 of each phase the participant collected a 24-hour urine specimen. Total alkali of the coconut water was calculated using pH and the concentration of citrate and malate to assess the antilithogenic potential of the beverage. Supersaturation levels were calculated using Equil2. Non-parametric paired analysis using the Wilcoxin test was performed for statistical analysis. RESULTS: There were 4 adult male and 4 adult female participants. Each individual 24-hour urine collection had a creatinine excretion within 20% of the mean for each subject's four samples corroborating that all samples were collected properly. The two samples from each phase for each individual were averaged.The coconut water itself was also analyzed. Consumption of coconut water significantly increased urinary citrate (29%), urinary potassium (130%), and urinary chloride (37%), without affecting urine volume beyond that of tap water. CONCLUSIONS: Coconut water consumption increases urinary potassium, chloride, and citrate in non-stone forming individuals.

Keywords: nephrolithiasis; calcium oxalate; coconut water; hypocitraturia

Poster Location: 22

Cardenas, Anjelica, M.S.; Yin, Yeuxi; Liu, Sally, B.S.; Lotfipour, Shahrdad, PhD.

Nicotine Gateway Effects on Adolescent Alcohol Intake and Preference

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In both human and rodent studies, adolescent nicotine exposure enhances the use of other drugs (i.e. the gateway effect). The current study tests this hypothesis for alcohol. We expose adolescent and adult male C57BL/6J mice to a 7-day treatment regimen of nicotine (2x 0.5 mg/kg/s.c./day) or vehicle. Subsequently, after a 7-day washout, we assess oral intake and preference of alcohol or water using the Drinking-in-the-Dark (DID) and two-bottle choice behavioral paradigms. Our results illustrate that animals drink pharmacologically relevant binge levels of alcohol. Adolescents drink significantly more total fluid versus their adult counterparts. Adolescents and adults drink more alcohol versus water, with a rapid increase in alcohol intake. Nicotine versus vehicle pretreated adolescents acquire alcohol self-administration, which is not observed in adults or water drinking groups. Further, nicotine pretreated, alcohol experienced adolescents versus adults have a higher preference for alcohol. All animals preferred alcohol over water when given a choice. The results are not confounded by differences in blood alcohol concentration. Taken together, our study highlights that age and developmental nicotine exposure are critical factors underlying adolescent susceptibility of alcohol use. Such findings have important clinical implications, given the high rate of e-cigarette and co-morbid drug use with alcohol during adolescence.

Keywords: Nicotine; Alcohol; Adolescence; Mice; Reward

Poster Location: 71

Chen, Lily, BS; Pham, Tiffany, MS; Heidari, Andrew, MS; Wong, Brian , MD, PhD

A Comprehensive Map of Ciliary Beat Frequency in the Human Nasal and Sinus Mucosa

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Objectives: Cilia in the upper airway beat to sweep secreted mucus out of the respiratory tract. However, to the best of our knowledge, existing studies on ciliary beat frequency (CBF) in the nasal cavity only examine specific regions or averaged frequencies of multiple regions. Here, we present a comprehensive assessment of CBF of the nasal mucosa. The CBF of nasal mucosa, untreated and subsequently treated with topical saline and epinephrine, was quantified for regions throughout the nasal cavity. Methods: Within 15 minutes of harvesting, nasal mucosa samples were imaged using a 2-D scanning swept source optical coherence tomography system. The system is comprised of a 200kHz vertical-cavity surface emitting laser coupled into a fiber based Michelson interferometer. A 2-D scanning microscope probe was utilized on the sample arm providing a lateral and axial resolution of 15um and 8um, respectively. Samples were imaged in three environments: unaltered, with saline, and with epinephrine. Novel programs were developed in Python to analyze resulting data. Results: Nasal samples were obtained from 10 patients undergoing functional endoscopic sinus surgeries. Tissue was extracted from the nasal wall, uncinate process, maxillary sinus, ethmoid sinus, and sphenoid sinus in patients undergoing functional endoscopic sinus surgery. The Python program yielded unbiased representations of frequencies present in the imaged sample. CBF in untreated mucosal samples ranged from 5.1-5.2 Hz. With saline application, frequencies ranged from 5.2-7.2 Hz, and with epinephrine application, 5.1-5.2 Hz. Conclusions: The results suggest that no differences in native CBF are present within the nasal cavity. Application of saline and epinephrine increases CBF to varying extents by region, with decreasing effects over time. These findings are critical for clinical applications since proper ciliary function is an important part of the primary immune defense system.

Keywords: Cilia; Optical Coherence Tomography; Image Processing; Ciliary Beat Frequency; Nasal Mucosa

Poster Location: 32

Cooper, Vinay, B.S.; Kaler, Kamaljot, M.D.; Parkhomenko, Egor, M.D.; Zachary Valley; Roshan Patel; Zhamshid Okhunov; Jaime Landman; Ralph Clayman

Holmium Laser-Assisted Endoscopic-Guided Retrograde Nephrostomy Access for Percutaneous Nephrolithotomy in Prone Split-Leg Position

University of California, Irvine; Urology

INTRODUCTION AND OBJECTIVES: Obtaining nephrostomy access, typically with a flank-based antegrade puncture technique, remains the most challenging aspect of a percutaneous nephrolithotomy. Herein we report a novel "inside-out" approach using the holmium laser to establish access in a retrograde fashion. METHODS: After one week of pre-treatment with tamsulosin and following a documented sterile urine, 7 patients underwent retrograde, holmium laser assisted, endoscopic-guided nephrostomy access in a prone, split leg position. In all cases a 360 micron laser fiber was used, typically set at 1J and 10 Hz; the laser was activated as it was pushed into the calyceal fornix and advanced until it exited the skin of the flank. RESULTS: In six of seven patients (86%), access via an upper pole posterior calyx was achieved using the holmium laser-assisted endoscopic-guided retrograde technique. In one patient, the laser tract was not dilated due to acute angulation; consequently, antegrade endoscopic and fluoroscopic guided access was performed. Mean total fluoroscopy time in the 6 successful cases was 32 seconds (5-64 seconds). There was one Clavien 3a post-operative complication of a subcapsular hematoma and secondary tearing of an inter-polar vessel remote from the site of access necessitating angioembolizaton and transfusion of 2 units of packed red blood cells. CONCLUSIONS: Holmium laser-assisted endoscopic-guided retrograde access in a prone split-leg position appears to be feasible. Further work is needed in order to better refine the technique and determine the limitations of this approach.

Keywords: Retrograde nephrostomy; Holmium Laser; Percutaneous Nephrolithotomy (PCNL); Nephrolithiasis; Nephrostomy access

Poster Location: 42

Cox, Brittney, PhD; Le, Aliza, BS; Wang, Weisheng PhD; Lynch, Gary, PhD, and Gall, Christine PhD

Episodic memory impairment in a mouse model of autism is due to defects in a novel, pathway specific form of hippocampal plasticity

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Failure to properly encode episodes is a common feature of autism and one likely related to other cognitive problems. The hippocampus plays a central role in episodic memory by building codes needed for organizing sequences into a narrative about what happened, where particular features occurred, and the order in which they appeared ('what', 'where', and 'when'). Human and animal research indicates that the dentate gyrus, the first stage of hippocampal circuitry, receives semantic information ('what') via the lateral perforant path (LPP) and spatial cues ('where') via the medial perforant path (MPP). Recent work showed that the LPP utilizes a novel form of memory related long term potentiation (LTP). We have found that this lppLTP effect is severely impaired in the Fmr1-KO mouse model of Fragile X syndrome, the most prevalent inherited cause of autism and intellectual disability. This impairment is much more pronounced than that for LTP in the MPP or the third glutamatergic input to the dentate gyrus. Synaptic mechanisms responsible for the LPP defect were identified. An unsupervised (no rewards) behavioral paradigm, related to protocols used human episodic memory studies, was then developed to test the prediction that Fmr1-KOs are unable to acquire the identity of individual cues in a sequence. DREADD experiments established that bilateral silencing of the LPP, but not of the MPP, during cue sampling completely eliminated learning in this paradigm in wild type mice. Unilateral inhibition of the LPP and the contralateral dentate gyrus also blocked learning in controls, establishing that the task is dependent on the LPP-dentate gyrus connection. Fmr1-KO mice were profoundly impaired on this episodic-like memory task but had no problem with acquisition when the same cues were presented outside of a sequence. Collectively, the results relate a defect in a pathway specific, singular form of plasticity to a critical intellectual problem in autism.

Keywords: hippocampus; Episodic memory; Animal Model

Poster Location: 72

Eikey, Elizabeth, PhD

A Taxonomy of Unintended Negative Consequences of Self-Tracking: How Diet and Fitness Apps Contribute to Eating Disorder-Related Behaviors in College Women

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Personal health informatics is becoming increasingly popular as more people adopt technologies to manage their health. Mobile health (mHealth) applications (also known as apps) for tracking diet and physical activity are pervasive, especially among young people. While these apps hold great promise for improving health outcomes, they may have unintended negative consequences, which prevent them from having a positive health impact. In order to contextualize this issue, I present one example: the use of diet and fitness apps among college women with eating disorder histories. Recently, evidence has emerged supporting a link between these apps and eating disorders. Research suggests college women who use these apps exhibit greater eating disorder symptoms, and individuals with eating disorders believe these apps contribute to their disorder. However, we lack an in-depth understanding of how diet and fitness apps affect these users. Using surveys, think-aloud-inspired exercises, and semi-structured interviews with twenty-four participants, I begin to fill this gap by presenting a taxonomy of unintended negative consequences of diet and fitness apps in the context of college women with eating disorders. Eight major themes emerged from the data: 1) fixation on numbers, 2) rigid diet, 3) obsession with the app and food, 4) app dependency, 5) high sense of achievement from being under budget or losing weight, 6) extreme negative emotions from exceeding the budget, 7) motivation from negative messages, and 8) excess competition. Clinicians as well as others who interact with college women (such as coaches, nutritionists, professors, etc.) should be aware of these potential effects and be cautious when recommending or prescribing diet and fitness apps among this population.

Keywords: self-tracking; mHealth; diet and fitness apps; eating disorders; personal informatics

Poster Location: 31

Ellen Hong, BA; Tiffany Pham, MS; Wesley Moy, PhD; Pamela Borden; Kyle Hansen; Brian Wong, MD PhD

An In Vivo Model of Electrochemical Therapy for Skin Rejuvenation and Scar Treatment

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Dermal scarring is often treated with laser therapy. Electrochemical therapy (ECT) would provide a low-cost, needle-based alternative for scar therapy and skin rejuvenation. We conducted a longitudinal in vivo study to determine the effects of ECT application to long-term tissue structure by creating redox chemistry in situ while observing cell viability and histology. Our study aimed to define electrical dosimetry and demonstrate that ECT can alter dermal matrix structure. The skin on the back of New Zealand white rabbits was portioned for three different dosimetry parameters (3 volts (V) for 5 minutes, 4V for 5 minutes, 5V for 5 minutes) into two groups, one with saline and another without. A custom acrylic jig with two needle electrodes was inserted and voltage was applied at each site per respective dosing. Subjects were imaged on days 0, 1, 2, 3, 7, 14, and 29 after pECT using digital photography and high frequency ultrasonography. Following euthanasia, the treatment sites were examined histologically. Mild localized inflammation was noted after ECT. No bleeding or infection was noted. Injury zone size increased with dosimetry in both native and saline injected sites. At 3V, there were no visible skin changes. At 4V and 5V with saline, localized scabbing was seen on day 7; normalized changes in skin texture were observed at days 14 and 29. Ultrasound images of 3-5V showed gas formation after ECT with epidermal and dermal injury. In this longitudinal in vivo study, ECT produced structural change in intact dorsal rabbit skin. The application of 3V to 5V for short time durations can achieve adequate skin changes. Tissue injury around the electrodes increased with the amount of total current transferred into the tissue and was limited in spatial distribution. There were no significant side effects over one month of evaluation. This study is a critical step for evaluation of ECT as a skin rejuvenation and scar therapy modality.

Keywords: Electrochemical therapy; In vivo; rabbit model; ultrasound; histology

Poster Location: 50

Elsensohn, Ashley MD MPH; de Feraudy, Sebastien MD Phd; Shiu, Jessica MD Phd; Anna Marie Hosking

Distinguishing neurofibroma from desmoplastic melanoma: the value of p53

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Background: Distinguishing desmoplastic melanomas (DMs) from neurofibromas (NFs) can be histologically challenging. To date, a reliable marker to differentiate the two entities has remained elusive. S100 subtyping and CD34 fingerprinting have been proposed as potential avenues, but controversy remains as to their reliability. From a genetic standpoint, desmoplastic melanomas are distinct from conventional melanomas, lacking classic mutations such as BRAF, NRAS and KIT. Exome sequencing has shown that DMs harbor a significantly higher mutation burden, with a median number of 65 mutations per megabase in DMs compared to 15 mutations per megabase in other melanomas. DMs have a paradoxical accumulation of p53, as ultraviolet radiation is the dominant mutagen. We hypothesize that p53 staining can be used to histologically differentiate neurofibromas from desmoplastic melanomas. Methods: Twenty desmoplastic melanomas and 20 neurofibromas were retrieved from the Dermatopathology Database at the University of California Irvine Medical Center and the Laguna Pathology Medical Group in Laguna Hills, California. Sections were taken from formalin-fixed, paraffin-embedded tissue, and stained with p53 antibody (Monoclonal, DO-7). Results: ?p53 was positive in 19/20 (95%) DMs and negative in 20/20 (100%) NFs (Two-tailed t test p-value < 0.0001). Conclusion: p53 can be used to help distinguish desmoplastic melanomas from neurofibromas.

Keywords: melanoma; desmoplastic; p53; immunohistochemical staining; IHC

Poster Location: 14

Firmalino, Vania; Anbarani, Afarin; Islip, Delaney; Bofan Song, Ross Uthoff, Thair Takesh, Ron Liang, Petra Wilder-Smith

First Clinical Results: Optical Smartphone-Based Oral Cancer Screening

The goal of this project is to develop and evaluate the screening performance of a novel, low cost smart-phone-based mini-probe for oral cancer (OC) screening and monitoring of oral potentially premalignant lesions (OPMLs). The device uniquely provides high resolution dual-modality white light images (pWLI) in combination with auto fluorescence imaging (AFI) capability. The aim of this study is to evaluate pWL and AF images of heathy oral mucosa, OPMLs, and OC to identify typical optical characteristics of each, develop and improve a diagnostic algorithm, determine diagnostic cutoffs and finally to evaluate diagnostic performance. Materials and Methods: 92 subjects with visually healthy oral mucosa, or with areas of oral leukoplakia, erythroplakia or ulceration were recruited in compliance with UCI IRB 2002-2805. PWL and AF as well as standard photographic images were recorded of 8 standard locations in the oral cavity of each patient. Each of these locations was separately diagnosed per usual standard of care by a blinded pre-standardized clinician. By evaluating a total of 32 variables from the pWL and AF images, characteristic signatures and cutoffs were determined for healthy mucosa, OPMLs and OC at each of the standard locations Results: Inter-subject variation at each location was small, but inter-site differences were considerable. Optical data from OPML and OC sites differed from normal with regard to white-light reflectance intensities, vascular homogeneity and standard deviation. The AFI signal in OPMLs and OC shifted progressively to the red, together with a diminished green fluorescence signal. The cloud-based diagnostic algorithm based on these properties performed well, with an agreement with standard-of care diagnosis (kappa value) of 80.6%. Conclusion: In a first clinical test, a low-cost compact oral probe combined with cloud-based diagnostic algorithm was able to differentiate between healthy, dysplastic and malignant oral mucosa.

