REACH DAY

Research, Education, and Collaboration in Health

FEBRUARY 21, 2020 • 8:30 a.m.–4:00 p.m.

Dr. Kiran C. Patel College of Osteopathic Medicine • College of Pharmacy • College of Optometry
Dr. Pallavi Patel College of Health Care Sciences • College of Medical Sciences • College of Dental Medicine
Ron and Kathy Assaf College of Nursing • Dr. Kiran C. Patel College of Allopathic Medicine
College of Psychology • H. Wayne Huizenga College of Business and Entrepreneurship • Shepard Broad College of Law

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NSU Florida
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The Nu Sigma Upsilon (NSU) Chapter of the Alpha Eta Society was established on December 5, 2008. This honor society recognizes the outstanding achievement of our students, faculty members, and alumni in all areas of health care sciences. Chapter members must meet strict qualifications for induction that include demonstration of significant scholarship, leadership, and contribution to the health care professions.

Our chapter has grown to include more than 800 members from various disciplines within the Dr. Pallavi Patel College of Health Care Sciences, including anesthesiologist assistant, audiology, health and human performance, health sciences, medical and cardiovascular sonography, occupational therapy, physical therapy, physician assistant, respiratory therapy, and speech-language pathology.

Message from Frederick Lippman,
HPD Chancellor, Special Projects

Today is indeed a proud day for Nova Southeastern University's Health Professions Division (NSU-HPD), because it marks the seventh important milestone in our evolution as a collaborative, multidisciplinary, and clinical research venue. In the 12 years since the inaugural HPD Research Day, NSU has continued to expand and develop into a fine example of what dedicated researchers can accomplish when given the support and encouragement of their institution.

Thanks to the proactive nature of Patrick Hardigan, Ph.D., who chairs the HPD Research Committee, the members agreed it would be an excellent opportunity to create a showcase for student and faculty involvement in what NSU traditionally calls scholarly activity, much of which is actually research. Interestingly, many people view research as working in a laboratory and using test tubes and specialty equipment when, the fact is, research extends far beyond that restrictive definition.

Our multidisciplinary researchers do some of the finest statistical and clinical research that can be found in the nation. This research is being conducted in an applied research lab using sophisticated research methodology and advanced statistical analysis techniques.

Many thanks to Elizabeth Swann, Ph.D., the leader of the interprofessional education (IPE) team. This year is the first time Research Day and IPE Day have combined to create Research, Education, and Collaboration in Health (REACH) Day. More and more health care educators are realizing the importance of training the different disciplines to know more about each other and to learn how to work together.

Before I continue, I would like to thank and acknowledge the HPD Research Day Committee members who have been working so diligently to ensure the project's success. They are Sibel Antonson, Gesulla Cavanaugh, Michelle Demory Beckler, Debra Dixon, Peter Gannett, Maria Hernandez, Harvey Mayrovitz, Julie Rodman, Jeff Thompson, and Kimberly Valenti.

REACH Day allows our talented students to all be present at one place at the same time, so they can participate in and view various poster presentations, as well as attend multiple discussion groups. This project has proven to be a truly time-consuming undertaking, so I commend the wonderful commitment of our deans and various program leaders who have allowed us to move forward with this multidisciplinary interchange in the area of research and scholarly activity.

Although it's impossible to predict the outcomes that will be realized in the weeks and months following REACH Day, I have no doubt our students will be vastly enriched by the experience. I believe they will come away with a realization of the importance of research and interprofessional teamwork in the formative accumulation of knowledge individuals go through, regardless of what HPD program they're participating in here at NSU.

I'm proud to say we've come a long way in a relatively short period of time. We now have multiple well-known and respected academic researchers in our institution that encompass the health professions spectrum, and the Center for Collaborative Research is Florida's largest wet research laboratory.

Now that we've demonstrated our capabilities and showcased our acumen and research prowess, it's become apparent that we're viewed from a more-esteemed perspective than ever before. Thank you for your participation.

Sincerely,

Frederick Lippman, R.Ph., Ed.D.
HPD Chancellor, Special Projects

Welcome to HPD REACH Day

February 21, 2020

The Health Professions Research Division is excited to welcome you to Nova Southeastern University's Health Professions Division Research, Education, and Collaboration in Health Day (HPD REACH Day). All eight HPD colleges—allopathic medicine, dental medicine, health care sciences, medical sciences, nursing, optometry, osteopathic medicine, and pharmacy—plus researchers from NSU's Halmos College of Natural Sciences and Oceanography have banded together to offer poster displays and oral presentations of their current research. There will also be interprofessional education (IPE) team representatives from NSU's College of Psychology, H. Wayne Huizenga College of Business and Entrepreneurship, and Shepard Broad College of Law.

In addition, groups of students will participate in interprofessional events. They will work together for case studies, simulated patients, and interprofessional games designed to foster communication, teamwork, and knowledge of other professions.

REACH Day reflects the important contributions to NSU's mission as it relates to academic excellence, intellectual inquiry, leadership, research, and commitment to community through engagement of students and faculty members in a dynamic, lifelong learning environment. This is an opportunity to learn about the research that our faculty members, residents, fellows, and graduate students have conducted as a critical part of their educational experience.

Adding to the festivities will be door prizes and awards for best student presentations. People from other colleges across NSU will visit our division to learn more about us and see the work we do here. Students and faculty members from all NSU's regional campuses will participate via streaming or videoconferencing. This event promises to be more than a day-long celebration of research and scholarly activities. It is also an opportunity for students and faculty members from multiple disciplines to interact with each other and with the larger research and NSU communities. I am so pleased you are able to be a part of this academic research and interprofessional event.

Patrick C. Hardigan, Ph.D.

Executive Associate Dean for Research

Dr. Kiran C. Patel College of Allopathic Medicine

Associate Dean of Academic Affairs

Interprofessional Education (IPE)

The Health Professions Division is proud of our Interprofessional Education (IPE) team led by Dr. Elizabeth Swann. IPE occurs when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes. - World Health Organization, 2010.

Throughout Research, Education, And Collaboration in Health (REACH) Day our IPE faculty and students are participating in sessions. Objectives for these IPE sessions include:

- Communicate one's roles and responsibilities clearly to patients, families, and other professionals.
- Explain the importance of Interprofessional Collaboration in the care of patients in health care settings.
- Use the knowledge of one's own role and the roles of other professions to appropriately assess and address patients' health care needs.

A thank you for all the hard work of the Nova Southeastern University Health Professions Division Interprofessional Education Faculty.

The IPE Executive Team

Kimberly Valenti, Karen Sando, Nikette Neal, Melissa Morris, Nannette Nicholson, Jacquelyn Moore, and Elizabeth Swann.

The IPE Planning Team

College of Optometry: Felicia Timmermann, O.D., FAAO
College of Pharmacy: Andrea Levin, PharmD, BCACP; and Karen Sando, PharmD
Dr. Kiran C. Patel College of Allopathic Medicine: Nikette Neal, MD, FAAP
Dr. Kiran C. Patel College of Osteopathic Medicine: Kimberly Valenti, MS; Noel Alonso, DO; Marysel Sierra, MS; Carmen Hernandez; and Michelle Johnson, DO
Dr. Pallavi Patel College of Health Care Sciences: Patricia Vargas, DHSc, RVT (Medical Sonography); Elise Bloch, EdD, OT/L (OT); Megan Colas, PhD, ATC, LAT, NREMT (AT); Elizabeth Swann, PhD, ATC (IPE); Melissa Morris, MSN, RN, CPN, CHSE (Simulation); Nannette Nicholson, Ph.D., CCC-A (Audiology)
Ron and Kathy Assaf College of Nursing: Caroline Smikle, Ph.D., MSN, RN; and Lisa Soontupe, EdD, RN, CNE

Thank you for your time, energy, passion, and collaborative efforts for Interprofessional Education at Nova Southeastern University.