Keywords: smartphone; optical; oral cancer; screening; clinical

Poster Location: 54

Frisch, Emily; M. Cervantes-Ortega; H. Lonappan; K. Biegler, D. Mukamel, and D. H. Sorkin

Health care disparities among people with type 2 diabetes: a California population based study

Background: Type 2 diabetes disproportionately affects racial/ethnic minorities and individuals with low socioeconomic status. Studies have shown that racial/ethnic and income disparities complicate the delivery of healthcare in the United States, and ultimately, the health outcomes of patients. Objective: This study sought to identify racial/ethnic and income differences in indicators of healthcare quality among a population-based sample of patients with type 2 diabetes. Methods: Data were obtained from the 2012- 2015 California Health Interview Survey, a population-based survey representative of California's noninstitutionalized population. Out of 81,629 total respondents, 4,461 (6.4%) non-Hispanic White (NHW), 596 (8.8%) non-Hispanic Black/African American (NHB), 829 (7.4%) Asian and Pacific Islander (API), and 2279 (9.2%) Latino/Hispanic (LH) self-reported a diagnosis of type 2 diabetes. Descriptive statistics and logistic regression analyses were conducted using weighted data. Results: Preliminary results suggested that API and LH patients were significantly less likely to have developed a plan with their medical provider to control their diabetes compared to their NHW counterparts (OR=0.41 [95%CI=0.28-0.61]; OR=0.50 [95%CI=0.37-0.67], respectively), and also were less likely to report having high confidence in their ability to manage their diabetes (OR=0.50 [0.27-0.93]; OR=0.50 [0.34-0.73], respectively). Higher income individuals, irrespective of race/ethnicity, were 2.84 times [1.74-4.63] more likely to have developed a plan compared to lower income people, and were 3.7 times [1.8, 7.8] more likely to report having high confidence in their ability to manage their diabetes. Conclusion: The implications for improving the delivery of healthcare for racial/ethical diverse and low income patients with diabetes will be discussed.

Keywords: Type 2 Diabetes, Health Disparities, racial/ethnic minorities

Poster Location: 34

Garcia, Bobby, MD; Lechuga, Thomas, PhD; Lane, Felicia, MD; Nasiri, Azadeh MD; Arthur, Afiba MD; Patel, Bansari BS; Chen, Dongbao PhD

Determination of LOXL-1 and Fibulin-5 Levels in the Vaginal Secretions of Women With and Without Pelvic Organ Prolapse

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Objectives: Pelvic organ prolapse (POP) is a multifactorial disorder associated with vaginal childbirth, aging, and a weakening of the connective tissue in the pelvic floor. Lysl oxidase-like 1 (LOXL1) and Fibulin-5 are two proteins which play an essential role in the synthesis and assembly of elastic fibers. Animal models lacking the Fibulin-5 gene develop POP spontaneously while those lacking LOXL1 develop POP 1-2 days postpartum. Measurements of LOXL1/Fibulin-5 to date have required an invasive tissue biopsy. The objective of this pilot is to determine if LOXL1 and Fibulin-5 can be extracted noninvasively from vaginal secretions, and to determine if levels of these proteins are associated with POP. Methods: A fox swab was used to collect the vaginal secretion specimen. ELISA specific for LOXL1 & Fibulin-5 was then conducted by measuring the optical densities of subject specimens compared against a standard curve using known antigen concentrations. Results: LOXL1 protein expression is decreased in women with Stage III-IV POP compared to controls (p=0.045). Our data supports a trend towards a positive correlation between prolapse stage and Fibulin-5 concentration and a negative correlation between prolapse stage and LOXL-1 concentration. Conclusion: In this small pilot we were able to develop a novel noninvasive method to detect LOXL1 and Fibulin-5 in the vaginal secretions of women with and without POP.

Keywords: Pelvic Organ Prolapse; LOXL-1; Fibulin-5

Poster Location: 16

Garcia, Ramon, BA; Torres, Lessley; Zavala, Sonia; Mendoza, Beverly; Ornelas, Elisa, Cortes, Haydee; Fortier, Michelle, PhD

Healthcare Disparities in Spanish-Speaking Families Undergoing Cancer Treatment: A Community Based Participatory Approach

University of California Irvine- Department of Anesthesiology & Perioperative Care

Latino youth in cancer treatment and their families experience a poorer quality of life than their White counterparts (White & Henderson, 2008; Vega, Rodriguez, Guskin, 2009; Bhatia, 2011). Further, research in healthcare disparities experienced by this population is sparse. Existing research shows parents of children in cancer treatment endure significant stress which can impact their health and quality of care received by children (Kazak & Barakat, 1997; Streisand, Kazak, & Tercyak, 2003). We aimed to address this gap in the literature by engaging in an equitable collaboration with community partners to identify specific needs of this population that will ultimately form an intervention. We utilized a Community-Based Participatory Research (CBPR) model to create a taskforce addressing this issue—CBPR studies are valid and reliable in addressing community disparities (Ammerman, Garlehner, Griffith, Rhodes, Samuel-Hodge, Maty, Lux, Webb, Sutton, Jackman,& Whitener, 2004; Wallerstein, & Duran, 2010). Spanish-speaking parents of youth who were in or had previously undergone treatment were recruited. We collaborated to generate themes of recurring experiences and barriers to optimal quality of life and experience for caregivers during children's cancer treatment. Meetings were continuously evaluated to ensure the process adhered to the following CBPR principles: 1. Collaborative & equitable, 2. Mutually beneficial, 3. Co-learning process. Taskforce meetings were transcribed and coded for thematic elements. Significant themes unique to the population were identified and presented to the taskforce for further discussion. Content generated was then used to operationalize factors affecting quality of life in this population. Factors included: lack of culturally competent care, difficulty in obtaining appropriate health related information, pressure of treatment care falling on one parent, and linguistic barriers affecting overall quality of communication.

Keywords: pediatric oncology; healthcare disparities; Latino; Community Based Participatory Approach

Poster Location: 58

Gombosev, Adrijana, MS; Grill, Joshua, PhD; Cox, Chelsea, MPH, MSW; Klein, Kirsten; Hoang, Dan

C2C: A Resource for UCI Researchers

University of California, Irvine, ICTS; University of California, Irvine, UCI MIND

Potential participant registries are tools to address the challenge of slow recruitment to clinical research. We report our experiences of developing a novel local potential participant registry that implemented online enrollment and data collection. The University of California, Irvine Consent-to-Contact Registry (C2C) is a local online potential participant registry. The purpose of the C2C registry is to enhance the efficiency of recruitment to clinical research at UC Irvine. It is a resource available to any UC Irvine investigator performing human subjects research with Institutional Review Board (IRB) approval. In the first year, 291 registrants were contacted about participating in research studies, with 82 (28%) enrolling in nine studies, indicating that registries can aid recruitment and provide needed guidance for investigators initiating new local registries. We report the experiences of developing, launching, and preliminarily using a local potential participant registry to enhance clinical research recruitment at an academic research institution. Our results suggest that local registries may enable improved research recruitment.

Keywords: Recruitment; Registry; Community; Clinical Trials

Poster Location: 55

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Transcriptomic and Proteomic Alterations Accompany Changes to the Plasma Metabolome in Older Adults with Incipient Dementia

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Background: Alzheimer's disease (AD) is a chronic, neurodegenerative disorder associated with deficits in learning and memory. There are currently no validated clinical laboratory tests to prospectively assess risk of developing AD. Although biomarkers of AD have been proposed, few discovery efforts have explicitly leveraged a systems biology, multi-"omic" approach. Here, we report such an analysis of baseline blood specimens contrasting healthy controls with initially healthy individuals who developed cognitive impairment over a five-year monitoring period. Methods: Blood plasma fractions (Control = 50, Converter = 26) were analyzed for protein and small molecule metabolite content using aptamer microarrays and targeted mass spectrometry, respectively. RNA-seq was conducted on whole-blood-derived RNA from these same samples. Disease state (Converter vs. Control) was modeled as a function of the quantified biomolecules using the mixOmics DIABLO algorithm. Results: As demonstrated previously in this cohort, phosphatidylcholines (PCs) were depleted in the plasma of Converter samples. This depletion of PCs correlated with alterations in the proteome and transcriptome surviving thresholding at the $r = .85$ level. Specifically, strong ($r = .90$) positive correlations were noted between PC levels and proteins expressed differentially in Converter and Control samples. In contrast, expression of a single transcript (Transcript G) was higher in Converter compared to Control samples and inversely associated with PC abundance at the $r = .85$ level. Conclusions: Our results expand upon previous findings suggesting that PCs are altered in the early stages of AD pathogenesis. Specifically, it appears that changes in the plasma metabolome are accompanied by relatively robust, disease-associated alterations to the blood transcriptome and proteome. Further work is necessary to identify and validate causative factors driving these relationships.

Keywords: Biomarkers; Applied Machine Learning; Alzheimer's Disease; Precision Medicine; Personalized Healthcare

Poster Location: 12

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Implementation of critical congenital heart disease screening for newborns in rural China

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Introduction. Critical congenital heart diseases (CCHD) can cause neonatal death without invasive correction. Cardiac screening, using pulse oximetry plus stethoscope auscultation, is effective for CCHD early detection. However, hospitals in rural Yunnan of China have almost no knowledge of this method. We therefore designed a one-day training program to teach rural obstetric doctors and nurses in Yunnan about this screening method. The objective of this study was to evaluate the results of this training program. Methods. The training program started on July 2015, and had trained 104 of the 125 Yunnan county hospitals (91.2%) by the end of 2016. The total number of doctor and nurse trainees was 2175. The evaluation plan consisted of two phases. Phase I was evaluating trainees' knowledge improvement and behavior change. 332 trainees from 19 hospitals participated in the 1st phase. The second phase was assessing clinical results of CCHD screening. Thirty-six hospitals participated in the 2nd phase. Results. During the 1st phase, the trainees demonstrated significant knowledge and behavior improvement about newborn cardiac screening. They answered 45.3%, 81.9% and 62.7% of questions correctly in the pre, post and 3-month quizzes respectively. During the 2nd phase, (September, 2015 to May, 2016), 44,614 newborn babies received proper cardiac screening, 207 had abnormal screening results. Conclusion. Study results indicated that one-day training was effective for rural obstetric personnel to understand medical knowledge regarding cardiac screening and master the screening skills.

Keywords: Critical Congenital Heart disease; Cardiac Screening; CCHD; Pulse oxymetry; Obstetric Training

Poster Location: 56

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Electroacupuncture modulates reflex elevation in blood pressure through adenosine receptor A2A, but not A1 in rostral ventrolateral medulla of rats.

Acupuncture potentially offers a non-pharmacological approach to reduce high blood pressure (BP). Electroacupuncture (EA) attenuates reflex elevation in BP induced by gastric distension (GD) through modulation of the activity of rostral ventrolateral medulla (rVLM). Although adenosine is released during neuronal activation in the rVLM, its role in acupuncture-cardiovascular regulation is unknown. Since selective activation of A1 and A2A rVLM receptors respectively induces pressor and depressor responses, we hypothesized that adenosine in the rVLM contributes to EA modulation of sympathoexcitatory reflexes through an A2A but not an A1 adenosine receptor mechanism. Repeated GD every 10 min was performed in Sprague-Dawley male rats under ketamine and a-chloralose anesthesia. EA (2 Hz, 0.5 ms, 1-4 mA) was applied at the P5-P6 acupoints, overlying the median nerve, for 30 min after establishing two consistent reflex responses to GDs. We found that repetitive GDs evoked consistent sympathoexcitatory pressor responses. EA (n=5) but not sham-EA (n=5) at P5-6 significantly (P<0.05) attenuated GD-induced elevations in BPs. EA modulation of sympathoexcitatory cardiovascular reflexes was reversed significantly after rVLM microinjection of SCH 58261 (1 mM in 50 nl; A2A receptor antagonist; n=8; P<0.05), but not by the vehicle (5% dimethylsulfoxide; n=6). Microinjection of DPCPX (3 mM in 50 nl; A1 receptor antagonist; n=4) into the rVLM did not influence EA inhibition of GD-induced pressor responses. GD-evoked sympathoexcitatory cardiovascular reflexes, in the absence of EA, were unaltered by administration of SCH 58261 into the rVLM. Neurons labeled with adenosine A2A receptors were co-localized with neurons stained with tyrosine hydroxylase (i.e., catecholaminergic neurons) in the rVLM. These data suggest that EA modulates sympathoexcitatory cardiovascular responses through an A2A receptor mechanism in the rVLM (supported by NCCIH grant, AT009347).

Keywords: Acupuncture; Cardiovascular reflex; Brain stem; Gastric distension

Poster Location: 69

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Integration of microfluidic chip with Loop-mediated Isothermal Amplification (LAMP) assay for rapid quantification of Enterococcus Faecalis

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Rapid and sensitive monitoring of water quality can effectively prevent accidental human exposure to waterborne pathogens. In this project, a rapid quantification method was developed for Enterococcus faecalis, a fecal indicator bacteria (FIB), used as a surrogate for water quality assurance. The loop-mediated isothermal amplification (LAMP) assay was combined with a microfluidic chip to produce thousands of individual reactions that convert the qualitative LAMP assay to quantitative results base on Poisson distribution. This "Lab on a Chip" (LOC) assay is considerably more rapid than the conventional culture-based and the polymerase chain reaction (PCR) based methods (i.e. qPCR and droplet digital PCR). The isothermal amplification removes the need of thermal cycling, which makes it suitable for field development. In this assay, the water sample is mixed with LAMP reagents in the presence of fluorescent dye. The mixture is then dispersed into thousands of droplets in oil on a microfluidic chip, where each droplet acts as an individual LAMP reaction. By counting the number of positive droplets among total droplets in the viewing field, the most probable number of the E. faecalis can be quantified statistically. Several types and compositions of oil were tested for the compatibility with sample/LAMP reagent mixture for droplet generation and stability. The optimized oil can form unified droplets of 70 μm in diameter, which were stable during LAMP reaction at 65? for 30mins. The droplets that stained with dsDNA fluorescent dye could be clearly visualized using fluorescence microscope and counted by Image J software. The limit of detection of droplet LAMP assay is 2cfu/ul with pure culture, and 3cfu/ul in seawater.

Keywords: Water quality; LAMP; Lab-on-a-chip(LOC); Pathogen quantification; Enterococcus Faecalis

Poster Location: 35

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Developing Optical Coherence Tomography Image Biomarkers Towards Intraoperative Head and Neck Cancer Margin Detection

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Objective: Incomplete surgical resection is the most common cause of local cancer recurrence. Optical coherence tomography (OCT), a minimally-invasive imaging modality, has been shown to detect abnormal changes in tissue architecture such as increases in epithelium thickness and loss of tissue stratification. However, analytic models to better understand these changes are lacking. This study evaluates changes in depth resolved intensity OCT signal to assess tissue stratification for evaluation of intact basement membrane(BM) as well as nuclei to cytoplasmic changes in malignant cell phenotypes. Methods: Head and neck cancer patients undergoing resection at the University of California-Irvine Medical Center were prospectively consented for study participation. Resected specimens of five oral cavity squamous cell carcinoma patients were scanned using a 3D swept-source microscope OCT system. Images were analyzed using a MATLAB processing algorithm that segments tissue types and image intensity. Tissue classification was confirmed by histopathology, the gold standard. Results: Tissue type was classified based on tissue stratification and intensity distribution. Normal oral mucosa was represented in OCT images with clear identifiable boundaries between the keratinized epithelium, squamous epithelium and lamina propria with a heterogenous distribution of low signal intensity. Malignant tissues presented with a loss in tissue stratification with no noticeable intact basement membrane and a homogeneous distribution of high OCT image intensity. Histopathological images correlated closely with OCT mapping and tissue classification. Conclusion: This study shows that OCT intensity signal analysis and BM topography can detect malignant tissue changes of oral cavity epithelium, and has potential to serve as a real-time analytic tool in the assessment of surgical margins. Further studies are required to assess tissue margins in vivo.

Keywords: Head and neck cancer; Oral cancer; Squamous cell carcinoma; Tissue margins; Optical imaging

Poster Location: 40

Hernandez, Sarah, PhD

Investigation of extracellular matrix expression and function in Huntington's disease induced pluripotent stem cell-derived cell models

Huntington's disease (HD) is a genetic neurological disorder with no treatment. The mutation causes atrophy of the brain, uncontrollable movements, and behavioral changes. The extracellular matrix (ECM) is a plastic component of the cellular environment, guiding cellular attachment, motility, and survival. The ECM provides neuroprotection and loss of certain components leads to neurodegenerative phenotypes, however little is known about the role of the ECM in neurodegenerative diseases, including HD. Additionally, ECM molecules are highly druggable targets. Therefore, exploiting the malleability of the ECM and its influence on neural plasticity through ECM modulation may prevent or reverse HD-associated changes. To understand these processes in human cells, we are using patient-derived induced pluripotent stem cells (iPSCs). Here, we explore HD-related ECM dysregulation in two iPSC-derived cell types: 1) medium spiny neurons (MSNs) and 2) brain microvascular endothelial cells (BMECs). In MSNs, which are the cell type most affected by HD, RNAseq data implicates a dysregulation of ECM-related genes and current work is focused on developing a high throughput phenotypic readout that assesses dysregulation of actin polymerization dynamics. We're also analyzing HD-related differences in the MSN secretome. In iPSC-derived BMECs, our lab recently published data demonstrating an HD-related increase in angiogenesis and reduction in barrier properties, implicating blood-brain barrier (BBB) deficits in HD. In BMECs, RNAseq data also demonstrates ECM dysregulation. Ongoing work explores the relationship between the ECM, the cytoskeleton, and barrier properties for identification of specific ECM-related molecules that can be modulated to ameliorate HD phenotypes and restore BBB function.

Keywords: Stem Cells; Huntington's disease; Extracellular matrix

Poster Location: 7

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A novel inhibitor of eIF4F protein translation complex sensitizes DLBCL cells to BCL-2 targeted therapy

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This project investigates feasibility of using small molecules targeting cap-dependent translation to sensitize diffuse large B cell lymphoma (DLBCL) cells to killing by BCL-2 inhibitor (venetoclax). Our hypothesis: DLBCL cell survival requires cap-dependent translation, facilitated by eukaryotic translation initiation factor 4E (eIF4E)-eIF4G interaction. We used the compound SBI-756, a novel inhibitor targeting the scaffolding protein eIF4G. Treatment of DLBCL cells (germinal center B-cell subtype) with SBI-756 synergistically induced apoptosis when combined with venetoclax. Cell viability was reduced compared to mTOR kinase inhibitor (TOR-KI) treatment combination. Moreover, SBI-756 reduced viability of VAL lymphoma cells lacking 4E-BP1, while VAL were insensitive to TOR-KI treatment. Proximity Ligation Assay showed that SBI-756 treatment prevents eIF4E-eIF4G association. Dual luciferase assays indicated a dose-dependent reduction in cap-dependent translation following SBI-756 treatment. Also, western blot analyses confirmed that SBI-756 treatment did not change mTOR substrate phosphorylation, indicating that SBI-756 effect is specific to eIF4E-eIF4G interaction prevention. Induced expression of a 4E-BP1 mutant (irreversibly binds eIF4E) sensitized DLBCL cells to venetoclax treatment to a similar extent as TOR-KI treatment. Lastly, when administered in vivo, the combination of venetoclax and SBI-756 reduced tumor size and weight more than each compound by itself, while not causing weight loss or interfering with mTOR signaling– indicating great potential and tolerability for the combination. Future directions: (1) Molecular mechanism for translation inhibition by SBI-756 synergizes with venetoclax to prime DLBCL cells toward apoptosis (2) PK and PD effects of venetoclax and SBI-756 treatment on DLBCL progression in vivo. Hence, this project highlights a novel combination for treatment of aggressive lymphomas, and establishes its efficacy using preclinical models.

Keywords: Diffuse Large B-cell Lymphoma; eIF4F complex; SBI-756; Venetoclax; BCL-2 inhibtor

Poster Location: 41

Huynh, Linda, BS; Zhang, Whitney; Ahlering, Thomas, MD

The Integration of (68)-Ga PSMA PET/CT Imaging in the Management and Treatment of Prostate Cancer Recurrence – A Single Center's Experience

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Introduction & Objectives 68Ga-PSMA PET/CT is a novel tool in post-radical prostatectomy restaging and treatment as it is both sensitive and specific to prostate cancer (PCa). We seek to evaluate a single center's experience for the detection of recurrent masses and emphasize the need for its integration into the management and treatment of PCa recurrence. Materials & Methods We analyzed patient data and 68Ga-PSMA PET/CT results for the first 30 patients undergoing the procedure after presenting with a BCR (two consecutive PSA values > 0.2 ng/mL), from October 2016 through October 2017. The mean patient age prior to surgery was 63.1 (range 51.6 to 72.3 years) and the mean pre-operative PSA was 8.3 (range 3.4 to 26.2 ng/mL). All patients had a primary robot-assisted RP for the treatment of Pca. Results Average time to BCR was 3.5 years post-RARP. Average age and PSA at the time of scan was 68.0 (57.4 -78.7) years and 3.9 (0.3-6.1) ng/ml, respectively. 28/31 (90.3%) had an exponential PSA doubling time. 22 (71.0%) patients had positive pathological findings on 68Ga-PSMA PET/CT. The detection rates were 100%, 83.3%, 20% and 50% for PSA levels of >2, 1-1.99, 0.5-0.99, and 0.2-0.49ngml, respectively. The smallest PSMA positive lymph nodes detected were 3mm in diameter. Detection rates increased with decreased PSA doubling time and time to recurrence was not a significant contributor to detection rate. Per indication by 68-Ga-PSMA PET/CT, 6 patients underwent a salvage PLND or pelvic mass resection of suspicious masses. Biochemical control (PSA<0.2ng/ml, 8 weeks post-op) was obtained in 2/6 (33.3%) patients. Conclusions 68Ga-PSMA PET/CT shows promising results in PCa re-staging and as a viable method to inform secondary treatment. Further studies are necessary to evaluate which patient groups have the highest benefit of this new imaging modality although the current literature suggests increased sensitivity and specificity for higher PSA levels.

Keywords: PSMA; PET/CT; prostate cancer; biochemical recurrence; nuclear medicine

Poster Location: 23

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Autologous vs. Allogeneic Mesenchymal Stem Cells in Neonatal Bronchopulmonary Dysplasia

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BACKGROUND: Bronchopulmonary dysplasia (BPD) is a chronic debilitating disease of preterm infants caused by oxygen toxicity, inflammation, and ventilator use leading to arrested alveolar development. Current therapies lack effectiveness and cause undesirable side effects. Our work utilizing bone-marrow derived mesenchymal stem cells (MSC) and their conditioned-media (MSC-CM) have shown protective effects in mouse BPD models. Analysis of the MSC-CM identified several biomarkers involved in lung injury and repair. A challenging question remains whether human umbilical cord MSCs harvested from BPD and non-BPD infants will have similar growth and differentiation potential and secretion of biomarkers as mouse bone-marrow derived MSCs. We hypothesized that BPD MSCs will lack biologic efficacy given exposure of these stem cells leading to predisposition to BPD. OBJECTIVES: 1. To isolate, culture, immunodeplete and differentiate human preterm (BPD & non-BPD) and term umbilical cord MSCs 2. To identify the biomarkers secreted by these MSCs into their conditioned media relevant to neonatal BPD, utilizing advanced proteomic analysis. DESIGN/METHODS: The human umbilical cord MSCs from preterm and term infants were isolated according to published methods with minor modifications. Immunodepletion was performed, the differentiation potential of these cells into osteocytes and adipocytes.We assessed the duplication and differentiation time between preterm BPD, preterm non-BPD and term MSCs. To analyze MSC media, MSC confluent cultures were incubated in serum-free D-MEM media for 24 hours and analyzed via advanced proteomics. RESULTS:We determined that preterm BPD MSCs had longer duplication and differentiation times (poor growth) compared with preterm non-BPD and term MSCs. Similarly, preterm BPD MSC media contained lesser amount of active biomarkers compared to preterm non-BPD and term MSCs.

Keywords: Bronchopulonary dysplaisia; mesenchymal stem cell; Umbilical cord

Poster Location: 13

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The Use of Optical Coherence Tomography to Quantitatively Measure Hair Regrowth in Alopecia Areata After Platelet-Rich Plasma Treatment

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Introduction: Alopecia areata (AA) is an inflammatory, non-scarring condition causing hair loss. Current treatment modalities are limited due to side effects and recurrence after therapy cessation. Platelet-rich plasma (PRP) is a new treatment modality that has been used for applications including skin rejuvenation, joint injection and hair growth. Thus far, results of PRP-induced hair regrowth have been controversial due to the inability to obtain accurate and reliable quantitative results. Objective: To use optical coherence tomography (OCT), a novel, non-invasive imaging system, to monitor hair follicle density and hair shaft diameter after PRP treatment. Case Report: A 60-year-old female with a nine-year history of AA presents to the office for evaluation and treatment. Her last treatment with intralesional triamcinolone occurred in April 2017; since that time the patient has not used any hair regrowth therapies. The patient received intradermal injections of 9 mL PRP throughout the scalp. Using photographs, SALT scores and OCT, we accurately assess the patient's hair pre- and post-treatment. Six weeks after PRP treatment, the patient exhibits 9% improvement in SALT score (baseline 42.1, post-treatment 38.2), with a 28% increase in hair follicle count on the right side of the scalp and 14% on the left. Hair shaft diameter within the follicle increases three-fold on the right side, however, no improvement is noted on the left. Discussion: The use of PRP for the treatment of AA has been previously described, however, reports of treatment success are limited and controversial especially without the ability to reliably measure therapeutic efficacy. This represents the first case of quantitatively measured PRP treatment success in a patient with AA. Conclusion: PRP is an effective treatment for AA with improvement in both hair follicle count and hair shaft diameter. OCT is a reliable and accurate method to quantitatively measure hair regrowth after PRP treatment

Keywords: Optical coherence tomography; Hair regrowth; Alopecia areata; Platelet-rich plasma; Clinical application

Poster Location: 21

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Determining the value of hair maintenance for cancer patients during chemotherapy treatment

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Background: Chemotherapy-induced alopecia (CIA) is one of the main adverse events of chemotherapy and can be experienced by 22 to 65% of cancer patients undergoing treatment. As many as 8% of cancer patients have considered forgoing chemotherapy because of the potential for CIA and its associated decrease in quality of life. Preventive treatment options such as scalp-cooling exist, and have been shown to significantly decrease hair-loss in patients with solid tumors undergoing chemotherapy. European studies have shown that such devices are cost-effective. However, only 17 cancer centers throughout the United States offer devices for patients undergoing chemotherapy due to lack of insurance coverage and excessive medical cost.
Hypothesis: Patients are interested in the use of novel preventive therapies to minimize CIA incidence and duration. Objective: To determine cancer patients' baseline understanding of CIA, their interest in minimizing hair-loss or increasing the chance of hair regrowth, and the cost patients are willing to accrue for novel preventive measures. Using these data we aim to predict the demographic of patients who are motivated in reducing CIA and to demonstrate that patients with non-solid tumor diagnoses are also interested in CIA-preventive strategies. Study Design: A survey-based, cross-sectional study of 100 patients currently undergoing or previously treated with chemotherapy at the Chao Comprehensive Cancer Center located at the University of California, Irvine.
Results: Patients overwhelming express their interest in CIA-preventive devices. Demographic characteristics such as age, gender, race and socioeconomic status play an integral role in patients' medical literacy regarding CIA, as well as their interest in preventing hair loss with novel therapeutics. Conclusion: CIA-preventive treatments and devices, such as scalp-cooling, are wanted and needed by solid tumor and non-solid malignancy cancer patients. It is our hope that this research will evoke change in the medical system to provide coverage for such preventive measures.

Keywords: chemotherapy-induced, alopecia, hair loss, preventive medicine

Poster Location: 74

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The Effect of Melanin on In Vivo Optical Imaging of Skin and Hair Follicle Morphology in Multiethnic Cohort

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Importance: Noninvasive real-time assessment of living tissue is quickly becoming invaluable for bolstering histologic and dermatoscopic diagnostic and prognostic measures of dermatologic conditions. While many skin researchers have explored the utility of noninvasive imaging in inflammatory and malignant skin conditions, there is yet to be a definitive and direct assessment of the effects of melanin on the quality of optical coherence tomography (OCT) and its accuracy in multiethnic patient populations. Purpose: The aim of this study was to evaluate the effects of increased melanin on the quality of OCT imaging in regards to characterizing skin and hair follicle morphology. Methods: Volunteers of various skin types were imaged in five locations of the body, including axilla and scalp. Cross-sectional data was compiled for image contrast, sharpness, tissue birefringence, epidermal thickness, and hair follicle morphological measurements of diameter and amount. Results: Fifteen subjects were imaged, including at least two subjects of each Fitzgerald skin type. Contrast and tissue birefringence showed no variation between skin type, gender, or age. Morphological findings of skin and hair follicles varied based on personal history and subject demographics, except for skin type. Conclusion: This study concludes that melanin does not have substantial effects on the quality or quantitative assessment capabilities of OCT images. Our findings support the use of OCT technology as a nondiscriminatory imaging tool that can obtain reliable data in different melanin skin types among multiethnic populations.

Keywords: Optical coherence tomography; Fitzgerald skin type; In vivo imaging; Melanin

Poster Location: 25

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Effectiveness of Lung-RADS in Reducing False-positive Results in a Diverse, Undeserved, Urban Lung Cancer Screening Cohort

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Purpose: Lung-RADS is a scoring system used to standardize lung cancer screening CT reporting and recommendations but has not been well-validated in clinical practice. This is a prospective study of the effectiveness of lung cancer screening using Lung-RADS in a diverse, undeserved, urban, academic clinical screening program. Materials and Methods: This is a clinical cohort who underwent low-dose CT (LDCT) for lung cancer screening, between December 2012-December 2016. LDCT results were prospectively assigned a Lung-RADS or equivalent score during study interpretation. Proportion in each Lung-RADS category and corresponding lung cancer rate; subsequent imaging, interventions, mortality and compliance were tracked. National Death Index (NDI) was queried for follow-up deaths. Results: The cohort comprised of 1,181 patients with 2,270 person-years of follow up. Mean age 64 [SD16.2] years, 51% women, 63% non-white, 71% current smokers, 69% overweight or obese, multiple co-morbidities. Lung-RADS false positive rate was 10.4% (95% CI 8.8-12.3). Baseline LDCTs were negative in 87% (1031): Lung-RADS 1-lung cancer rate 0.2% or Lung-RADS 2- cancer rate 0.5%. Positive baseline exams were Lung-RADS 3 in 10% (119)-cancer rate 3.4%, Lung-RADS 4a in 1.2% (14)-cancer rate 43% and Lung-RADS 4b in 1.5% (18)-cancer rate 83%. Lung cancer prevalence was 2.1%. Mortality was 40% in lung cancer patients versus 2.5% in the remaining cohort (p<0.001). 54% of patients were overdue for first annual exams. 84% (989) had follow-up via electronic records or personal contact and the remainder had vital status ascertained via NDI. Conclusions: Lung cancer screening using Lung-RADS was effective in reducing the false positive rate compared to the National Lung Screening Trial (NLST) in a diverse and underserved urban population.