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Auditorium A

Effect of Increased Implant Crown Height on Fracture Strength of IPS e.max CAD Hybrid Abutment Crown: An In-vitro Study

Leila Ahmadian, DDS, Assistant Professor, College of Dental Medicine,
Nova Southeastern University
Mohammad Mehdi Imani Emadi, DDS, Private Practice
Rasoul Arbabi, DDS, Private Practice
Jeffrey Thompson, Ph.D., Professor, College of Dental Medicine, Nova Southeastern University
Marvin Golberg, DDS, College of Dental Medicine, Nova Southeastern University

Introduction. Retrievability of a screw-retained implant crown is the most important characteristic that encourages the clinician to choose it over a cement-retained implant crown. Titanium insert and ceramic block along with CAD/CAM technology is a new treatment modality that is a cost-efficient and time-saving option with the esthetic results. The aim of this in-vitro study is to evaluate the fracture strength of these restorations by increasing the height. **Materials and Methods.** Forty AstraTech EV dental implants (4.2X9.0 mm) were embedded in acrylic resin blocks. Five groups (n=8) were designed to simulate a molar implant-supported restoration; Group 1: Custom abutment with milled and cemented zirconia crown, Group 2: Custom abutment with screwmentable milled zirconia crown. Groups 3, 4, 5: Ti-Base abutment with screwmentable milled lithium disilicate crown. The height of the crown was 11mm for groups 1,2,3 and 13 and 15 mm respectively for groups 4 and 5. After cyclic loading, specimens were loaded under a progressive loading. Removal torque value (RTV) was measured before and after progressive loading. R-Studio and R 3.2.2 were used for all statistical analysis, and significance was accepted at $p < 0.05$. **Results.** There was no statistically significant difference between the groups regarding the RTV. The fracture resistance of group 5 was less than the other groups. **Conclusion.** Ti-base supported implant crowns can be considered as a treatment option if the crown height is less than 13 mm. The screw loosening is a common incidence regardless of the height of the crown.

Evaluation of Scatter and Zone of Occupancy for a Hand-Held X-Ray Device

Maritzabel Hogge, MS, Associate Professor, College of Dental Medicine,
Nova Southeastern University

Scatter radiation from the patient could be of concern for the population in close proximity to the occupancy zone when using a hand-held x-ray device. It is claimed that Kavo Nomad Pro-2 (Kavo Kerr) external shielding device eliminates scatter radiation. The objective of this study was to test and verify this claim. The scatter radiation of the Kavo Nomad Pro-2 was tested in an operatory room evaluating the horizontal and vertical occupancy zones. The scatter radiation was measured using a solid-state detector TNT 12000 Dosimeter detector and ion chamber. In the center of the room the operator was located at o degree coordinate point. From “0” degree coordinate point were tracings every 30 degrees in the floor. The exposures using the Kavo Nomad Pro-2 will be made at intervals of 10 seconds from 0 to 140 cm distance in 35 cm increments every 30 degrees intervals and the ion chamber will be placed in each location. The highest scatter radiation at a horizontal occupancy zone was reported at 180 degrees. Whereas the highest scatter radiation measured at the vertical occupancy zone was at 180 and 150 degrees at a distance of 35 cm.

Role of Cathepsin-B in the Osteoclastogenic Effect of Porphyromonas Gingivalis- Phosphoglycerol Dihydroceramide

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Chiaki Yamada, Ph.D., Postdoctoral Research Associate, College of Dental Medicine,
Nova Southeastern University
Juliet Akkaoui, MS, Research Associate, College of Dental Medicine,
Nova Southeastern University
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Nova Southeastern University
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Nova Southeastern University

Objective. This study aims to evaluate the impact of the PGDHC/CtsB axis on RANKL-mediated osteoclastogenesis. **Background.** Cathepsin-B (CtsB) is a lysosomal-cysteine-protease associated with pathological processes. CtsB regulates RANKL-mediated osteoclastogenesis through degradation of non-muscle myosin IIA (Myh9). We recently demonstrated that phosphoglycerol dihydroceramide (PGDHC) from *Porphyromonas gingivalis* upregulated osteoclastogenesis in a Myh9-dependent manner. However, activation of CtsB by PGDHC in periodontal bone loss is unclear. **Methods.** RANKL-stimulated RAW264.7 cells were exposed to PGDHC in the presence/absence of membrane impermeable CtsB inhibitor CA-074, and membrane permeable CtsB inhibitor CA-074 Me. TRAP staining was performed at day 4 to identify mature osteoclasts and pit formation assay was performed at day 7 to assess osteoclast activity. Intracellular CtsB activity and extracellular inflammatory cytokine expression were assessed after 48 and 96 hours. **Results.** PGDHC upregulated RANKL-induced osteoclastogenesis of RAW 264.7 cells. CA-074-Me, but not CA-074, inhibited osteoclastogenesis and mature osteoclast activity. PGDHC increased CtsB activity after 48h and induced extracellular expression of Tnf-α and IL-1β after 96h. However, only the overexpression of IL-1β was CtsB mediated. **Conclusion.** PGDHC promotes osteoclastogenesis via upregulation of intracellular CtsB activity in pre-osteoclasts. PGDHC does not induce an inflammatory effect on pre-osteoclasts but increases the production of inflammatory cytokines by mature osteoclasts through CtsB dependent and independent pathways. These results may lead to a better understanding of bacterial osteolysis, as in periodontitis, and development of novel anti-bone loss therapy. **Grants.** This study was funded by the NIH grant R03-7-16-2018 and NIDCR administrative research supplement to promote diversity in health-related research.

Does a Simulated Stethoscope Complement Cardiopulmonary Knowledge and Confidence in Doctor of Physical Therapy Students

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Melissa Morris, MSN, Director of Simulation and Interactive Technology,
Dr. Pallavi Patel College of Health Care Sciences, Nova Southeastern University
Alicia Fernandez-Fernandez, Ph.D., Dr. Pallavi Patel College of Health Care Sciences,
Nova Southeastern University

Objective. The purpose of this study is to ascertain if the addition of a simulated stethoscope into the cardiopulmonary lab session will improve Doctor of Physical Therapy (DPT) student cardiopulmonary assessment knowledge and confidence in auscultation and identification of heart and lung sounds. **Background.** Literature review indicates that utilizing a simulated stethoscope in the skills laboratory setting in healthcare profession education had positive impacts on cardiopulmonary skill acquisition and student confidence. **Methods.** The study was conducted on volunteered DPT students in year two (DPT2) and year three (DPT3) of the program. All students completed a 12-question multiple-choice pre-test and confidence survey related to cardiopulmonary assessment. In addition, DPT2 students attended a one-hour cardiopulmonary lab session (intervention) which included practicing cardiopulmonary assessment utilizing simulated stethoscopes. At the conclusion of the intervention, DPT2 students completed a post-test and confidence survey. **Results.** Data analysis is currently under review. Forty-eight DPT3 students completed a multiple-choice test and confidence survey. Thirty-nine DPT2 students completed the pre and post intervention test and survey. A comparative analysis of all the data collected from the multiple-choice questions will be done using the Wilcoxon signed-rank test. All confidence survey responses will be analyzed with descriptive statistics. Initial analysis indicates second-year students showed statistically significant improvements in test scores after training. They also demonstrated increased confidence from baseline in several of the areas covered during the simulation. **Conclusion.** This study looks to validate that incorporating a simulation-based learning (SBL) cardiopulmonary auscultation activity into the DPT curriculum would improve the DPT student's cardiopulmonary auscultation assessment skill acquisition. **Grants.** This study was unfunded.

Foot-ground Contact Forces in Elite American Football Players: Do Heavier Players Run Softer?