Keywords: Lung; Cancer; Lung-RADS; Screening; False-positive

Poster Location: 57

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A role for group 2 innate lymphoid cells in muscular dystrophy

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Duchenne muscular dystrophy (DMD) is a genetic neuromuscular disorder characterized by progressive myofiber deterioration that ultimately leads to death. Asynchronous bouts of injury and repair elicit the chronic activation of immune responses that exacerbate muscle degeneration in a feed forward fashion. Normal immune mediated repair processes become inadvertently dysregulated, where the disrupted balance between type 1 and type 2 immune responses leads to impaired regeneration. Importantly, recent studies demonstrate the requirement of type 2 immune responses for the efficient regeneration of skeletal muscle. However, the mechanisms that regulate these responses have yet to be fully elucidated. Group 2 innate lymphoid cells (ILC2s) are critical regulators of type 2 immunity that promote tissue repair and the restoration of homeostasis. Using the mdx mouse model of DMD, we found that ILC2s are increased and activated in dystrophic muscle. Gain-of-function studies using IL-2/anti-IL2 complex (IL-2c) and IL-33 showed that this treatment effectively increased the frequency and number of ILC2s and enhanced type 2 cytokine expression in mdx skeletal muscle. IL-2c/IL-33 treatment also increased myofiber cross sectional area, suggesting enhanced muscle regeneration. In addition, ablation of IL-13-producing cells, including ILC2s, inhibited the recruitment of muscle eosinophils, an innate immune cell population previously implicated in muscle regeneration. Collectively our data support a working model in which ILC2s enhance type 2 immune responses to promote skeletal muscle regeneration. Ongoing experiments are aimed at understanding the mechanisms in which ILC2s regulate type 2 immunity and how these processes regulate skeletal muscle regeneration.

Keywords: Duchenne Muscular Dystrophy

Poster Location: 1

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Regulatory T cells suppress muscle degeneration during muscular dystrophy

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The pathogenesis of Duchenne muscular dystrophy (DMD) is exacerbated by chronic muscle inflammation, which can be partially mitigated by immunosuppressive glucocorticoids that with chronic use cause side effects. Accordingly, research directed at defining how inflammation is regulated in DMD promises to yield novel therapeutic approaches to inhibit degenerative inflammatory responses. Here we show that regulatory T cells (Tregs) suppress muscle inflammation and injury, and enhancing Tregs in vivo ameliorates muscular dystrophy. Tregs were largely absent in wild type mouse and normal human muscle, but were elevated in the necrotic lesions of muscle from the mdx mouse model of DMD and dystrophic patients. The depletion of Tregs exacerbated muscle inflammation and myofiber injury, and resulted in a higher frequency of interferon-gamma (IFN?)-producing CD4+ T cells. In contrast, increasing muscle Tregs with IL-2/anti-IL-2 antibody complex (IL-2c) reduced myofiber injury and muscle inflammation, reflected by reduced serum albumin+ myofibers and expression of cyclooxygenase-2, respectively. Moreover, muscle Tregs expressed high levels of IL-10, which was upregulated in whole muscle by IL-2c. These findings indicate that IL-2c ameliorates the severity of dystrophinopathy by increasing muscle Tregs that suppress muscle inflammation, likely through the production of IL-10; and highlight the potential of harnessing the immune system's natural suppressive activities to mitigate chronic inflammation.

Keywords: Inflammation; Immunology; Muscular dystrophy; Regulatory T cells

Poster Location: 28

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Tissue-engineered 3D Ear Cartilage Construct

Center for Tissue Engineering

Microtia is a congenital anomaly of the ear resulting in a range of structural abnormalities with severe cases involving the complete absence of the external ear. The current standard of care involves surgical reconstruction techniques requiring a multi-stage approach with several drawbacks for the patients. Tissue engineering technologies offer an alternative, more effective approach to external ear reconstruction. Current cartilage engineering techniques present with challenges, including the difficulty of reaching a sufficient chondrocyte yield in culture. Here, we propose a novel model of cartilage engineering. In order to expand cell numbers, we co-cultured chondrogenic cells with adipose-derived stem cells (ADSCs), which were then seeded into a 3D acellular adipose-derived extracellular matrix scaffold (AAM) resembling the native niche of chondrocytes in vivo. Auricular chondrocytes (ACs) were isolated from porcine ear, expanded in vitro, and characterized by staining. ADSCs were isolated and expanded from human lipoaspirate. ACs were cultured alone or with ADSCS at different ratios in 3D on the AAM and cartilage formation was characterized histologically. ACs were successfully isolated from the porcine ear and showed positive staining for type II collagen and glycosaminoglyans. When the isolated ACs were cultured with the ADSCs in 3D, cartilage formation was confirmed, and the 1:9 ratio of ACs to ADSCs showed the best result. By comparing ACs alone to the co-culture with ADSCs in 3D AAM we revealed that ADSCs provide adequate support to induce cartilage formation when the number of ACs is limited. This novel model of cartilage engineering provides a setting for utilizing the patient's own chondrocytes and adipose tissue for the creation of a customized ear framework that could be used for further surgical reconstruction.

Keywords: Tissue engineering; Adipose-Derived Stem Cells; Microtia; Chondrocytes; 3D Printing

Poster Location: 5

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Variable Clinical Features in Pompe Disease Associated with Novel Mutations

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Pompe disease is a lysosomal storage disorder caused by the deficiency of enzyme acid alpha-glucosidase (GAA) which results in accumulation of glycogen particularly in the skeletal, cardiac, and smooth muscles. The late-onset form with symptoms presenting in childhood through adulthood, is characterized by proximal muscle weakness, respiratory insufficiency, and unlike classic or infantile-onset form typically with no cardiac involvement. We report our experience with 24 adult patients (4 females/20 males) with Pompe disease at one center, several of whom had unique findings and novel mutations. Patients ranged in ages from 22-73y. (mean 52 y.) and were diagnosed at a range of 11-65 y (mean 45 y.) often after a history of progressive muscle disease of several years duration. Genetic sequencing revealed that twenty-two individuals had the common c.-32-13T>G mutation, and six patients, including two sibships had four novel mutations: c.1594G>A, c.2655_2656delCG, c. 1951-1952delGGinsT, and c.1134C>G. A male with the c.1594G>A mutation developed an intracerebral aneurysm at the age of 43 y. treated with surgery. Another male with the c.525_526delTG developed testicular cancer and is in remission. Cardiomyopathy was noted in an adult with the c.525_526 delTG mutation, and peripheral neuropathy in a male with the c. 1951-1952delGGinsT. Two siblings with the c.2655_2656delCG developed very high antibody titers, one of whom developed a severe infusion reaction. Other clinical features included scoliosis and cardiomyopathy in a young adult, BiPAP requirement in eight, tinnitus in seven, and one individual was born with partially developed hip and clubfoot. 22 of the 24 patients currently receive alglucosidase alfa with different response rates in their muscle weakness, pulmonary function dynamometry, and functional studies. One individual (Patient 20) is receiving an investigational drug-neoGAA, while another (Patient 21) is not receiving enzyme replacement therapy at all.

Keywords: Pompe; Natural Histroy; Novel mutations; glycogen storage

Poster Location: 61

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Auditory Brainstem and Middle Latency Response Changes in a Rodent Repeat-Mild Traumatic Brain Injury Model

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Background: Mild traumatic brain injury (mTBI) is caused by direct physical trauma to the head, and accounts for over 2 million emergency room visits, hospitalizations, and deaths in the United States annually. Although mTBI causes a variety of well-known cognitive and physiological deficits, its' effects on the auditory system remain poorly understood. We investigate changes in auditory brainstem (ABR) and middle latency responses (MLR) in a murine model of repeat-mTBI. Methods: ABR and MLR changes were measured across five-timepoints pre (baseline) and post (day-1, week-1, week-3, and week-5) injury at four frequencies (8, 16, 24, and 32 kHz). Stimuli intensities ranged from 20 to 80dB SPL (increments of 10dB) for ABR, and only an 80dB SPL intensity was presented for MLR, to three different wild-type C57/Bl6 mice groups (sham [n=7], 5-Hit [n=8], and 10-Hit [n=8]). Direct cortical impacts were delivered to each isoflurane anesthetized mouse with a TBI-0310 Impactor (speed: 5 m/s, depth: 1 mm, dwell time: 500 ms). Results: Using a 3x5 repeated-measures mixed ANOVA, with Tukey HSD post-hoc pairwise comparisons, between-group significant differences at 1-week were found between 10-Hit and 5-Hit at all frequencies ($p<0.01$), and between 5-Hit and sham at 8kHz, 16kHz, and 24kHz ($p<0.05$). In addition, within-group significant differences ($p<0.001$) were found comparing 1-week to baseline MLR at all frequencies for 10-Hit group only. A similar behavior was observed in ABR wave-V amplitudes at 8 kHz. In addition, we saw a 60% decrease in ABR wave I amplitude (SE = 0.15) and 0.28ms shift (SE = 0.11) in ABR wave I latency at 32kHz. Conclusions: Our results suggest that mTBI may cause temporary MLR and ABR changes. Future studies are needed to understand the acute and chronic effects of repeat head injury on auditory processing.

Keywords: mild traumatic brain injury; sensorineural hearing loss; auditory brainstem; repeat cortical impacts

Poster Location: 64

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The progression of a mounted system to a portable, handheld device for wide field blood flow visualization

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Laser Speckle Imaging (LSI) is a wide-field optical technique that enables superficial blood flow quantification. LSI is normally performed in a mounted configuration to decrease the likelihood of motion artifact. However, mounted LSI systems are cumbersome and difficult to transport quickly in a clinical setting for which portability is essential in providing bedside patient care. To address this issue, we created a handheld LSI device using scientific grade components. To account for motion artifact of the LSI device used in a handheld setup, we incorporated a fiducial marker (FM) into our imaging protocol and determined the difference between highest and lowest speckle contrast value for the FM within each data set (Kbest and Kworst). The difference between Kbest and Kworst in mounted and handheld setup was 8% and 52%, respectively, thereby reinforcing the need for motion artifact quantification. When using a threshold FM speckle contrast value (KFM) to identify a subset of images with an acceptable level of motion artifact, mounted and handheld LSI measurements of speckle contrast of a flow region (KFLOW) in an in-vitro flow phantom experiments differed by 8%. Without use of the FM, mounted and handheld KFLOW values differed by 20%. To further validate our handheld LSI device, we compared mounted and handheld data from an in-vivo porcine burn model of superficial and full thickness burns. The speckle contrast within the burn region (KBURN) of the mounted and handheld LSI data differed by <4% when accounting for motion artifact using the FM, which is less than the speckle contrast difference between superficial and full thickness burns. Collectively, our results suggest the potential of handheld LSI with a FM as a suitable alternative to mounted LSI, especially in challenging clinical settings with space limitations such as the intensive care unit.

Keywords: laser speckle imaging; wide-field imaging

Poster Location: 37

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Office-Based Ultrasound Guided Percutaneous Renal Mass Biopsy

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Introduction: We prospectively evaluated the feasibility, safety and efficacy of office-based, ultrasound-guided percutaneous renal biopsy (USPRB) of renal cortical neoplasms (RCN). Methods: Patients with a RCN underwent office-based USPRB. USPRB's were performed in the prone/lateral decubitus position. The Hitachi-Aloka alpha 7 or BK3000 ultrasound (US) devices with facilitated US targeting (FUT) technology was used to visualize the tumor. The probe was positioned so the tumor was in the virtual needle path as projected by the FUT technology. After injection of 1% lidocaine, an 18G biopsy needle was inserted using a guide on the transducer probe and advanced toward the RCN with US (5 to 7 cores were taken), and was repeated 1 hour later to check for hematoma. We assessed pain on a ten-point scale before, after, and a week after the procedure. Patient demographics, tumor characteristics, procedure time, complications, and histopathological diagnosis were documented. Results: A total of 71 patients with a mean age of 65.9 underwent renal biopsy. Median tumor size was 3.6cm. Median R.E.N.A.L. nephrometry score was 6. 59 of the 71 biopsies were diagnostic. Diagnostic biopsies included 48 renal cell cancer and 11 patients with benign histopathology (7 oncocytic renal neoplasm; 4 angiomyolipomas). All patients with benign histopathology elected active surveillance. No major complications during or after the biopsy procedure occurred. One patient experienced hematuria which was resolved without intervention. No patients reported pain before the procedure. Median pain score after the procedure was 1/10(0-3) and 0/10(0-5) at one hour after the procedure and 0 at three week follow up (p=0.365, 0=0.634). Based on histopathology (benign and indolent RCC sub-type), surgical intervention was averted in 56% of patients. Conclusions: Office-based, target-facilitated USPRB of selected RCN is feasible, safe and substantially impacts and improves management.

Keywords: Ultrasound; Biopsy; Renal Cortical Neoplasm; Renal Cancer

Poster Location: 43

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In Vivo Optical Imaging using Multiphoton Microscopy For Diagnostic Indices In Alopecia Areata

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In vivo imaging studies using devices like the confocal microscopy (CM) and ultrasound (US) are becoming increasingly common among physicians because of their noninvasive nature and minimal risks. Our study explores the utility of multiphoton microscopy (MPM), which has greater resolution than both CM and US, as an adjunct to histological studies and a diagnostic tool for alopecia areata (AA). AA is a nonscarring type of hair loss that commonly presents as well-circumscribed patches on the scalp. This autoimmune disease causes a lymphocytic infiltration of the follicular bulb, predominantly catagen or telogen hairs, fibrous tracts, and intact sebaceous glands seen on histology. With the MPM, cellular details of the epidermal portion of the follicular unit can be visualized using autofluorophores and infrared wavelengths of light. Using MPM, differentiation of follicular structures can be visualized in real time without using any stains or contrast material. MPM also allows the clinician to examine multiple sites during the same imaging sessions without having to perform any incisions. The most impactful improvement of using MPM is that the same area can be followed through time to track disease progression, which is not possible with biopsy techniques. Many hallmark features of AA can be confirmed using MPM like exclamation point and vellus hairs. This pilot study using MPM to study AA bridges laser-based technological advances with modern clinical practice. In our results, histological features of AA were found on MPM images. MPM was able to visualize disease-related changes of the hair follicle.

Keywords: alopecia; dermatology; optical imaging

Poster Location: 26

Lindsay, Karen, PhD; Buss, Claudia, PhD; Wadhwa, Pathik, PhD, MD; Entringer, Sonja, PhD.

The interactive effects of maternal stress and diet in pregnancy on markers of inflammation

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Excess inflammation during pregnancy may exert adverse effects on fetal development and birth outcomes. Maternal nutrition and stress are two of the most frequently but independently studies factors for their influence on prenatal inflammatory status, but their interaction in the context of pregnancy has been significantly understudied. The aim of this study is to investigate the combined effects of perceived stress and dietary inflammatory index across pregnancy on markers of maternal inflammation. This is a prospective longitudinal study of N=250 women carrying a healthy, singleton pregnancy. Research assessments were conducted in early, middle and late pregnancy which included: a 4-day ambulatory Ecological Momentary Assessment (EMA) of maternal perception of stress, from which the Perceived Stress Score (PSS) was computed; Dietary intake assessment by three 24-hour dietary recalls, from which the Dietary Inflammatory Index (DII) was computed as a validated summary measure of a pro-inflammatory diet; blood sample collection from which Interleukin (IL)-6 and Tumor Necrosis Factor (TNF)-a were measured. Each of the variables PSS, DII, IL-6 and TNF-a were highly correlated across time points and were thus averaged across pregnancy. Linear regression tested the association of the prenatal stress-diet interaction (PSS*DII) with IL-6 and TNF-a, adjusting for key covariates (maternal age, pre-pregnancy body mass index, socioeconomic status, race/ethnicity). Scatter plots were used to interpret the effects of PSS on inflammatory markers at a given DII. The interactive effect of prenatal stress and diet was associated with mean TNF-a across pregnancy ($p=0.01$), such that women with a DII in the highest quartile (high inflammatory diet) had higher levels of TNF-a as their PSS increased. There were no effects on IL-6. Maternal stress should be considered concurrent with diet during pregnancy to help regulate the inflammatory milieu to which the developing fetus is exposed.

Keywords: Pregnancy; Diet; Stress; Inflammation; Tumor Necrosis Factor-alpha

Poster Location: 60

Mahmoud, Ranim, MD:; Singh, Preeti, MD, MPH:; Gold, June-Ann, MD:; Miller, Jennifer, MD: Roof, Elizabeth, MA: Dykens, Elisabeth, PhD: Butler, Merlin, MD, PhD: Driscoll, Daniel, MD, PhD: Kimonis, Virginia, MD

A multicenter study of maternal and fetal features in Prader-Willi syndrome

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Background: Prader Willi Syndrome (PWS) is caused by lack of expression of genes on the paternal chromosome 15q11.2 - q13. There is an evolving phenotype for those patients with either a Deletion, Uniparental Disomy (UPD) or an Imprinting Center (IC) Defect. Objectives: We evaluated the early manifestations of PWS in pregnancy and early neonatal period to identify clinical features that would lead to early detection of PWS. We also looked for genotype-phenotype correlations within the genetic subtypes. Methods: Data from 355 patients from the Rare Diseases Clinical Research Network (RDCRN) PWS registry were used to analyze multiple clinical maternal and neonatal factors. Results: Out of 355 patients 61% had deletion, 36% had UPD and 3% had an IC defect. 54% were born by C- section (population 32%). Fetal movements were decreased in 72%. Mean birth weight was 2.71 kg. All babies were hypotonic, 72% needed gavage feeding and 23% needed G-tube placement, these values being significantly higher than the general population. Maternal age was significantly higher in the UPD group as was pre-pregnancy weight. Conclusions and Future Directions: The goal of this study is to increase awareness of the perinatal and neonatal features of PWS thus enable earlier diagnosis, treatment and prevention of morbid obesity and co-morbidities. We recommend newborn screening for early detection and prevention of complications of PWS.

Keywords: Prader Willi Syndrome; RDCRN; perinatal; neonatal; natural history

Poster Location: 63

Manville, Rían; Papanikolaou, Maria; Abbott, Geoff;

Direct Neurotransmitter Activation of Voltage-Gated Ion Channels

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Voltage-gated potassium channels KCNQ2-5 (Kv7.2-5) generate the M-current, which controls neuronal excitability. KCNQ2-5 subunits each harbor a high-affinity anticonvulsant drug binding pocket containing an essential tryptophan (W265 in human KCNQ3) conserved for >500 million years yet lacking a known physiological function. Here, phylogenetic analysis, electrostatic potential mapping, in silico docking, electrophysiology and radioligand binding assays revealed that the anticonvulsant binding pocket evolved to accommodate the inhibitory neurotransmitter gamma-aminobutyric acid (GABA), which directly activates KCNQ5 and KCNQ3 via W265. An extensive set of controls demonstrated that the effects do not arise from activation of canonical GABA receptors or other signaling mechanisms. GABA and endogenous metabolites of GABA, but not glutamate or dopamine, competitively and differentially shift the voltage dependence of KCNQ3 activation. Our results uncover a novel paradigm: chemosensing of the neurotransmitter-metabolite landscape by voltage-gated ion channels to regulate channel gating and cellular excitability.

Keywords: GABA directly activates Kv channels

Poster Location: 66

Manville, Rían, Ph.D.; Papanikolaou, Maria, Ph.D.; Abbott, Geoff, Ph.D.

Molecular mechanism underlying a traditional anticonvulsant: synergistic KCNQ2/3 potassium channel activation by dual components of Mallotus oppositifolius extract.

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Voltage-gated potassium channels formed by KCNQ2 and KCNQ3 generate the phosphatidylinositol 4,5-bisphosphate (PIP2)-augmented M-current, which regulates neuronal excitability. Hyperexcitability of neuronal cells is associated with numerous neurological diseases, such as benign familial neonatal seizures (BFNS), a disease linked to mutations in the gene encoding KCNQ2. In the developing world, an estimated 80% of epilepsy patients use herbal remedies for primary healthcare, such as the Ghanaian shrub Mallotus oppositifolius. M. oppositifolius extract has been previously shown to delay the onset of seizures as well as reduce their frequency and duration in mouse models of epilepsy. However, the active components and the molecular basis for these anticonvulsant properties were unclear. Here, we report that KCNQ2/3 channels are activated by mallotoxin (MTX), a natural product isolated from the Ghanaian shrub M. oppositifolius. Application of MTX to oocytes expressing KCNQ2/3 channels shifted the voltage for half-activation (V0.5) in the hyperpolarizing direction, leading to an increase in current amplitude at test potentials between -80 mV and -40 mV. MTX also had a marked effect on KCNQ2/3 channel kinetics, increasing the rate of activation but slowing deactivation. Similar effects of MTX were observed in oocytes expressing KCNQ2 or KCNQ3 alone, with KCNQ2 exhibiting greater sensitivity, suggesting KCNQ2 may be the primary molecular target of MTX. Additionally, isovaleric acid (IVA), another component of M. oppositifolius extract, also activated KCNQ2/3 channels, albeit less potently than MTX. Strikingly, dual application of MTX and IVA to KCNQ2/3 channels produced a highly effective, synergistic KCNQ2/3 activation. Finally, MTX and IVA were also more effective in combination, versus alone, in suppressing pentylenetetrazole-induced tonic seizures in mice. Our results suggest that KCNQ2/3 activation by both MTX and IVA is the molecular basis for the anticonvulsant

Keywords: Mallotus extract activates M-channels

Poster Location: 67

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Preliminary Efficacy Testing of an Intervention for Pain Management in Children Undergoing Cancer Treatment: Pain Buddy

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Mobile health technology plays a vital role in children with cancer and has the potential to address the issue of under-treated pain. The purpose of this study is to explore the preliminary efficacy of Pain Buddy, an interactive web-based intervention to manage cancer pain and symptoms in children. Pain Buddy encompasses a validated pain and symptom diary, coping skills training, an electronic communication tool and a three-dimensional avatar to guide the child through the program. To evaluate the preliminary efficacy of Pain Buddy, 19 children (14 male, 5 female) ages 8-18, undergoing cancer treatment were recruited to complete an 8-week study involving completion of symptom diaries twice daily. Out of 19 children recruited, 8 were randomly assigned to the Pain Buddy intervention group; 11 were placed in the attention control group. A healthcare provider monitored symptom diaries in the intervention group. On average, children completed 96.79 ±19.34 diaries over the 8-week period. Of the 1591 total diaries completed, 113 resulted in symptom trigger alerts, which was a symptom rate of 7.10%. On average, children in the intervention group spent 4.23 + 0.96 hours in the Pain Buddy program over the 8 weeks, while children in the attention control group spent 3.44 + 2.73 hours in the program over 8 weeks. When comparing for pain severity over the study period, children in the intervention group reported significantly lower pain severity at the time of diary entry than the children in the attention control group (U = 976.00, p = 0.281).

Keywords: Mobile Health; Oncology; Pediatric Cancer; Web-based Intervention

Poster Location: 51

Monroe, Derek, PhD,; Cecchi, Nick,; Hicks, Jim, PhD; Small, Steven, MD, PhD

The Effects of Repetitive Head Impacts on Cognitive Function and Neural Connectivity in Collegiate Water Polo Players

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Objectives: We aimed to quantify the cumulative cranial mechanical load (CCML) sustained by athletes engaging in sports associated with a high-risk of head injury (i.e., water polo). We sought to relate changes in neural complexity and functional connectivity to CCML. We also sought to relate changes in response inhibition and cognitive interference control (Eriksen Flanker Task; Stroop Color-Word Interference Task) to CCML. We hypothesized that athletes sustaining the greatest CCML would exhibit reductions in long-range, high frequency (gamma) connectivity, increases in local, short-frequency (alpha) connectivity, and reduced neural complexity. We also hypothesized that athletes sustaining the greatest CCML would exhibit impaired response inhibition and interference control. Results: Three-dimensional accelerometers registered twenty-one head impacts sustained by nine male water polo athletes across ten games. CCML was computed per athlete as the sum of the median-weighted peak linear acceleration, peak rotational acceleration, and peak rotational velocity of each head impact sustained. Athletes (n=4) who sustained the greatest CCML ("high-load" athletes) demonstrated decreased performance on the Eriksen Flanker Task relative to athletes who sustained the lowest CCML (n=5) ("Low-load" athletes). No differences between groups were observed for the Stroop Task. A Bayesian probabilistic single-case approach revealed that two of the high-load athletes exhibited reduced long-range gamma synchrony (between anterior and posterior electrodes), increased local alpha synchrony in frontal electrodes, and reduced neural complexity between the pre-season and post-season relative to non-athlete controls. Low-load athletes did not exhibit differences relative to controls. To our knowledge, these data represent the first evidence for the potentially adverse effects of repetitive, low-intensity head impacts on neural connectivity.

Keywords: athlete monitoring; brain injury; functional connectivity

Poster Location: 73

Newhart, Veronica; Warschauer, Mark; Jones, Masha R.

Telepresence robots for virtual academic inclusion and improved well-being, health, and social outcomes for homebound pediatric patients

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Advances in pediatric medicine have improved the survival rates of many once-fatal childhood illnesses. As a result, millions of children and adolescents in the US now live with chronic illnesses such as cancer, immune deficiency, and others (Sexson& Madan-Swain, 1993). This has led to a growing population of homebound pediatric patients who are unable to physically attend school due to symptoms or treatments of their illness but are still cognitively able to learn. In our study, we explored the use of telepresence robots by homebound pediatric patients to attend their local schools. In order to explore if this practice may have a positive effect on perceived well-being, we sought to answer the questions:

1)Why are students using these robots?
2)Do they feel happier using the robots?

Our study found that remaining socially connected to their peers and school community was the primary motivation for using this technology and that almost all participants reported feeling" happy" or "good" when using the robot.

Keywords: robotics, telepresence robots, education

Poster Location: 38

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Epstein - Barr virus detection in Extranodal NK/T-cell Lymphoma

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Background: Extranodal NK/T-cell lymphoma (ENKL) is an angiocentric and angiodestructive tumor associated with prominent necrosis that predominantly involves extranodal sites, particularly the upper aerodigestive track. It is usually found in the nasal/paranasal area, tonsils, hard palate, and salivary glands. Localization to the larynx is rare. Epstein-Barr virus (EBV) is found in nearly 100% of the cases. Herein we present two cases of ENKL involving the nasal cavity and subglottic area. Case 1: A 62 year-old man presents with history of nasal discharge and nasal blockage in his right nostril since 3-4 months ago. CT and MRI findings are consistent with diffuse polypoid disease but more significant involvement of the right nasal fossa. Biopsy of nasal mass demonstrates clusters of lymphoma cells in an extensively necrotic background. The neoplastic cells are positive for CD2, CD3, CD56, CD43, and EBV by in situ hybridization (EBER). Ki67 denotes a high proliferative activity (80%). Case 2: A 23 year-old women presents with several weeks of respiratory distress and hoarseness of voice. Bronchoscopy shows swollen vocal cords and arytenoids with severely stenosed glottis and subglottis. Also, multiple 1-2 mm pink-colored nodules over the false vocal cords and vallecula are identified. Histology section shows unremarkable squamous mucosa with underlying diffuse proliferation of atypical lymphoid cells in a necrotic background. The atypical lymphoid cells are positive for CD2, CD3, CD56, CD30, and EBER with high Ki-67 proliferative activity. Conclusion: ENKL diagnosis can be challenging due to the non-specific patient's clinical symptoms and the relatively unusual localization. In the setting of inflammation in the nose and paranasal sinuses, neoplastic NK/T cells may be masked by secondary reactive inflammatory cells or intense necrosis. Therefore, a diagnosis of ENKL is frequently dependent on a series of immunohistochemical and molecular studies.

Keywords: Extranodal NK/T-cell lymphoma; Epstein - Barr virus; Angiocentric; EBV; Lymphoma

Poster Location: 45

Ornelas, Elisa; Agbayani, Crystle; Mendoza, Beverly; Cortes, Haydee; Fortier, Michelle

C-TIPS: A Web-Based Program to Improve Management of Children's Cancer Pain

In the United States each year, about 15,700 children are diagnosed with cancer. Unfortunately for most children, cancer treatment can cause significant pain, which impacts not only the quality of life of children but of caregivers and families as well. The growing field of health mobile health (mHealth) offers an avenue to improve pain management in children with cancer. The current study describes the development and usability testing of Cancer-Tailored Intervention for Pain and Symptoms (C-TIPS), an mHealth program designed to help parents manage children's cancer pain in the home setting. C-TIPS is tailored based on children's age and treament protocol and consists of information and skills training for parents, including a module on parent stress management. Participants included 30 parents of children undergoing treatment for cancer. Participants were recruited to complete the C-TIPS program and then provide both quantitative and qualitative feedback regarding usability and likability. Quantitative analysis of the usability ratings showed high satisfaction levels with both the education and skill training modules ($ps < 0.001$). Following use of the skills training module, parental reports of stress levels significantly decreased ($p = 0.004$) while relaxation ratings increased ($p = 0.05$). Qualitative results from the focus group interviews showed that parents found C-TIPS to be useful, accessible, and provided relevant information. Results of this study suggest that C-TIPS, an mHealth program focused on parent management of children's cancer pain in the home setting was well-received and accessible. Next steps will be to collect preliminary efficacy data on both parent stress and children's pain during cancer treatment. Improving pain management at home for children with cancer is vital for improving both child and parent quality of life.

Keywords: Pain Management; Pediatric Caner; Information Technology; Stress Management

Poster Location: 52

Owyong, Michael, B.S.; Lotan, Yair, M.D.; Kapur, Payal, M.D.; Panwar, Vandana; Lee, Thomas K.; Zi, Xiaolin; Martin, Jeremy; Mosbah, Ahmed; Abol-Enein, Hassan; Ghoneim, Mohamed; and Youssef, Ramy F.