G. Monique Mokha, Ph.D., Professor, Dr. Pallavi Patel College of Health Care Sciences,
Nova Southeastern University

Objective. The objective of the study was to determine if body mass was related to vertical foot-ground contact forces in American football players. **Background.** American football players seeking to be drafted by the National Football

League (NFL) showcase their running abilities in the 40 yard dash. Top performers are typically lighter, but heavier players must also demonstrate speed. High foot-ground contact vertical forces are associated with increased speed. **Methods.** Twenty adult male American football players from across the United States training for the NFL draft (age, 22.1+/-2.1 yrs; height, 1.83+/-9.9 m; mass, 98.9+/-16.1 kg) participated in this study. Subjects ran for 5 sec bout between 6.0-6.5 m/s on an instrumented treadmill. Data were smoothed with a low pass Butterworth filter with a cut-off frequency of 5 Hz. Body mass was measured in kilograms using an InBody device. We examined the relationship between average vertical foot-ground contact forces, or average vertical ground reaction forces (vGRF) and body mass. Pearson's correlation coefficients were calculated to determine associations between body mass and vGRF for both the right and left sides, $p<.05$. **Results.** Mean vGRFs for the foot-ground contact were 1.65+/-0.15 body weights (BW) for the right side and 1.66+/-0.20 for the left. Body mass was moderately and negatively associated with vGRF for both the right (r = -0.549, p = 0.018) and left (r = -0.530, p = 0.024). **Conclusion.** American football players' running performance is affected by their mass with heavier players running softer. This may be an injury prevention strategy. **Grants.** This study did not receive funding.

Auditorium B

Dysphagic Symptoms in Patients with Chagas Disease, as Assessed by Fiberoptic Endoscopic Evaluation of Swallowing

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Barbara O'Connor Wells, Ph.D., Associate Professor, Dr. Pallavi Patel College of Health Care Sciences, Nova Southeastern University
David Ross, SLP.D. student, Dr. Pallavi Patel College of Health Care Science, Nova Southeastern University

Objective. This study was conducted to examine and describe oral and pharyngeal dysphagic symptoms in adults residing in Brazil with a diagnosis of Chagas Disease (CD) using fiberoptic endoscopic evaluation of swallowing. **Background.** CD is a parasitic disease transmitted by an insect that can greatly impact a person's swallowing and their ability to meet their daily nutrition and hydration needs. **Methods.** The purpose of this study is to provide objective descriptions of the oral and pharyngeal swallow anatomy and physiology, with a focus on the dysphagic symptoms of adults with swallowing disorders arising from CD infections in order to fill the void in the existing literature. The theoretical method used as a foundation for this study is the WHO's *International Classification of Functioning, Disability and Health* model. **Conclusion.** Data analyses presented will include descriptive statistics, measurement of central tendencies, and inter-rater reliability to analyze quantitative and qualitative data from swallowing and nutrition assessments used in the study. "Logistic Regression" will analyze if certain demographic factors (e.g., age, gender, length of time since diagnosis of CD) can predict swallowing symptoms and the severity of those symptoms. Our goal is to create a database of oral and pharyngeal symptoms that can be disseminated to communities impacted by CD. **Grants.** This study was partially funded by a grant from PCHCS/ACON

A National Research Incubator Network for Health Research◆

Jacqueline Hinckley, Ph.D., Associate Professor, Dr. Pallavi Patel College of Health Care Sciences, Nova Southeastern University

Objective. This project fosters the training and development of effective multi-stakeholder research groups that include patient partners with communication disabilities. **Background.** Health research directly affects individuals living with a particular health condition. Yet, health research is often initiated exclusively by researchers with little to no input from those who will be affected by the research. For patients, clinicians, and researchers to work collaboratively, preparatory training and skill development is needed. **Methods.** We have developed a set of tools that enable and empower this kind of collaborative health research, described by PCORI as "research done differently". We are now working towards a national network that will serve as a research team incubator, providing tools, shared knowledge, funding opportunities, mentorship and training. **Results.** NSU is the hub of this national research incubator for developing truly collaborative research with patients with communication disabilities, clinicians, and researchers. **Conclusion.** It is possible to include people with communication disabilities into all aspects of research planning, priorities, data collection, analysis, and dissemination. **Grants.** This project was funded through Patient-Centered Outcomes Research institute (PCORI) Eugene Washington PCORI Engagement Awards (2017-2019, 2020 – 2021).

Role of Endothelin Axis in Oral Cancer Invasion and Pain

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Yi Ye, New York University College of Dentistry
Dongmin Dang, New York University College of Dentistry
Dan T. Viet, New York University College of Dentistry
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Kentaro Ono, New York University College of Dentistry
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Brian L. Schmidt, New York University College of Dentistry

Objectives. Oral cancer patients suffer from clinically intractable pain leading to poor quality of life; oral cancer is a capricious disease with unpredictable metastasis. We have shown in our previous studies that oral cancer pain and

metastasis are processes controlled by the endothelin axis, which is a gene pathway comprised of the endothelin A and B receptors (ETAR and ETBR). We hypothesize that ETAR and ETBR play dichotomous roles in oral SCC metastasis and pain, such that ETAR activation and silenced ETBR expression result in increased metastasis and pain. In this study we explore the effect of inhibiting ETAR and re-expressing the ETBR gene on oral cancer metastasis, proliferation, and pain. **Methods.** Our treatment strategy involves antagonizing ETAR with macitentan, a new orally available drug, and re-expressing *EDNRB* with adenovirus gene transduction, a gene therapy technique we had developed previously. We hypothesize that this treatment strategy inhibits cancer invasion (*i.e.*, metastasis) and pain. We employ *in vitro* and *in vivo* models, and the newly available pharmacologic agent macitentan, to test our hypothesis. **Results.** Our collective *in vitro* and *in vivo* results demonstrate that the combination of macitentan and *EDNRB* gene therapy produces an antinociceptive effect through inhibition of endothelin-1 mediated neuronal activation (*i.e.*, calcium influx quantified by real-time calcium imaging). **Conclusions.** Furthermore, while the combination therapy does not significantly reduce proliferation, it inhibits invasion and metastasis both in cell culture and in a mouse model of tongue cancer. Lastly, we demonstrate that the endothelin axis genes are methylated and dysregulated in cancer tissue of patients. **Grant support.** Oral and Maxillofacial Surgery Foundation.

Reliability of Methods to Evaluate Sensitivity Caused by In-office Bleaching Procedures

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Nova Southeastern University

Objective. To evaluate and compare the reliability of different methods to measure sensitivity caused by in-office bleaching procedures. **Methodology.** A convenience sample of 34 patients from the dental clinics of Nova Southeastern University participated in the study upon IRB approval, signing consent forms and complying the inclusion/exclusion criteria. All procedures were provided by the same operator according to the manufacturer's instructions using Opalescence® Boost® PF 40% (Ultradent, South Jordan, UT). No additional treatments provided for desensitization. Visual analogue scale (VAS) was used to assess the level of sensitivity during the procedure, 1-hour, 24-hours, 48-hours, 1-week and 2-weeks intervals. Electric pulp test (EPT) was also used before and after the bleaching and at 2-weeks follow-up. Both of these tests were compared to evaluate if there is a correlation, and which method was more accurate in providing us with a better understanding of the patients' experience. Pairwise correlations using a Bonferroni adjustment were used to examine the association between VAS and EPT values. A mixed, general linear model with Tukey-adjusted pairwise comparisons were used to compare changes in VAS and EPT values over time. Statistical significance was found at $p < 0.05$. **Results.** Statistically no significant correlation was found between VAS and EPT when compared at during the procedure and 2-weeks follow up ($p = 0.824$, and $p = 0.160$). Also, EPT did not show any difference in sensitivity during each time period ($p = 0.168$, and $p = 0.121$). Significant difference was found when VAS was comparing in different time points giving us a better understanding of the sensitivity experienced by patients. Differences was found at $p = 0.0001$. **Conclusion.** VAS showed greater reliability in assessing patients' sensitivity level throughout the procedure, even though VAS is a subjective tool. On the other hand, EPT showed no correlation to patients' experience nor VAS outcomes.