Prognostic Utility of PD-L1 in Squamous Cell Carcinoma of the Bladder

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Introduction: There is growing interest in immunotherapy utilizing checkpoint inhibitors for treatment of bladder cancer. There have been no reports on the expression of programmed death ligand 1 (PD-L1) in squamous cell carcinoma (SCC) of the bladder. Herein, we assessed the relationship between PD-L1 expression and clinicopathological features and oncological outcomes in SCC. Methods: Immunohistochemistry of PD-L1 was performed on 151 radical cystectomy specimens with pure SCC treated with radical cystectomy (RC) in Mansoura, Egypt from 1997 to 2003. Results: The study included 151 cases of SCC (98 men) with a median age of 52 years (range: 36-74 years). Schistosoma was associated with 81% of SCC cases. Overall, 141 (93%) patients presented with = T2 stage and 47% had high grade carcinoma. Positive expression of PD-L1 was found in 101 (67%) specimens. Negative expression of PD-L1 was associated with higher pathological T stage ($p = 0.04$) and grade ($p = 0.01$). The median length of follow-up after RC was 63 months (range: 1-100 months). Kaplan-Meier analyses showed that negative expression of PD-L1 is associated with both disease recurrence ($p = 0.01$) and bladder cancer-specific mortality ($p = 0.01$). In multivariate Cox proportional hazards regression analyses, negative expression of PD-L1 was an independent predictor of disease recurrence (HR 2.05, 95% CI 1.06 - 3.96, $p = 0.03$) and bladder cancer-specific mortality (HR 2.89, 95% CI 1.22 – 6.82, $p = 0.02$), after adjusting for tumor grade, pathologic tumor stage, lymph node involvement, and lymphovascular invasion. Conclusions: Negative expression of PD-L1 is associated with higher tumor stage, tumor grade, and worse oncological outcomes after RC for SCC. This study suggests that higher expression of PD-L1 may be part of the immune response associated with better outcomes in SCC. Further studies are needed to elucidate if PD-L1 can be a predictor of response to immunotherapy for SCC.

Keywords: bladder cancer; biomarkers; prognosis

Poster Location: 44

Paganini-Hill, Annlia PhD; Fisher, Mark MD; Greenia, Dana RN MS; Paganini-Hill, Annlia Ph D; Fisher, Mark MD; Greenia, Dana RN MS; Floriolli, David MD; Bryant, Natalie BS; Corrada, Maria Sci D; Kawas, Claudia MD

24-hour ambulatory blood pressure, cognitive performance, and cerebral microbleeds in the elderly

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24-hour ambulatory blood pressure, cognitive performance, and cerebral microbleeds in the elderly Objective: We analyzed cross-sectional data from a cohort of 90+ year-olds to test the hypothesis that blood pressure (BP) variables are associated with cognitive function and cerebral microbleeds (CMB). Background: Multiple studies suggest a role for BP variability and nocturnal BP dipping in the development of cerebrovascular disease and cognitive impairment. Methods: Study subjects were 121 participants (mean age = 93 years, 63% female) in The 90+ Study, a study of aging in individuals aged 90 years and older. Participants were given a neuropsychological test battery and all subjects underwent 24-hour ambulatory BP measurement. MRI scans were available for 26 participants. Over three time frames (24-hour, daytime, nighttime) and separately for systolic BP (SBP) and diastolic BP (DBP), we represented BP by mean, minimum, maximum, standard deviation (SD), coefficient of variation, average real variability, percentage of high measurements (>140 mmHg for SBP and >90 mmHg for DBP), percentage of low measurements (<90 mmHg for SBP and <60 mmHg for DBP), and nocturnal dip (% change of mean night BP from mean day BP). Results: Cognitive status was normal in 97 subjects, and cognitively impaired not demented/demented in 24. Mean nocturnal dips (both SBP and DBP) differed significantly between the two groups, with normal participants having on average greater dip levels (6.6 vs 1.3, p=0.006 for SBP and 11 vs 4.4, p=0.002 for DBP). Greater nocturnal dips were related to better language, recent memory, and visual-spatial ability. MRI findings showed subjects with CMB (n=18) had higher SD of daytime SBP than those without (n=8) (20 vs 16, p=0.03). Those with CMB also had a greater proportion of high nighttime DBP (>90 mmHg) readings (3.6 vs 0, p=0.03). Conclusions: Among 90+ year olds, nocturnal BP dipping may have a role in cognitive impairment, while SBP variation and dias

Keywords: cognition; blood pressure; microbleeds; nocturnal dipping

Poster Location: 70

Panchal Shweta; Almuzayyenm AA; Dr.Rosemary Dziak

A Novel Treatment of Osteosarcoma- Inhibition of Magnesium uptake TRPM7 channels employing targeted drug delivery systems.

Oral Sciences, SUNY Buffalo and Radiological Sciences, UC Irvine Health

A. Introduction- 1. Osteosarcoma: Osteosarcoma is the most common primary bone malignancy affecting children and young adults. It is third most common malignancy affecting adolescents after leukemia and lymphoma. Some cases of malignancy have also been reported in the later stage around 60 years of life. It usually presents with chronic pain that worsens at night. They are high grade tumors encountered mostly at the intraosseous site most commonly in the metaphyseal region of long bones. They are within the medullary cavity, grow to infiltrate the surface of the bone and involve the surrounding soft tissues. The exact cause of osteosarcoma is not known but a multitude of factors like physical, biological, environmental and chemical factors are known to contribute to the disease. Osteosarcomas have a high propensity for metastasis through the heamatogenous route with the lung being the most common site. Around 20-25%of the patients present metastasis at the time of diagnosis. The metastasis brings down the survival rate to 30% compared to 60-70% for metastasis free osteosarcomas. The 5 year survival rates is reported in the range of 55%-75% for most European countries, USA and Japan etc. The survival rates improved dramatically in 1970-1980's in Japan and USA but then remained steady for next decades. The noticed lack of improvement in the last decades necessitates the need to conduct more research and the development of efficient new treatment strategies 2. The role of Magnesium in osteoblastic proliferation: Magnesium (Mg) is the fourth most abundant cation in the human body. The free form of Mg constitutes 15-20% of the total body Mg that amounts to 0.8-1.2mM concentration. Optimum Mg levels are essential to regulate numerous cellular functions and enzymes including ion channels, signaling pathways and metabolic cycles. Physiologically Mg plays an important role in bone formation, neuromuscular coordination and muscle contraction. Approximately 60% of the body st

Keywords: Osteosarcoma

Poster Location: 8

Papanikolaou, Maria, Dr; Manville, Rian, Dr; Abbott, Geoffrey, Professor; N/A

Amyloid Precursor Protein C99 Fragment Modulates Kv Channel Activity

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The KCNE family of K+ channel subunits (KCNE1-5) are single transmembrane (TM) domain glycoproteins that are formed from short polypeptides of ~130 amino acids. They co-assemble with a wide range of voltage-gated potassium (Kv) channel pore-forming a subunits, modifying the channels' kinetics and voltage dependence, and other features including trafficking, subcellular localization and pharmacology. Here, we hypothesized that the Amyloid Precursor Protein (APP) single TM domain fragment, C99, might perform similar functions due to its topological resemblance to the KCNE proteins. APP is involved in the regulation of multiple cellular functions via protein-protein interactions and has been most studied with respect to Alzheimer's disease (AD) because abnormal processing of the C99 fragment contributes to the formation of amyloid plaques, which are causally related to AD. Strikingly, we found that C99 exhibits 24% sequence identity with KCNE1, comparable to the identity between KCNE1 and KCNE2-5 (21-30%). We quantified the functional effects of co-expressed C99 on various Kv channels expressed in Xenopus laevis oocytes using two-electrode voltage-clamp electrophysiology. C99 inhibited activity of KCNQ2/3, KCNQ1-KCNE1, hERG, Kv1.1 and Kv1.2 channel activity, by 30-50%. In contrast, C99 had no effect on Kv4.2, Kv4.3 or KCNQ4 channel activity. We also observed C99 inhibition of hERG activity in Chinese Hamster Ovary (CHO) cells using patch-clamp electrophysiology. Finally, using confocal microscopy we observed C99 co-localization with hERG and KCNQ2 in the CHO cell plasma membrane. Future studies will address the possible role of C99 modulation of Kv channel function in normal physiology, and in the cognitive decline associated with AD.

Keywords: Amyloid Precursor Protein; Potassium Channels; TEVC; Immucolabelling; Whole Cell Patch Clamp

Poster Location: 68

Pham, Christine, BS; Ekelem, Chloe, MD/MPH; Mesinkovska, Natasha, MD/PhD

A Systematic Review of the Outcomes of Hair Transplantation in Primary Scarring Alopecia

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Importance: Hair loss, or alopecia, is one of the most commonly presented problems in dermatology. Scarring alopecias are considered particularly damaging due to limited success in slowing permanent disease progression and current treatment methods, such as intralesional and topical steroids and topical minoxidil, are largely ineffective. Objective: Hair transplantation is a debated treatment option for advanced cases of primary scarring alopecia. This study reviews the efficacy of hair transplantation as a treatment option for primary scarring alopecia. Methods: A primary literature search was conducted using PubMed to identify articles in scarring alopecia and hair transplants published from 1960 to present time. Discussion/Results: Thirteen reports with thirty two patients were included in this review. Twenty five patients experienced moderate to positive results, while seven patients experienced negative results or recurrence of disease. Positive hair transplantation results have been reported in patients with central centrifugal cicatricial alopecia, en coup de sabre, discoid lupus erythematous, pseudopelade de brocq, and folliculitis decalvans. Positive and negative results were observed in patients with lichen planopilaris and frontal fibrosing alopecia. Conclusion: Findings show that hair transplant surgery can be considered a treatment option for certain primary scarring alopecias. However, the data needs to be interpreted with caution as of concern for positive-result publication bias.

Keywords: hair transplantation; primary scarring alopecia; alopecia; primary cicatricial alopecia

Poster Location: 47

Pham, Tiffany, MS; Borden, Pamela; Hansen, Kyle; Moy, Wesley, PhD; Krasieva, Tatiana, PhD; Sivoraphonh, Ryan; Hong, Ellen, BA; Sun, Chung-ho, PhD; Hill, Michael, PhD; Wong, Brian JF; PhD

Understanding Electrochemical Therapy Efficacy and Dosimetry in Adipose Tissue

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Objectives: Lipomas, benign masses of adipocytes, are the most common soft tissue tumors. Lipomas of large size and in unfavorable locations may be removed for cosmesis or discomfort. Current lipoma and adipose reduction therapies include invasive surgical or expensive minimally-invasive methods. Thus, we investigated the efficacy of Electrochemical Therapy (ECT), a low-cost, minimally-invasive technology, to dissolve adipose tissue. We identified dosimetry parameters of ECT. Methods: ECT was applied to harvested cheek and submental adipose tissue of Yorkshire pigs at the following dosimetry: 4-6 volts exposed over 3-5 minutes. Two needle electrodes were inserted into tissues. Saline was injected into tissues prior to ECT. High frequency ultrasonography was acquired during ECT at 0, 30, and 300 seconds. After ECT, pH dye was applied to tissues to evaluate electrolytic acid base injury. A subset of ECT samples; positive controls of hydrochloride, sodium hydroxide, deoxycholate acid, heat; and no treatment were stained with bodipy, a fluorescent lipophilic dye, and morphology changes were assessed using multiphoton microscopy. Histology was acquired of experimental conditions. Results: In ultrasound images, we observed gas formation between electrode sites, greater with increasing voltage and duration of ECT. pH mapping showed increased area of acid and base injury with increasing voltage and time. Fluorescent microscopy showed adipocyte lysis with presence of lipid droplets in ECT conditions and positive controls. Histology showed adipocyte damage at both anode and cathode sites. Conclusion: ECT induces adipocyte lysis, suggesting its potential for use as a low-cost, minimally-invasive means of adipose removal. ECT is able to lyse water molecules to induce acid and base injury to adipose tissue. Higher voltage and longer duration caused greater effects. Further studies are required to assess the functional state of the cells after ECT and the following healing.

Keywords: lipolysis; lipoma; adipose reduction; adipose contouring; electrochemistry

Poster Location: 15

Plewa, Jake,; Surampalli,Abhilasha, MD; Wencel, Marie, BSc.; Merit Milad: Sandra Donkervoort: Vincent J. Caiozzo: Namita Goyal: Tahseen Mozaffar: Virginia Kimonis

A multidimensional cross-sectional analysis of clinical evaluation in 35 individuals with mutations of the valosin-containing protein gene.

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Inclusion body myopathy (IBM) associated with Paget disease of the bone (PDB) and frontotemporal dementia (FTD) or IBMPFD is an autosomal dominant degenerative disorder caused by mutations in the valosin-containing protein (VCP) gene. We aim to establish a detailed clinical phenotype of VCP disease amongst 35 (28 affected individuals, 7 presymptomatic gene carriers) individuals versus 14 unaffected first-degree relatives in 13 families to establish useful biomarkers for IBMPFD and identify the most meaningful tests for monitoring disease progression in future clinical trials. Comprehensive studies included the Inclusion Body Myositis Functional Rating Scale (IBMFRS) and fatigue severity scale questionairres, strength measurements using the Manual Muscle Test with Medical Research Council (MRC) scales, hand-held dynamometry using the microFET and Biodex dynamometers, 6 minute walk test (6MWT), and pulmonary function studies. Strong correlation was observed between the IBMFRS and measurements of muscle strength with dynamometry and the other functional tests, indicating that it may be utilized in long-term follow-up assessments due to its relative simplicity. This cross-section study represents the most comprehensive evaluation of individuals with VCP disease to date and provides a useful guide for evaluating and possible monitoring of muscle weakness and pulmonary function progression in this unique cohort of individuals.

Keywords: VCP; Inclusion body myopathy; Natural history; BIODEX dynamometry; IBMFRS

Poster Location: 62

Riedel, Stefan; Gargus, Matthew; England, Whitney; Ramirez, Bryan; Wandro, Stephen; Oliver, Andrew; Whiteson, Katrine

Hypoxia, exercise and the microbiome: A study on the impact of voluntary exercise in hypoxia exposed rats on the composition of fecal and cecal microbes.

Microbial community composition in the animal gut is unique to each individual, and has been shown to be influenced by diet, sleep, infection, and exposure to microbes especially early in life, exercise, and other life events. An ongoing study being conducted at the Pediatric Exercise Research Center focuses on examining whether exercise intervention can reduce growth stunting related to hypoxia exposure early in life. Postnatal hypoxia is a frequent complication of premature birth caused by the under development of the lungs. Exercise has been shown to impact microbial community composition in both animal and human studies. We hypothesize that with the introduction of exercise, the microbial community composition and metabolic profiles will shift in a healthy direction. In a rat model of early-life exposure to hypoxia, we followed microbiome composition in groups of animals that were exposed to 10% oxygen for 10 days, and then subgroups were given access to a running wheel for voluntary exercise for 60 days. Microbial DNA was extracted and sequenced from cecal contents. We observed an expansion in microbial community diversity with exposure to exercise. Multivariate analysis of microbial community composition from animals in each of the hypoxia and exercise groups will be presented.

Keywords: microbiome; microbial community; hypoxia

Poster Location: 11

Sayadi, Lohrasb M.D.; Alexander, Michael, Msc.; Banyard Derek M.D., MBA; Lakey, Jonathan Ph.D Widgerow, Alan M.D, FACS- corresponding author

Micro/nanobubbles: A Novel Oxygenation Technology for cellular and organ transplantation

UCI Department of Plastic Surgery (1, 3, 5) UCI Department of Surgery (2,4)

Purpose: The survival and preservation of transplanted tissue are directly tied to and limited by ischemia time. A new innovation, micro/nanobubbles (MNBs), are miniature gaseous voids that allow for oxygenation of a tissue bathed in them for varying periods of time. Given their high oxygen carrying capacity, MNBs offer a new technology for oxygenating transplantable tissue and improving cell survival and viability. A priority in the field of islet cell transplantation for Type 1 Diabetes is to preserve every single islet count due to the shortage of donors and consistent low recovery of islets. Here we demonstrate that islet cell survival and viability can be improved with MNBs Materials & Methods: Rat pancreatic islet cells were harvested and split into 3 groups starting with 500 cells in each group - these were cultured in JPI media overnight. On day 0, media was changed to either control media (pO2: 210 mmHg); control media with dissolved air (pO2: 210 mmHg) or micro/nanobubbled solution (pO2: 223 mmHg). Media was replenished under the same conditions at 24 hours. On day 2 the number of living islet cells were counted using dithizone staining and their viability was assessed using the calceinAM/propidium assay. All experiments were replicated 5 times to achieve statistical significance. Data: Islet cells preserved in air filled MNB solutions had both a significantly improved cell survival and viability (Islet count: 223, viability: 96±1%) when compared to either islet cells treated with control media (Islet count: 104, viability: 87±1%) or control media with dissolved air (Islet count: 92, viability: 87±1%). Conclusions: MNBs added to standard media significantly improve oxygenation and survival of harvested pancreatic islet cells prior to transplantation compared to control media. These findings are very encouraging in the field of islet cell transplantation for Type 1 diabetes given the demonstrated increase in preservation of robust cells.