Multi-Peak Versus Single-Peak Curing-Light Heat-Generation on Pulpal-Wall with Bulk-Fill-Resin-Composite

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E. Kilinc, College of Dental Medicine, Nova Southeastern University
Cristina Garcia Godoy, DDS, College of Dental Medicine, Nova Southeastern University

Objectives. Compare heat-generation of various multi-peak-LCUs with single-peak-LCU at the pulpal-wall (PW) of deep cavities when curing bulk-fill-resin-composites (BFRC) containing Ivocerin photoinitiator. **Background.** Multi-peak light-curing-units (LCU) are gaining popularity due to potential depth-of-cure concerns with single-peak LCUs, especially with photoinitiator alternatives used in (BFRC). However, there is limited data on their heat-generation. **Methods.** Single extracted/sound human-molar was used for standardized set-up. Box cavity (3.5x2.5x3mm,0.5mm remaining-dentin-thickness) was prepared on buccal-surface for BFRC placement, access window was opened from the opposite lingual-surface to expose PW of the pulp-chamber. PW was reflected to an infrared thermal-camera

(Thermovision-A320,FLIR) via minimal-energy-loss-mirror (NT99-456,Edmund) to measure transferred-heat from LCUs through dentin. Three multi-peak LCUs (Bluephase-PowerCure/IvoclarVivadent, Valo/Ultradent, D-Light-Pro/GC) were compared to one single-peak LCU (Demi Ultra/Kerr) when curing BFRC (Tetric-EvoCeram Bulk-Fill/IvoclarVivadent,IVA-shade,3mm). Restorations were placed with no bonding agent for easy BFRC removal after each curing. PW temperatures during full-curing-cycle (10sec.) were recorded in four LCU groups(n = 10). Baseline-to-maximum temperatures(ΔT) were measured (Thermavision ExaminIR) and statistically analyzed using One-way ANOVA and Tukey's post-hoc tests. **Results.** There were statistically significant differences among LCU groups in ΔT (F (9,90) = 154.9, p <0.001). Tukey's post-hoc test revealed that lowest heat-generation was achieved by multi-peak group (Valo) which was statistically lower than the heat generation of the single-peak LCU(Demi). Single-peak LCU came second and generated statistically lower heat compared to the remaining two multi-peak LCUs (Bluephase-PowerCure,D-Light-Pro) (p <0.001)(see Figure). **Conclusions.** Data showed no significant difference in multi-peak versus single-peak LCUs to claim that heat generation of one is superior than other. Single-peak LCU came in second lowest and was between various multi-peak LCUs. Further studies are necessary using body-temperature as baseline.

Older Adults Aging-in-Place

Rebecca I. Estes, PhD, Professor, Dr. Pallavi Patel College of Health Care Sciences,
Nova Southeastern University
Judith Olson, PhD

Objective. The study was conducted to explore the meaning of home and aging in place (qualitative) and the relationship between PEO characteristics (quantitative), of community dwelling adults, 65 and older. **Background.** Census reports indicate the number of adults over age 65 continues to increase. Surveys reveal 90% of older Americans cling to their homes and want to "age-in-place." To address this need, occupational therapists need to understand the meaning of home and aging-in-place and know what personal, environmental, and occupational (PEO) characteristics best support aging-in-place. No known studies have investigated all aspects concurrently. **Methods.** This study used a cross-sectional mixed methods design; however, this poster covers only the qualitative data collected via face-to-face interview. Responses were audio taped and then transcribed. Using phenomenological qualitative methods, transcriptions were coded by research team members to discover themes that emerged from the rich variety of participant responses. **Conclusion.** A home is more than the physical environment and aging-in-place is important to older Americans. While home modifications can strengthen the physical, personal, and social accessibility of the home, occupational therapists who view the aging adult holistically may benefit their clients by addressing the person's resilient and creative response and the importance of home to age in a meaningful environment. **Grant.** This study was funded by an NSU College of Health Care Sciences and College of Nursing FY 2013 Faculty Research & Development Grant.

Using a Self-Contained Integrated Clinical Education (ICE) Model to Identify Student Deficits

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Shari Rone-Adams, DBA, Professor, Dr. Pallavi Patel College of Health Care Sciences,
Nova Southeastern University

Introduction. NSU PT Program was an early adopter of the self-contained clinical education model, where faculty supervise students in the clinical setting. The program uses the model for integrated clinical education experiences (ICE) and service-learning activities. Recently it has been identified that the model may facilitate identification of student deficits and allow for remediation prior to full-time internships. **Case presentation.** The self-contained ICE model relies on faculty to supervise students in assigned clinical settings. Objectives for each experience align with student level. Students receive input from supervising faculty and complete a self-assessment. Faculty also supervise students for required service-learning activities. **Deviation From the Expected.** The model has helped identify students who are struggling with integration of knowledge /skills when working with patients, allowing faculty to initiate remediation prior to full-time clinical experiences. Faculty are aware of the knowledge / skills that students should have at specific points in the curriculum and can recognize key deficits. Early remediation can ensure student clinical readiness for full-time experiences. This was an unforeseen outcome of the model. **Discussion.** Participation in the model has led to students feeling better prepared for full-time clinical experiences in the areas of communication, integration of knowledge, and clinical reasoning. The model has been used to identify student deficits in the first and second years of the program and to initiate remediation of cognitive, professional and psychomotor skills. **Conclusion.** Research is needed to confirm the impact of the integration of the self-contained ICE model on student clinical readiness. **Grants.** None

Soft Tissue Mobilization Increased Hamstring Mobility

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Megan Colas, Ph.D., Associate Professor, Dr. Pallavi Patel
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Ramon Ramirez, Dr. Pallavi Patel College of Health Care Sciences,

Nova Southeastern University
Ashmita Thakur, Halmos College of Natural Science and Oceanography,
Nova Southeastern University

Objective. The aim of this study was to determine if there is a difference between administering Graston Technique Therapy (GT) and Therapeutic Cupping (TC) over the area of hamstring tightness. **Background.** Limited research reveals that the use of different soft tissue mobilization techniques increases tissue mobility in different regions of the body. **Methods.** Thirty-three subjects between the ages of 18-35 years with bilateral hamstring tightness participated in this study. Each intervention was administered on a different leg for 8 minutes and over the entire area of the hamstring muscles. The intervention of TC used one cup and was moved over the entire treatment area. Subjects attended one session where treatment and leg order were randomized before attending the session. The intervention per leg included baseline and post measurements of soreness visual analog scale, Sit-n-Reach (single leg), goniometric measurement for straight-leg hip flexion motion, and superficial skin temperature. **Results.** An Intervention (GT vs TC) x Time (Pre vs Post-Intervention) repeated measures ANOVA revealed a significant difference for Superficial Skin Temperature (PreTC – 90.01±2.45, PostTC – 96.8±1.4; PreGT – 90.14±2.72, PostGT – 92.99±2.05; P = 0.000) with TC showing the largest warming affect. Paired T-tests revealed significant between each dependent variable per interventions (P = 0.000). **Conclusion.** Both GT and TC showed to be impacting hamstring mobility with TC being the only treatment that had the greatest increase in superficial skin temperature which indirectly suggests more blood flow to the area. **Grants.** No grants funded this project.

Ecologically Valid, Virtual Reality-Based Multi-Tasking Assessment for Individuals with Neurologic Communication Disorders

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Objective. The purposes of this project are to 1) review approaches to multi-tasking assessment in neurological communication disorders and 2) develop a virtual reality-based assessment appropriate for those with communication disorders. **Background.** Multi-tasking is an acknowledged aspect of everyday life according to the World Health Organization's International Classification of Functioning. Many multi-tasking assessments require mobility in environments like shopping malls or hospitals. Virtual reality is a tool that can overcome the physical barriers experienced by many individuals with neurologic conditions. In addition, no multi-tasking assessments are currently validated for individuals with acquired neurogenic language disorders, such as aphasia. **Methods.** After a comprehensive review of the literature, we gathered input from clinicians and individuals with aphasia about relevant daily activities associated with multi-tasking. The Cooking Task (Frisch et al., 2012; Craik & Bialystok, 2006) is a valid assessment for those with mild cognitive impairments. We selected this task to explore for a potential application for those with language disorders, and because it could be simulated in a virtual reality environment. **Results.** We are currently piloting this project and results from our initial pilot participants will soon be available. **Conclusion.** We believe that a virtual reality-based multi-tasking assessment may be an appropriate clinical tool for those with acquired communication disorders.

Is There a Replication Crisis in Aphasia Treatment?

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Objective. The purpose of this project is to examine whether the evidence base for aphasia treatment after stroke is substantiated by sufficient replication. **Background.** A critical factor in developing an evidence-based practice is the existence of replicated results for any treatment. Replication helps to ensure that observed treatment effects are reproducible (Sigurardóttir & Sighvatsson, 2011). **Methods.** We chose to use the aphasia treatments listed in the ASHA Practice Portal in September, 2018 to analyze. First, we reviewed the list of treatments. General treatment approaches, such as "Life Participation Approach", "Word Retrieval Cueing Strategies", and "Computer-based treatments" were excluded because those broad approaches do not share consistent procedures that can be replicated Each of the remaining treatments were searched for by name in relevant bibliographic databases including: Academic Search Premier (EBSCOhost), ProQuest Central (ProQuest), CINAHL Complete (EBSCOhost), and ERIC (ProQuest). **Results.** We found that 17/17 of the listed aphasia treatments had been replicated in some way. Of the 17 treatments listed on the ASHA Practice Portal: 4/17 had been replicated by the original authors only, 5/17 had been replicated by other authors only, and 8/17 had been replicated by the original authors and others. **Conclusion.** Non-replications are expected in scientific research to explore new territory. Treatment research should be held to a high standard for replication, since implementation requires treatment procedures to be successful across users.

Hull Auditorium

3D in Vitro Spheroid: A Preclinical Model for Drug Discovery Against Different Cancer

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Objective. This study was conducted to determine the effectiveness of the anti-cancer drug treatments using 3D (three-dimensional) cultures that closely mimic the tumor microenvironment (TME) in the whole body. **Background.** The TME is one of the major determinants in regulating tumor progression and the metastatic process of cancers. The format of the cell growth can also determine the response of cancer cells to various drug treatments under the *in vitro* conditions. **Methods.** We conducted experiments with 3D culture to study the anti-cancer effects of SAHA, Nutlin-3, TMZ, and F16. The treatments were performed with lung (H1975 and H460), prostate (LNCaP-MST) and brain (U-87 MG) cancer cells that were growing 3D format as spheroids. **Results.** Western blot analysis of untreated cancer cells showed tenfold higher expression of cancer stem cell (CSC) markers (CD24, CD133) in the cells that were growing as spheroids in 3D cultures compared to the (2D) cultures. Also, the treatment of cells growing in 3D cultures as spheroids with SAHA (7.5 µM) lowered the expression of CSC markers in 7 days. Similar inhibition of CSCs was observed when the LNCaP-MST spheroids were treated with the MDM2 inhibitor Nutlin-3 (20 µM) for 7 days. Interestingly, the CSC markers showed a significant reduction in U-87 MG cells after F16 (a new drug patented by NSU) treatment also compared to TMZ. **Conclusion.** The 3D spheroid system may better predict the treatment outcomes of anticancer drugs. **Grants.** This research was funded by the Royal Dames of Cancer Research Inc., Florida.

A Qualitative Assessment of Health Status of the Arab Descent Community in South Florida

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Objective. The purpose of this study is to expand our knowledge of the risk factors that affect the health status of Arab descent Americans (ADAs) in South Florida. **Background.** Research on health outcomes of ADAs is sparse. Considering the current sociopolitical climate in the US, it is important to take steps to better understand the stigma associated with this marginalized group and how such discrimination and stereotypes impact their general health and health outcome such as healthcare services utilization (HSU) and medication adherence. **Method.** A convenience sample of 27 eligible participants was recruited using a snowball sampling approach. Recruitment only took place in non-clinical settings. Study participants were divided into three focus groups led by a moderator. Each focus group followed the same procedures and protocol guidelines. Verbatim transcripts of the audio-taped focus group sessions were transcribed in English and a qualitative data management software- NVivo 12—was used for the analysis. **Results.** Participants' mean age was 35 years, 70% were female, 37% US-born, and 48% have been in the US for 20 years or more. Eight themes were identified as being strongly associated with HSU and medication adherence: gender role; generation differences; religion; health literacy; self-perceived discrimination; access and insurance; mental health stigma; and reactive health need. **Conclusion.** Participants highlighted the influence of religion on the outcomes. Additionally, health literacy levels and self-perceived discrimination negatively affect their HSU and medication adherence. **Grants.** This study was funded by the Health Professions Division grant.

Hull Auditorium

Osteopontin & β2-adrenergic Receptor Signaling in Cardiac Fibrosis

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Objective. Test the role of osteopontin in anti-fibrotic β_2AR signaling in cardiac myocytes. **Background.** Cardiac β_2-adrenergic receptors (ARs) are known to inhibit collagen production and fibrosis in cardiac fibroblasts and myocytes. β_2AR is a G_s protein-coupled receptor (GPCR) and, upon its activation, stimulates generation of cyclic 3`, 5`-adenosine monophosphate (cAMP). cAMP has two effectors: protein kinase A (PKA) and the exchange protein directly activated by cAMP (Epac). Epac1 inhibits cardiac fibroblast activation and fibrosis. Osteopontin (OPN) is a ubiquitous pro-inflammatory and pro-fibrotic cytokine, including in the heart. **Methods.** We used the H9c2 cardiac myocyte cell line & the real-time qPCR, co-immunoprecipitation/western blotting, and ELISA techniques. **Results.** The cardiotoxic hormone aldosterone upregulates OPN via the mineralocorticoid receptor (MR) in H9c2 cardiomyocytes. This is prevented by β_2AR-activated GPCR-kinase (GRK)-5. GRK5 directly phosphorylates and inhibits the MR in cardiomyocytes. Additionally, CRISPR-mediated OPN deletion enhances β AR-dependent cAMP generation in H9c2 cardiomyocytes and upregulates Epac1. OPN deletion also enables the β AR to completely abrogate transforming growth factor (TGF)-β-dependent fibrosis in H9c2 cardiomyocytes. Mechanistically, OPN interacts with G_{sa} subunits to facilitate recruitment of GRK2, the major GRK phosphorylating and desensitizing the cardiac β_2AR. This, in turn, augments the GRK2-dependent functional desensitization of the β_2AR, thereby opposing this receptor`s anti-fibrotic cAMP/Epac1 signaling. **Conclusion.** We have uncovered a direct inhibitory effect of OPN in cardiac $\beta_2$AR`s anti-fibrotic signaling via facilitation of GRK2-mediated receptor desensitization. Thus, OPN blockade could be of value in the treatment and/or prevention of cardiac fibrosis. **Grants.** PFRDG FY2018-19 #335467

Searching for the Elusive Angiotensin-1-7 Receptor

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Objective. To use radioligand binding assays to characterize the receptor(s) for angiotensin-1-7, a metabolite of the primary agonist of the renin-angiotensin system. **Background**. Angiotensin-1-7 (Ang- 1-7) was first reported to be a hormone in 1987. However, subsequent attempts to define its physiological function for this peptide were problematic. In 2003, we, Santos et al. reported that Ang-1-7 was an endogenous ligand for the protooncogene/orphan G protein-coupled receptor protein Mas. While we demonstrated ^{125}I-Ang-1-7 binding using receptor autoradiography, it is necessary to demonstrate that this binding meets pharmacological criteria for a receptor. **Methods**. Classical radioligand binding assays of tissue membrane suspensions are incubated with a range of concentrations of $^{125/127}$I-Ang-1-7 or ^{3}H-Ang-1-7 with and without non-radiolabeled Ang-1-7 or with different Ang peptides, e.g., AngII, AngIII, Ang-2-7, etc. "Specific" receptor binding of $^{125/127}$I-Ang-1-7 is evaluated using non-linear regression analysis to fit the Langmuir isotherm. Additionally, HPLC analysis of metabolism of Ang 1-7 in the assay is determined. **Results**. By varying assay medium constituents and peptidase inhibitors we can approximate the concentration and dissociation constant for $^{125/127}$I-Ang-1-7 binding in testis and liver of spontaneously hypertensive rats. However, other Ang peptides compete for this $^{125/127}$I-Ang-1-7 receptor equivalent to Ang-1-7, calling into question the pharmacological specificity of this binding site. Additionally, there is significant metabolism of Ang-1-7 which compromises the ability of the binding assays to obtain accurate values. **Conclusion**. We are continuing to validate

this receptor binding assay to definitively characterize the receptor(s) for Ang-1-7. **Grants**. This study was partially funded by a PFRDG.