Keywords: Micro/nanobubbles; Transplantation; Islet cells; Diabetes; Oxygenation

Poster Location: 29

Seiler, Magdalene, Ph.D.; McLelland, Bryce T; Lin, Bin, Ph.D; Collin, Joseph, Ph.D.; Mellough, Carla; Lako, Majlinda; Aramant, Robert; Nistor, Gabriel; Keirstead, Hans

3D retina organoids produced from CRX-GFP human embryonic stem cells (hESCs) processed into retinal sheets and transplanted into immunodeficient retinal degenerate (RD) rats

1Physical Medicine & Rehabilitation, Sue & Bill Gross Stem Cell Resource Center, UC Irvine, School of Medicine, Irvine, CA 2 Institute of Genetic Medicine and Institute for Ageing, Newcastle University, Newcastle, U.K. 3AIVITA Biomedical Inc, Irvine, CA

Purpose: To demonstrate retinal and photoreceptor differentiation from a Cone-Rod Homeobox (CRX)-GFP cell line in vitro and in vivo after transplantation to a rat model of retinal degeneration (RD). Methods: 3D retina organoids were differentiated from a hESC CRX-GFP cell line (Collin et al. 2016) using a feeder-free system; protocol after Zhong et al. 2014. Retinal sheets were cut from organoids and prepared for transplantation. Remainder "pieces" of processed organoids were analyzed by qPCR for a variety of neuro-retinal genes. Flow cytometry on dissociated organoids at various time points allowed for the detection of a CRX-GFP+ population. After being loaded into a patented implantation tool, the tissue was deposited subretinally into 55d-old immunodeficient RCS rats. Development of transplants was monitored by optical coherence tomography (OCT). Sections of transplanted eyes were analyzed by immunohistochemistry for donor and retinal markers. Results: Retina organoids spontaneously generate various retinal progenitors and sub-populations as determined by qPCR (custom retinal array) and histology. Flow cytometry of dissociated retinal organoids demonstrates an upregulation of GFP, indicative of CRX expression, with time in culture. OCT scans monitored the growth and maturation of the transplanted sheets. Photoreceptor rosettes within the transplant were positive for the human markers SC121 and Ku80, as well as photoreceptor markers recoverin and rhodopsin. Conclusions: Our data shows that a CRX-GFP hESC cell line can generate retinal tissue through feeder-free 3D organoid culture. The resulting retinal organoids can be further processed into transplantable sheets. The CRX-GFP hESC cell line is capable of generating new photoreceptors within the RCS RD retina and provides an excellent opportunity for optimizing future retinal sheet transplantations. Support: CIRM TR4-06648 (PI MS); CIRM DISC1-09912 (PI BB); R01 EY0124045 (PI HK)

Keywords: retinal transplantation; retinal degeneration; human embryonic stem cells; optical coherence tomography; immunodeficient

Poster Location: 2

Singhal, Meghali, MD; Aslam, Muhammad, MD; ; Angele Nalbandian; Robin Lagrandeur; Fayez Bany-Mohammed; Cherry Uy; Peter Donovan; Dan Cooper

Mesenchymal Stem Cell Biomakers Prevent Bronchopulmonary Dysplasia via Suppression of Lung Inflammation

Purpose: Bronchopulmonary dysplasia (BPD) is a chronic debilitating lung disease of preterm infants leading to arrested alveolar development with long term morbidity and high mortality. Our work utilizing bone- marrow derived mesenchymal stem cells conditioned-media (MSC-CM) have shown protective effects in mouse BPD models. Analysis of the MSC-CM identified Osteopontin (Opn) and Macrophage colony stimulating factor 1 (Csf1), as key mediators (biomarkers) leading to protection against BPD. We hypothesized that the lack of above MSC biomarkers at birth leads to development of BPD via uncontrolled TGF-b1 activity. Our objectives were to determine the levels of Opn, Csf1, and active TGF-b1 in the TAF of preterm infants in the first week of life and correlate them with later development and severity of BPD. Methods: Infants less than 32 weeks' gestational age and/or less than 1500 gms birth weight who were intubated within 24 hours of life were enrolled into the study. The first TAF sample was obtained at intubation before any exogenous surfactant administration. The second sample was obtained at extubation or on the 4th day of life if still intubated. Levels of Opn, Csf1, TGF - b1, and secretory IgA were analyzed using immunoassay. Secretory IgA was used as control to correct for TAF volume. Infants were followed prospectively for outcome data including the development of BPD (oxygen requirement at 36 weeks' corrected gestational age). Results: To date, 29 infants have been enrolled and TAF samples obtained. Subjects were similar in their baseline maternal and neonatal characteristics. Standard curves were used from our pilot study to analyze data. 19 of 29 subjects developed BPD. Levels of Opn and Csf1 were lower at birth for BPD infants when ccompared with infants who did not develop BPD (TGF-b1 153 versus 123 pg/mL). Conclusions: MSC biomarkers, Opn and Csf1, prevent BPD at birth by suppression of lung inflammation (M1 macrophage surge and active TGF-b1).

Keywords: Preterm; Bronchopulmonary dysplasia; BPD; Tracheal aspirate

Poster Location: 6

Smith, William; Lin, Bin; Seiler, Magdalene

Analysis of Visual Responses in the Superior Colliculus

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Retinal degeneration such as Age-related Macular Degeneration and Retinitis Pigmentosa affects millions of people worldwide. The goal is to repair damaged retina and restore the lost vision by transplanting human embryonic stem cell derived 3D retinal organoid sheets. Detection and analysis of neural activity in the superior colliculus(SC) of retinal degenerate rats will provide quantitative feedback to the treatment provided. An extensive amount of documentation was compiled on how to find latency, spike count, and amplitude in the SC during light stimulation. Currently the neural responses have to be processed manually. This task is time consuming and there is a need to integrate an algorithm that could make analysis more efficient. The implemented algorithm will be able to detect neural responses to light stimulation. This information will then be displayed in spatial maps where latency, spike count, and amplitude of neural response will be generated for the analysis of visual responses in the SC

Keywords: Analysis

Poster Location: 4

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Rescue of age-related macular degeneration (AMD) retinal cells in vitro

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Age-related macular degeneration (AMD) which is characterized by retinal pigment epithelium (RPE) cell death is one of the leading causes of blindness worldwide. Currently, there are a limited number of FDA-approved treatment options available for the dry form of AMD. The goal of this study was to examine the effects of an FDA-approved drug in AMD RPE cybrid cells in vitro. We hypothesized that AMD RPE cybrid cells treated with a mitochondria-stabilizing FDA-approved drug will have improved health than their untreated counterparts. AMD cybrid cells were created by fusing blood platelets obtained from AMD patients with human ARPE-19 cells lacking mtDNA (Rho0). All cybrids had identical nuclei but differed in mtDNA content. AMD cybrids were treated with 50 μM drug, followed by gene expression studies, mitochondrial staining, and cell-based assays. Administration of the drug significantly up-regulated the genes associated with mitochondrial biogenesis and production of cytoprotective peptides (P<0.05) in AMD cells. Significant down-regulation of markers of apoptosis, inflammation, angiogenesis, and hypoxia (P<0.05) was observed in cybrids treated with the drug. Furthermore, drug-treated AMD cells showed significantly higher mitochondrial membrane potential, lower mitochondrial superoxide production, and higher number of viable cells compared to their untreated counterparts (P<0.05). In conclusion, the tested drug improves the health and function of AMD RPE cybrid cells. Therefore, our study identifies this FDA-approved drug as a potential candidate for macular degeneration therapy.

Keywords: Age-related macular degeneration (AMD); Retina; Mitochondria; FDA-approved drugs; Macular degeneration therapy

Poster Location: 17

Strahsburger, Erwin; Pizarro, Jessica; Zyuñiga, Alex; Ocares, Sergio; Vallejos, Camila

Prospection of Chilean Benthonic Marine Organism as a Source of Antimicrobial Compounds: Potential Use to Treat Skin Pimples or Gastric Ulcer Disease

Faculty of Renewable Natural Resources, University Arturo Prat

The benthonic environment harvests a rich diversity of marine organism that expresses secondary metabolites to improves their survival skills and take advantage over other competitors. Some of these metabolites are biologically active against diverse pathogens as antimicrobial molecules, raising a wide interest in study these marine organisms as a new source of biomedical substances, especially in those still uncharacterized organisms. In this report, we show a wide prospection study about the presence of secondary metabolites with antimicrobial activity in a broad uncharacterized population of benthonic organisms that live in the coast of Tarapacá region at North of Chile. We analyzed 40 benthonic organisms, and 26 of them shows antibiotic activity within a potency from mild to high against Staphylococcus aureus. The activity was observed in ethanol extract, a suspension totally compatible with the environment and with future inclusion in pharmacological studies. These extracts were obtained from organs, tissue or whole organism, and 16 of these marine organisms had only one extracts with antimicrobial activity. The others 10 organisms had an active extract from diverse tissue or organs. The highest antimicrobial activity was observed in 11 marine organisms and belong to the taxonomic groups; Echinodermata, Annelida (polychaeta), Mollusca and Arthropoda (crustacea). Finally, one of these extracts was deeply characterized and its antimicrobial activity was observed against Gram-positive and Gram-negative bacteria, including clinically isolated with resistance to multiple antibiotics. This activity is improved at acid pH and was non-toxic to HeLa cells. Therefore, there is a high potential of use to treat bacterial disease under acid conditions like skin pimples or gastric ulcer and shows the richness of Chilean coast in providing the marine organism with a high potential to develop natural products with application in the treatment of infection's disease.

Keywords: Secondary Metabolites; Antibiotic; antioxidant

Poster Location: 24

Su, Yinuo, Student Researcher; Stehli, Annamarie, MPH; Schuck, Sabrina, Ph.D.; Montesions, Johanna; Leong, Vanessa; Cordia, Theresa; Abdullah, Maryam

Peer Playground Interactions of Children with Neurodevelopmental Disorders in the context of a School-based Behavioral Health Intervention

UC Irvine, Psychology & Social Behavior UC Irvine, Pediatrics Greater Good Science Center, UC Berkeley

This study examined the correlation between social interactions and duration of treatment for a group of children with neurodevelopmental disorders participating in a behavioral health program. Children with Attention Deficit/Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD) demonstrate significant difficulties with social relationships, especially in establishing and maintaining friendships. The Playground Observation of Peer Engagement (POPE) coding system, a semi-structured observation tool, allows for the systematic recording and analysis of peer interactions on the playground. The POPE system observes social interactive states over a period of 3, ten minute observations. Archival data from sixty-one children (aged 5 to 12 years) in treatment was analyzed. Cross-sectional analysis of each child was conducted in efforts to understand the effect of duration of treatment on social interaction and explore the potential benefits of treatment. Average number of months of treatment was 10.6 (min= .2, max= 31.2; 65% < 1 year, 22% 1-2 years, and 13% >2 years). Continuous duration in months was used in regression models. Poisson regression, using PROC COUNTREG in SAS, was selected due to the outcomes being counts, resulting in zero-inflated distributions. Models revealed a significant decrease in inappropriate responses with longer duration of time (ß=-27.21, t=119.24, p<=.0001). No significant relationship was seen between duration of treatment and appropriate initiations and responses, total initiations, nor missed responses. Poisson models revealed a relationship with treatment duration and the occurrence of some the interactive states. Longer duration was associated with increased probability of higher counts of states of 'proximity'(ß= 0.078347, t=2.35, p=.0198) and 'onlooker' (ß= 0.026878, t=2.93, p=.0034), and lower counts of 'games with rules' (ß= -0.012833, t=-2.25, p=.0246). Implications for treatment planning and next steps are discussed.

Keywords: ADHD; Autism; Behavioral Health; Peer Interactions; Playground Setting

Poster Location: 65

Subramanian, Arul; Schilling, Tom; Kanzaki, Lauren

Developing a translational approach to treat tendon injuries using insights from zebrafish.

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Tendon injuries are major debilitating disorders, particularly affecting athletes, soldiers and the elderly. Tendons are composed of a specialized collagen-rich ECM and populated by tendon fibroblasts (tenocytes). Tendon ECM is exposed to extreme tensile forces from muscle. Sudden changes in the magnitude of this force often rupture tendons. Zebrafish serve as an excellent model to study tendon development. They form different types of tendons – e.g. force-transmitting and load-bearing-similar to humans. We are using zebrafish to study the effects of the contractile forces from muscles on tendon development. Objectives: A) To identify factors influencing assembly of tendon ECM and response to mechanical force from muscle contraction. B) Develop a translational approach from zebrafish studies to develop effective treatment strategies for tendon injuries. Results: We have identified a novel ECM component called Thrombospondin 4 (Tsp4), which functions as a scaffolding protein to organize tendon matrix during development. Our work (Subramanian and Schilling 2014) has shown that loss of Tsp4 weakens tendons leading to detachment of muscles upon increasing contractile force. Human TSP4 protein can rescue muscle detachment in zebrafish showing conservation of a critical role in tendon ECM organization between zebrafish and humans. Injecting human TSP4 in normal zebrafish embryos strengthens tendons, improving their ability to resist increasing levels of contractile force, suggesting a role for TSP4 in improving healing of tendon injuries. Recently, we have found that mechanical force from muscle contraction also controls the shapes of tenocytes in tendons and guides the proper distribution and organization of Tsp4 in the ECM. We wish to develop a translational approach to test a potential role for scaffolding ECM proteins such as TSP4 and force-dependent ECM reorganization in mice, as proof of principle for their application in repair of human tendons.

Keywords: tendons; tendonitis; ECM organization; Mechanotransduction; tendon repair

Poster Location: 27

Suellen Hopfer, PhD, CGC; Margaret Wright, PhD,; Harry Pellman, MD; Richard Wasserman, MD, MPH, Alexander G. Fiks, MD, MSCE

Variation in Health Care Practitioners' HPV Vaccine Communication

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Background: Adolescent HPV vaccine coverage continues to be suboptimal at 56% for > 1 HPV dose despite national guidelines
Low HPV vaccination contrasts starkly with other adolescent vaccines: Tdap at 87% and MCV4 at 81% CDC NIS-Teen, 2015
Objectives: To characterize practitioners' HPV vaccine communication practices based on responses to hypothetical case histories
Results: 52% strongly recommended HPV vaccination to parents of preteens, following ACIP age-based recommendation guidelines, believed their peers did, and used multiple communication strategies
20% strongly recommended HPV vaccination according to age-based guidelines, but do not engage families in discussion about benefits of vaccinating
28% did not strongly recommend HPV vaccination to parents of preteens, were more likely to use a non-evidence, risk-based approach to deciding when to recommend HPV vaccination, less likely to believe their colleagues prioritized HPV vaccination
Conclusion: Although most pediatricians strongly recommended HPV vaccination to parents of preteens following ACIP age-based recommendation guidelines, over one-quarter (28%) did not, highlighting continued gaps in HPV vaccine communication and delivery. Since practitioner communication styles vary, practitioner communication training offers a mutable intervention target. Development of a practitioner communication focused intervention may help to improve universal adoption of consistent and timely messaging to parents.