The Emerging Role of GSK-3 Inhibitors as Promising Drug Candidates in NSCLC

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Objective. This study was conducted to assess the apoptotic role of GSK-3 inhibitors: BIO and CHIR 98014 against H460 K-Ras *mutant* (*mut*) and H1975 K-Ras *wild type* (*wt*) Non-small cell lung cancer (NSCLC) cells. **Background**. NSCLC accounts for 80% - 85% of lung cancers, with mutation of KRAS being the most frequent aberration. Our study was designed to determine the use of GSK-3 inhibitors as apoptotic inducers against NSCLC cells. **Methods**. In our study, the cell viability and cell proliferation of H460 and H1975 were measured using MTT and BrdU assay after 24, 48, and 72 h of BIO and CHIR 98014 treatments. Imaging studies to assess Reactive oxygen species (ROS), Mitochondrial Membrane Potential (MMP), and Caspase-3/7 cleavage were conducted. The trans-endothelial migratory assay was conducted to assess the potential of BIO and CHIR 98014 for inhibiting cancer metastasis. Western blot analysis was conducted for measuring pGSK-3, phospho-p53, p21, XIAP, BAX, LC3B, Caspase-3, and Caspase-9 levels. **Results**. GSK-3 inhibitors significantly reduced the cell viability after 24 h treatment in H1975 compared to H460 cells. In addition, BIO and CHIR 98014 demonstrated significant upregulation of ROS levels, while decreasing its mitochondrial membrane potential, leading to cleavage of Caspase-3, 7, and 9. Interestingly, a significant elevation of phospho-p53, p21, and LC3B levels was observed with BIO and CHIR 98014 treatments. **Conclusion**. Our results indicated that GSK-3 inhibitors were able to induce cell death by activating both extrinsic and intrinsic apoptotic pathways. **Grants**. This study was funded by the PFRDG grant 334818 and the financial support from the Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida.

Jonas Auditorium

VEGF Stimulated Differentiation of Gingival Stem Cells to Endothelial Cells

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Purpose. In bone tissue, engineering vascularization remains a major challenge to regenerate bone in large defects. The long-term goal of this study is to develop a highly vascularized tissue engineered bone for the repair of critical size bone defects in the craniofacial region. The purpose of this study was to investigate the *in vitro* differentiation of human gingiva derived stem cells (GMSCS) to endothelial lineage. **Methods.** GMSCs isolated from gingival tissue were treated with 0, 10, 50 and 100 ng/ml VEGF for one week. The expressions of endothelial maker genes VCAM-1, PCDH12, FLT1 and KDR were measured by quantitative PCR. An immunofluorescence and a matrigel assays were performed to examine the endothelial differentiation of GMSCs. The results were analyzed using ANOVA, a Dunnet Multiple comparison test. **Results.** The stimulation of GMSCs with VEGF enhanced the gene expression of endothelial markers VCAM -1 in a dose dependent manner. While VCAM-1 and KDR expression was significantly upregulated at all concentrations ($P=0.0041$, $P= 0.003$) respectively, the upregulation of FLT1 ($P<0.001$) and PCDH-12 ($P<0.0001$) was maximum at the cells treated with 50ng/ml VEGF. Immunofluorescence analysis demonstrated the typical expression of PECAM-1. The functional behavior of the differentiated cells showed capillary like structures (matrigel assay). **Conclusions.** Our findings support that GMSCs can differentiate into endothelial cells. GMSCs as autologous stem cell source provide new options for engineered vascularized tissue for the repair of craniofacial defects. **Funding.** HPD grant # 335703

Antibiotics: The Attack of Microbes

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Objective. This article will focus its discussion on the three major mechanisms utilized by antibiotics to suppress bacterial cell growth: inhibition of cell wall synthesis, cessation of protein synthesis, and modification of DNA synthesis. Moreover, a brief method of action that bacteria have acquired to evade inhibition will be presented. **Background.** Within the past few decades, antibiotics have slowly lost their effectiveness due to an increase in the prevalence of bacterial resistance. The success and failure of antibiotics necessitates the understanding of their natural history and mechanism of action. Lastly, the current overuse of antibiotics in a hospital setting will be reevaluated by analyzing the emergence of antibiotic resistance in patients. **Methods.** Nine articles related to cell wall synthesis inhibition, seventeen articles related to protein synthesis inhibition and fifteen articles related to DNA synthesis inhibition were analyzed and reviewed in order to gather the data necessary. In addition, about thirty articles on the societal implication of antibiotics resistance and its effect in healthcare were used. **Conclusion.** The dramatic increase in antibiotic resistance has rendered us vulnerable to frequent medical and surgical complications, added health care costs, and increased mortality. Combating antibiotic resistance will require a concerted effort from all facets of society including legislation and enforcement action from the governmental levels. Therefore, leading to the improvement of monitoring the use of prescription drugs, classification populations at risk, and prompt response to outbreaks and cases of infraction.

Nurses' Attitudes Toward Caring for Adults with Intellectual and Developmental Disabilities Hospitalized to Inpatient Medical Settings: A Systematic Review

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Objective. The purpose of this systematic review was to elucidate current evidence regarding nurses' attitudes about providing care to adults with intellectual and developmental disability (IDD) who are hospitalized in medical settings. **Background.** Individuals who have an Autism Spectrum Disorder (ASD) or IDD are hospitalized 6 times more often than the general population, 1.44 times more likely to die in the hospital than are those in the general population and face higher hospital costs. Furthermore, the number of individuals having IDD is increasing in the United States. Studies revealed that nurses report more negative emotions about providing care to individuals with IDD. **Methods.** A seven-person team consisting of faculty and doctoral students conducted extensive literature search strategies to locate and appraise relevant literature reporting original data studies. The data were appraised using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. **Results.** Eight articles published up to November 2019 were included. Improved training, consistent patient information, and improved communication are needed. **Conclusion.** This systematic review illuminates the critical gaps in the scientific body of knowledge regarding effective interventions to address the persistent disparity in attitudes of registered nurses regarding caring for patients with IDD. Research data to inform the implementation of interventions to improve the attitude and emotions toward adults with IDD among nurses employed in acute care facilities is lacking. This dearth hinders the delivery of effective healthcare which results in an impaired nurse-patient relationship and increased costs. **Grants.** This study was not grant funded.

Navigating Healthcare Science Student Learning and Engagement Through Implementation of a Virtual Classroom

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Objective. This study explored whether virtual classrooms can be utilized to facilitate student learning and engagement. **Background.** University students and their learning approaches undergo constant changes, mainly due to advances in technology. Therefore, student expectations are continuously shifting. Although technology allows easier access to learning material, students still depend on a structured learning environment facilitated by an instructor to receive and process the correct information. **Methods.** A virtual classroom developed and housed in Second Life was used to deliver a week-long course on health promotion. Thirty students from different healthcare science programs participated in the study. After a 15-minute live orientation session, participants explored the classroom for a week, completed a short quiz, and described their experience using a survey. The quiz was completed via Canvas while Qualtrics was used to capture student experience. SPSS v.26.0 was utilized to run correlation and cluster analyses. **Results.** Hierarchical cluster analysis was completed in order to identify groups of students that had similar characteristics. The results partitioned students into three clusters characterized by quiz score, belief in difficulty of the content and technology. Correlation analysis revealed that students who perceived the course content as challenging also expressed that the control devices interfered with performance within the virtual classroom; $r(22)=0.473$, $p<0.041$. **Conclusion.** 82% of the participants believed that the Second Life platform can serve as an alternative to supplement occasional live student engagement and learning. **Grants.** This study was funded by the HPD Research Grant at Nova Southeastern University.

The Impact of MDM2 Inhibition on the Expression Levels of XIAP on Various Cancer Cell Lines

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Jonas Auditorium

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Background. Overexpression of the oncogenic Murine Double Minute 2 homolog (MDM2) gene is enhanced during cancer development and continues through disease progression. X-linked Inhibitor of Apoptosis Protein (XIAP) binds to MDM2 protein and stabilizes its pro-cancerous function. XIAP-MDM2 heterodimerization occurs when XIAP binds to the Really Interesting New Gene (RING) domain of the MDM2 protein. Also, XIAP inhibits the pro-apoptotic proteins caspase 3, 7 and 9; which are the regulators of the intrinsic pathway of the cellular apoptosis. **Objective.** The goal of our study was to determine whether inhibition of MDM2 using RG7388 (MDM2 specific inhibitor) will decrease the level of XIAP in MDM2 overexpressing cancer cells. **Methods.** For this purpose, we analyzed the expression levels of XIAP and cell survival in LNCaP (Prostate cancer), LNCaP-MST (MDM2 transfected cells), SJSA-1 (Osteosarcoma) and GI-101A (breast cancer) cells via western blotting, MTT assay, and the trypan blue exclusion test. Notably, the XIAP expression is significantly higher in the LNCaP-MST and SJSA-1 cells, which also have elevated expression of MDM2. **Results.** Our results show a positive correlation between MDM2 and XIAP expressions in cancer cells. **Conclusion.** Treatment with RG7388 decreased XIAP expression, and inversely correlated with the upregulated levels of caspase enzymes, and activation of the intrinsic apoptosis pathway. However, further studies are warranted to confirm the intracellular mechanisms involved in the regulation of XIAP in MDM2 positive cancers. **Grants.** This project was supported by The Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida.

Marder Auditorium

Low Vision Patients' Preferences for Light Intensity and Color Temperature During Near Reading

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Objective. To investigate whether lighting preferences for reading were related to inner versus outer retinal degeneration in a heterogeneous low vision (LV) population. **Background.** While task specific lighting is commonly recommended by low vision practitioners to improve the reading performance of visually impaired individuals, it is not well understood whether LV patients' preferences for light during near reading are related to retinal disease type and/or severity of visual function loss. **Methods.** Preferences for brightness and color temperature with the LuxIQ/2 while reading hard copy printed materials were evaluated in office for 43 LV patients. Distance visual acuity (VA), near VA and contrast sensitivity (CS) were assessed. Patients' ocular disease was categorized according to whether it primarily affected the outer retina versus inner or all retinal layers. **Results.** When comparing patients with ocular disease affecting the outer retina to those with inner retinal disease, there was no significant difference in preferences for brightness or color temperature. Preference for white light intensity or color temperature was not significantly related to age, gender, distance or near VA. Those with reduced CS were significantly more likely to prefer lower (warmer) color temperature. CS was not significantly related to preference for white light brightness. **Conclusions.** Patients with reduced CS tended to prefer warmer color temperatures. Demographics, VA, and inner versus outer retinal disease were not significant factors related to white light preferences for reading. **Grants.** This study was funded by a grant from NSU Health Professions Division

Short-term Metamorphopsia Induced by Overnight Orthokeratology and Its Association to Changes in Optical Quality Measured with Double-pass Technique

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Objectives. To map the time course of changes in perceived distortion and optical quality during the first month following orthokeratology lens wearing, and to explore the association between those two. **Background.** Orthokeratology lens is an effective device to slow down the axial elongation in myopia development. However, some patients experience visual distortion after lens wear. **Methods.** A total of 43 subjects (20 boys and 23 girls) with age ranging from 8 to 12 years completed the study. All subjects were fitted with spherical four-zone orthokeratology lenses following the procedures recommended by the lens manufacturer. The subjects were required to wear the lens for at least eight consecutive hours at night. After lens removal during the daytime, orientation discrimination threshold was quantified with groups of briefly displayed short line segments in a two-alternative forced choice task by adaptive staircase paradigm. Objective scattering index (OSI) was evaluated using the double-pass technique (OQAS-II, Visiometrics). Measurements were scheduled prior to lens dispatch (baseline), followed by evaluations at 1day, 1 week, 2 weeks, and 1 month after the initial lens wearing. **Results.** At baseline, 1w, 2w, and 1 month after lens wearing, the mean ODT values were 3.99±1.33, 6.76±2.58 ($p< 0.01$), 6,65±2.66 ($p< 0.01$), 5.41±2.14 ($p<0.01$). **Conclusions.** Both subjectively perceived metamorphopsia and objectively measured ocular scatter index significantly increased following the start of orthokeratology treatment. However, visual distortion peaked earlier and showed a quicker recovery than optical quality. This discrepancy may be contributed by a swift neural adaptation.

The Effects of a High Calcium Diet on Intraocular Pressure

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Objective. The study was performed to determine whether a relationship exists between dietary intake of calcium-rich foods and intraocular pressure (IOP). **Background.** Glaucoma is a progressive optic neuropathy which may result in blindness. The only modifiable risk factor and management option is reduction of the IOP via topical medications,

laser treatments, and surgery. Recent literature supports that calcium channel blockers (CCB), may also be effective in reducing IOP. To date, no research has been conducted to study the effects of dietary calcium on IOP. **Methods.** The study included 57 participants aged 40-70 years old of a variety of ethnicities. Participants completed a calcium dietary intake questionnaire and had their IOP measured. Each food item on the questionnaire had a predetermined score and the scores were grouped into categories of overall dietary calcium intake labeled as poor, fair, good, and excellent. **Results.** Elevated dietary calcium intake and elevated IOP were correlated ($p = 0.028$) in the study group including treated glaucoma patients and untreated ocular hypertensives. Significant correlations were not detected in any of the other data groups. The data also revealed that the amount of subjects that scored poorly on their calcium intake decreased as the IOP increased. The number of patients that scored the highest on the calcium questionnaire were more likely to have higher IOP. **Conclusion.** This pilot study demonstrated a correlation between high dietary calcium intake and elevated IOP despite glaucoma status and treatment. This research may provide insight in future management strategies for this disease.

Microsurgical Resection of Petroclival Meningiomas Treated with Stereotactic Radiosurgery to Address Persistent Trigeminal Pain

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Introduction. Petroclival meningiomas (PCM) are challenging tumors to manage, and a small percentage present with trigeminal neuralgia (TN). Observation, surgical resection and stereotactic radiosurgery (SRS) have typically been offered as treatment options. We address 3 cases where this rare and aggressive manifestation of TN was completely controlled after microsurgical resection. These cases will address the feasibility of surgery as an option to treat medically refractory TN after SRS. **Deviation From the Expected.** Patients with tumor driven TN generally respond well to conventional therapy or SRS, however, in this particular subset, TN persisted despite adequate tumor control. The cases reviewed showcase the novelty of microsurgical resection in patients with medically refractory TN. **Case Presentation.** We present three cases of patients with PCM who underwent tumor microsurgical resection to manage their medically refractory TN. Each patient failed conventional medical therapy (i.e., anti-neuropathic pain medication), and underwent SRS. Radiologic tumor control was achieved in all patients after SRS, however TN persisted despite adequate lesion management. Subsequently the 3 patients underwent micro-surgical resection. All 3 patients had complete resolution of their TN pain, with a BNI score of 1 at median follow up of 26 months. **Discussion.** Tumor control after SRS in patients with PCM is over 95%. For these patients, the goal of surgery was to address their persistent TN through surgically removing any tumor remnants that persisted after SRS. **Conclusion**. Microsurgical resection is a good option for patients with persistent facial pain after SRS treatment of PCM complicated by medically refractory TN.