Keywords: HPV vaccination, intervention

Poster Location: 33

Valdebran, Manuel, MD; Hoang, Tuyen, PhD; de Feraudy, Sebastien, MD; Hosking, Anna Marie; Lin, Jessica; Barr, Ronald

Predictive Algorithm of Residual Disease in Re-excisions Specimens of Cutaneous "Atypical Squamous Proliferations"

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To screen for skin cancer, dermatologists utilize shave biopsy technique to histologically assess a lesion. However, in a portion of cases, not sufficient tissue is available to determine if the proliferation is malignant. Dermatopathologists call these cases "atypical squamous proliferation" (ASP) which is a frustrating diagnosis to clinicians because there is no consensus how to manage them. The aim of this study is to predict the likelihood of underlying carcinoma in re-excision specimens based on different variables. Methods: This retrospective study conducted at the Dermatopathology service at the University of California Irvine. Electronic query was used to identify all ASP cases seen from 2003-2017. Information about initial diagnosis, clinical characteristics, demographics, and outcome status were variables gathered to predict underlying carcinoma. Assessment of a second dermatopathologist was added to evaluate inter-observer reproducibility by crosstab and Kappa statistics. Multivariate logistic regression analysis was performed to determine the independent predictors of underlying carcinoma. Results: A total of 268 ASP specimens were studied. We found three significant predictors of an underlying carcinoma: age of 65+ versus younger (OR=7.5, p=.0472); anatomical location of lesion head-neck versus trunk (OR=5.3, p<.0435); and initial dermatopathologist assessment in favor of malignancy versus none (OR=4.3, p=.0138). Initial dermatopathologist assessment in favor of malignancy was the strongest predictor with a predicted probability of 11%. Head and neck location and age over 65 increased the predicted probability to 22%. Evaluation of ASP by a second dermatopathologist did not increase the predicted probability. Conclusion: Patients could benefit a wait and see approach in cases where these predictors are not met, whereas, those who meet these predictors could benefit from rebiopsy or alternatively conservative treatment and follow up.

Keywords: Dermatopathology; Atypical squamous proliferation; Squamous cell carcinoma; Cancer; Skin

Poster Location: 48

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Crowd Sourcing Evaluation of Ureteroscopic Videos using the Post-Ureteroscopic Lesion Scale (PULS) to Assess Ureteral Injury Following Ureteral Access Sheath Deployment

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INTRODUCTION AND OBJECTIVES: We hypothesized that crowdsourcing assessments could be applied to the Post-Ureteroscopic Lesion Scale (PULS) for determining ureteral injury. METHODS: At the end of an ureteroscopic procedure, 14 ureters were digitally recorded from the ureteropelvic junction to the bladder. Each recording was reviewed by 10 highly experienced ureteroscopists to determine a mean PULS score. Following training of lay reviewers, the Crowd-Sourced Assessment of Technical Skills, CSATS (CSATS, Inc., Seattle WA) platform was used to obtain crowd-based reviews. The mean PULS scores were determined using a linear mixed-effects (LME) model. The intraclass correlation coefficient (ICC) was also calculated as a measure of the agreement among experts. Spearman's rank correlation (rho) was used to quantify the strength of the relationship between the crowd LME mean and the experts. RESULTS: The ten expert reviews were collected within 21 days; 2,100 lay reviews were collected in just over 2 days (i.e. 49 hours). The ICC for the ten experts was 0.68 (95% confidence interval 0.49 to 0.86). When the expert mean PULS was < 1, the crowd scored those videos at 1 to 2. The highest scored video by the experts was 3.2; the crowd scored the same video 2.25. The correlation between the crowd LME means and expert means across all videos was 0.70 (p=0.0056) indicative of moderately strong agreement. CONCLUSIONS: There is a moderately strong correlation between crowd-sourced and expert PULS rating. It may be beneficial to further refine the training of the crowd by additional exposure to the nuances of ureteral injuries, particularly for PULS <1 (i.e. no injury) or >3 (i.e. urothelial separation). Source of Funding: None

Keywords: ureteral access sheath; ureteroscopy; nephrolithiasis; PULS; ureteral injury

Poster Location: 20

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Variable Clinical Features in Fabry Disease in Patients with Novel Mutations

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Fabry disease is an X-linked lysosomal storage disorder characterized by the deficiency of the enzyme a-Galactosidase A caused by mutations in the a-Galactosidase A (GLA) gene. This leads to an accumulation of globotriisyceramide (GL-3) in the cells of the body, particularly in the skin, kidneys, heart, and nervous system. Clinical features are phenotypically heterogeneous, in part due to the unique mutations in the GLA gene. We present the molecular and clinical characteristics of 22 patients with Fabry disease from a multidisciplinary clinic at UC Irvine. We describe 2 novel mutations not previously reported in the literature, and no recurrent mutations in this cohort unless patients were related.

Keywords: Fabry disease; lysosomal storage disorder

Poster Location: 49

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Initial Clinical Testing of Ureteral Access Sheath Force Sensor to Prevent Ureteral Injuries

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INTRODUCTION AND OBJECTIVES: Ureteral injury is a major concern with regard to deployment of an ureteral access sheath (UAS). The force that results in ureteral injury in humans has not been defined. In a previous study, using a novel UAS Force Sensor (UAS-FS), developed in conjunction with the UCI Department of Engineering, we noted that a peak force of 8 Newtons (N) resulted in splitting of the ureter in a porcine model. Herein, we present our initial clinical findings using UAS-FS during routine ureteroscopy. METHODS: Among 24 patients, tamsulosin was given for up to a week prior to UAS deployment in 88% in an attempt to induce a state of ureteral relaxation. UAS deployment force was measured using UAS-FS under fluoroscopic control by 4 different surgeons. Continuous measurements began when the tip of the UAS was inserted into the urethra and ceased when the tip of the UAS reached the ureteropelvic junction. If the force approached/began to exceed 8N (audible sound), passage was stopped, progress of the UAS was recorded fluoroscopically, and the UAS was withdrawn and a smaller UAS selected. Ureteroscopic evaluation of the entire ureter was performed at the end of each case to assess for potential ureteral injuries using the post-ureteroscopic lesions scale (PULS). RESULTS: There were 24 patients among whom there were 32 UAS deployments. The 16 French UAS could be passed at < 8N in 72% of patients; in the remainder the 16F UAS was withdrawn and a smaller UAS was deployed (14F in 6 cases and 1.5F in 1 case) being careful to not exceed 8N. The mid ureter location was where the maximum peak pressure (24%) was most commonly recorded. No patient experienced a significant ureteral injury (i.e. PULS >2) The mean PULS grade was 0.79. CONCLUSIONS: The UAS-FS was able to measure UAS insertion force in a reproducible fashion. By limiting the force exerted on the UAS to < 8N, no significant urothelial injury occurred.

Keywords: access sheath; ureteroscopy; ureteral; tamsulosin

Poster Location: 36

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Antisense oligonucleotide treatment targeting glycogen synthase (GYS1) in a mouse model of Pompe disease

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Pompe disease is a devastating myopathy resulting from the deficiency of the lysosomal enzyme acid ??glucosidase (GAA). The standard of care is enzyme replacement therapy (ERT) with recombinant human (rh) GAA (Lumizyme®, or Myozyme®). ERT works well in alleviating the cardiomyopathy; however, many patients continue to have progressive muscle weakness from muscle glycogen accumulation. In Pompe disease, the substrate glycogen is produced by muscle glycogen synthase (GYS1). No specific small molecules inhibitors of glycogen synthase are currently available. Finding a specific inhibitor is challenging given the presence of a highly homologous essential glycogen synthase (GYS2) in the liver. Proof of principal studies performed by Douillard-Guilloux (2008, 2010) showed that inhibition of GYS1 reduced lysosomal glycogen. Clayton et al. (2014) showed that knockdown of GYS1 mRNA was achieved by phosphorodiamidate morpholino oligonucleotide (PMO) conjugated with a cell penetrating peptide (PPMO) however was considered nephrotoxic for patients. Antisense Oligonucleotides (ASO) technology has emerged as a powerful direct therapeutic alternative to conventional small molecule approaches or gene replacement strategies for the treatment of genetic disorders by targeting RNA. Most recently Spinraza® won FDA approval as the first and only therapy for spinal muscular atrophy using this strategy and our hope is that this technology can be applied to Pompe disease. In order to impart specificity for the muscle variant of the enzyme, we propose the use of ASOs which are short, synthetic single-stranded DNA sequences designed to bind to target RNA by well-characterized Watson-Crick base pairing, and once bound can modulate RNA function through a variety of events. Preclinical studies of 150 ASOs in wild type and Pomp mice have indicated that two ASOs developed against GYS1 have been effective in knocking down GYS1 by approximately 50% through a degradative mechanism using RNAseH1.

Keywords: Pompe disease; antisense nucleotides; glycogen; glycogen synthase; mouse model

Poster Location: 18

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Point-of-care Personalized Determination of Treatment Need and Response ?During Wound Infection and Inhalation Injury

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The goal of this work is to develop a novel bedside capability for assessing chronic infection risk, instituting personalized therapeutic interventions and monitoring treatment response in wounded soldiers. Recent advances in culture-independent microbial community monitoring have revealed that there are dynamic communities of bacteria and fungi infecting diverse wound types. Spatial monitoring of the local conditions (i.e. pH, oxygen and associated metabolites) that influence microbial survival will help us understand the factors that lead to chronic wound development. To achieve this goal, biomarkers of wound infection risk and individual wound healing dynamics will be identified and mapped using a novel nonlinear optical microscopy (NLOM) probe. A novel NLOM probe was designed with a large field of view and increased imaging depth and speed, to align with clinical use parameters. The probe is enabled for imaging modalities such as Multi-Photon Microscopy (MPM) and Second Harmonic Generated (SHG) Fluorescence, Stimulated Raman Scattering (SRS) and Coherent Raman Scattering Microscopy (CARS), as well as fluorescence imaging, all without the need for extraneous dyes and markers that are required using conventional imaging techniques. These techniques were combined with culture-independent 'omics techniques and applied in a laboratory biofilm infection model. The effects of conventional antibacterial measures such as Povidone Iodine were mapped in real time, demonstrating the inadequate antibacterial effect of this intervention. Selective growth of different bacterial populations under various conditions such as pH, oxygenation, and matrix were also mapped. Experiments are underway using model wound microbial communities including major opportunistic pathogens (P. aeruginosa, S. aureus and A. baumannii) along with complex mixes of anaerobes and fungi from saliva and soil samples to mimic the microbial communities detected in wounds.

Keywords: Microbial communities; Wounds; bacteria

Poster Location: 9

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Development of aptamer-based molecular biosensor for bladder cancer detection and surveillance

Bladder cancer is well-characterized as an aggressive and heterogeneous disease that is associated with a high recurrence rate and requires lifelong cystoscopic surveillance. Although cystoscopy surveillance is highly effective, the procedure is invasive and expensive. Therefore, a reliable, inexpensive and non-invasive detection tool is still in need. We investigated the application of a structure-switching aptamer-based biosensor to identify specific molecules or a panel of molecules for sensitive and specific detection of bladder cancer recurrence in urine. DNA aptamers are molecular probes tunable to recognize specific environments. Our approach aims to define and profile the urinary molecular biomarkers specific to bladder cancer using patient urine. After 13 rounds of in vitro selection using clinical urine samples from bladder cancer diagnosed patients, a converged aptamer population demonstrating affinity for multiple bladder cancer urine samples has been isolated. Initial characterization of the selected aptamer population using next-generation sequencing reveals an enriched aptamer population. We aim to convert the well-characterized aptamers into an easy-to-use paper-based colorimetric assay for bladder cancer detection using urinary samples.

Keywords: Aptamers; biosensor; bladder cancer

Poster Location: 10

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RAC1-GTPase and magnesium superoxide dismutase are crucial determinants in UV-induced and reactive oxygen species-directed melanoma etiology

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UV exposure is the primary environmental risk factor for human melanomas yet the underlying mechanism is not fully understood. Recent studies have shown that UV-induced chemiexcitation of melanin derivatives plays a critical role in inducing DNA mutations. This process requires the participation of reactive oxygen species (ROS) which are highly produced by cellular NADPH oxidase (NOX) complexes. We thus hypothesize that ROS producing and metabolizing enzymes are the major contributors in UV-driven melanomas. Using a pathway-driven case-control study that included 170 cases and 152 controls, we genotyped 23 prioritized single nucleotide polymorphisms in NADPH oxidases 1 and 4 (NOX1, NOX4), CYBAp22phox membrane protein, RAC1-GTPase, and ROS metabolizing enzymes superoxide dismutase (SOD) and catalase, to investigate their associations with the risk of melanoma. We first identified 5 SNPs including rs1049255 (CYBA), rs4673 (CYBA), rs10951982 (RAC1), rs8031 (SOD2), and rs2536512 (SOD3) that exhibited significant genotypic frequency differences between melanoma cases and healthy controls. In simple logistic regression models, RAC1 rs10951982 (OR 8.98, 95% CI: 5.08 to 16.44; $P<0.001$) reached universal significance after Bonferroni correction ($P=0.002$) and the minor alleles showed an association with increased risk of melanoma. In contrast, minor alleles in SOD2 rs8031 (OR 0.16, 95% CI: 0.06 to 0.39; $P<0.001$) and SOD3 rs2536512 (OR 0.08, 95% CI: 0.01 to 0.31; $P=0.001$) were associated with a reduced risk of melanoma. In multivariate logistic regression models, RAC1 rs10951982 (OR 6.15, 95% CI: 2.98 to 13.41; $P<0.001$) remained significantly associated with an increased risk of melanoma. Our results highlighted the importance of RAC1, SOD2, and SOD3 variants in the risk of melanoma. Once the results are replicated and validated, these SNPs are useful for screening high-risk individuals for a better prevention plan in melanoma.

Keywords: Melanoma; Reactive oxygen species; Single nucleotide polymorphisms; Superoxide dismutase; RAC1-GTPase

Poster Location: 46

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Using Electroretinography to Study Retinal Degeneration of Royal College of Surgeons (RCS) Nude Rats

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One project of our lab is to restore or improve vision of Royal College of Surgeons (RCS) immunodeficient nude rats, a retinal degenerate model, by transplantation of human embryonic stem cell (hESC) derived retina sheets. The hypothesis is that hESC-derived retina sheets can replace degenerated photoreceptors and rescue existing photoreceptors from further degeneration. Development and integration of transplanted photoreceptors may lead to improvements in visual performance of patients with retinitis pigmentosa and age-related macular degeneration (AMD). Electroretinogram (ERG) tests provide a noninvasive method of measuring vision changes over time, thus are used in our current project to trace the degeneration process of photoreceptors in RCS Nude Rats. The hypothesis was that photoreceptors in RCS nude rats' eyes would degenerate as rats aged. ERG tests were conducted monthly. As expected, both a-wave and b-wave decreased significantly for scotopic and photopic tests with increasing age, showing degeneration of photoreceptors in RCS nude rats. For future plans, we will perform ERG on hESC-derived retina transplant rats, and sham surgery rats. Visual differences between each group can be determined, thus proving the success rate of hESC-derived sheets on vision improvement. The ERG exams supply invaluable data to be integrated into the ongoing research on combating retinal degenerative diseases. Its successful results will provide a foundation for future clinical trials in humans.

Keywords: Stem Cell; Electroretinography; Retinal Degeneration; hESC-derived retinal organoid sheets

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