Oxidative Burst and Necroptosis in Macrophages Infected with Carbapenem-Resistant Klebsiella Pneumoniae (CRKP)

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Objective. To clarify how KP35, a representative clinical isolate of CRKP ST258, evades innate immune clearance. **Background.** CRKP ST258 are a multidrug-resistant Gram-negative bacteria responsible for numerous, often lethal, health care- and community-associated infections. The predominant species of CRKP ST258, e.g. KP35, have become resistant to phagocytic killing. Ahn et al. demonstrated that neutrophils failed to clear KP35 after 2 hours, while KPPR1, a well-studied reference strain, was cleared within 30 minutes. In similar studies, KP35 rapidly depleted alveolar macrophages. We hypothesized that KP35 does not activate the oxidative burst and that it promotes necroptosis in macrophages. **Methods.** Macrophage-induced THP-1 cells were infected with either KP35, KPPR1, or

S. aureus USA300. qRT-PCR analyses were performed for expression of NOX2/gp91^{phox}– the catalytic core of NADPH oxidase. Flow cytometry were performed for mitochondrial and intracellular reactive oxygen species (mROS and iROS). Immunoblots for p-MLKL were performed to investigate the induction of necroptosis. **Results.** KP35 does not upregulate NOX2 transcription. KP35 kills macrophages without causing an increase in iROS, and with or without causing an increase in mROS. KP35 does not induce phosphorylation of MLKL in macrophages. **Conclusion.** KP35 does not upregulate NOX2, but activation of the oxidative burst has not been ruled out as flow cytometry was confounded by significant cell death. Two populations of dead cells emerged during flow cytometry: the first, positive for mROS and the second, negative for mROS. This suggest that KP35 induces two forms of cell death. The lack of p-MLKL rules out necroptosis. **Grants.** NIH.

Morris Auditorium

An Eye-Tracking Approach to Measure the Engagement of Children with Autism Spectrum Disorder

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Objective. To examine gaze behavior measurements of children with Autism Spectrum Disorder (ASD) in comparison to neurotypical children in response to human-animal interaction stimuli. **Background.** Successful social interactions require that individuals are aware of another's intentions to make the correct prediction. The ability to understand others' intentions and make the correct prediction is highly correlated with the ability to demonstrate emotion or arousal, in which observing both can be captured with eye-tracking data. Children with an ASD lack sufficient abilities to engage with others. However, the literature suggests that a pet can serve as an aid to teach certain skills, including social skills which help connect with others. **Methods.** Neurotypical children and children with ASD were recruited from the public and from CARD-UM-NSU, Mailman Segal Center, and Nicklaus Children's hospital. Data were collected using the Tobii Pro Nano to measure eye movement. Autism risk was assessed with the M-CHAT tool. The Tobii Pro Nano lab was used to analyze imaging eye-tracking data and IBM SPSS V 26.1 was used to analyze the numerical data. **Results.** Children with ASD respond positively to a friendly dog similar to children with neurotypical development. Gaze fixation data suggest that children with ASD understand the animal's toy preference. **Conclusion.** Children with ASD can form relationships with a pet to improve social interaction skills. These findings provide evidence crucial to understanding the impact of pet therapy on the social behaviors of children with ASD. **Grants.** Funded by the President's Quality of Life Grant FY 2019.

Attitudes and Perception of Nursing, Medical, Pharmacy and Dental Students Towards Each Other's Role Pre and Post the Jamaica Medical Mission

Inter-Professional Collaboration ◆

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Objective. This study was conducted to determine if inter-professional learning interactions influence the perception and attitudes of Nursing, Medical, Pharmacy, and Dental Students towards each other's role pre and post the Jamaica Medical Mission Inter-Professional Collaboration trip. **Background.** Although there has been an increase in inter-professional collaborative education programs in the United States, not all healthcare professionals are included (Navickis & Mathieson, 2016). Little is known about how healthcare students perceive and understand the role each play in providing excellent inter-professional teamwork and their attitude towards working together. **Methods.** The Inter-professional Attitudes Scale (IPAS) was administered to students from the four aforementioned healthcare professions prior to and after their collaborative involvement in providing health care services to individuals from the Jamaican community. Paired sample t test and the Wilcoxon Signed Rank test were conducted using IBM SPSS V.26.1. **Results.** There was no significant difference between the participants' overall pre-test score in comparison to their post-test score $t(22) = 1.14$, $p = .269$ for responsibilities, patient centeredness, diversity and ethics, and community centeredness. However, there was a significant difference between participants' inter-professional bias

before and after the inter-professional collaborative session. The Wilcoxon Signed-Rank test indicated that participants demonstrated less inter-professional bias after the trip Z = -2.07, p = 0.038. **Conclusion.** Students from the health professions have great attitudes toward their roles, responsibility, and patient centeredness regardless of their program of study. Nonetheless, these students could benefit from more collaborative engagements in order to reduce bias about students from other disciplines.

Screening, Brief Intervention, and Referral to Treatment (SBIRT): An Intervention to Promote Cervical Cancer Awareness Among Black and Hispanic Women in Broward County

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Background. Although cervical cancer is one of the most preventable types of cancers, Hispanic and Black women die more of the disease than Caucasian women. Despite clear recommendations and evidenced benefits of cervical cancer screening, screening rates across the United States, particularly in the southern areas of the US are significantly lower than anticipated for Black and Hispanic women. Factors related to low screening behaviors are complex; however, lack of knowledge regarding risk factors and failure to recognize one's personal risk have been identified as leading barriers. **Method.** A community-based sampling approach was used to survey Black and Hispanic women in Broward County. Sixty-four women were pre-screened, and ten were eligible for risk assessment using the Siteman Cancer Center's Disease Risk tool. **Results.** 44% did not have a pap test within the last 3-5 years. 75% did not receive vaccination against HPV. Out of 10 individuals who were eligible for risk assessment, 40% (n = 4) had above average risk for cervical cancer; however, they never had the HPV vaccine, did not have a hysterectomy, and were not screened for cervical cancer for the past 3-5 years. 60% (n = 6) had below average risk and did not take preventive measures against cervical cancer either. **Conclusion.** More robust communication strategies specific to these populations must be implemented to encourage participation in preventive behaviors.

Nurses' Attitudes and Emotions Toward Caring for Adults with Intellectual Disabilities Admitted to Medical/Surgical-Type Units

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Objective. This study was conducted to describe the attitudes and emotions of nurses working on adult medical/surgical-type units toward caring for adult patients with intellectual disabilities. The results will provide guidance and justification for design and implementation of interventions to improve the quality of life for the providers, the patients, and the patients' families. **Background.** Studies indicate that nurses have negative attitudes about providing care to individuals with intellectual disabilities. These negative attitudes and emotions likely lead to poor health care outcomes for patients and families. **Methods.** This was a descriptive study in which participants completed an online research instrument which was previously tested for psychometrics among nurses in the United Kingdom. This was a convenience sample of 200 nurses working in adult medical-surgical-type units in a large South Florida hospital. **Results.** Participants reported a negative overall attitude but more positive emotion and less negative emotion toward providing care for adults with intellectual disabilities. On average, participants with a family member or close friend with a developmental disorder scored lower on attitude (n = 56, M = 68.84, SE = 2.73), than those without such a relationship (n = 144, M = 69.83, SE = 1.92). This difference, 1.19, *BCa* 95% *CI* [-5.65, 8.03], was not significant, $t(198) = 0.35$, $p = .731$. **Conclusions.** Poor attitudes toward providing care for these patients may have corresponding negative effects on healthcare outcomes and quality of life. **Grants.** This study was supported by a grant from Nova Southeastern University's Health Professions Division.

Morris Auditorium

An Examination of Preventive Strategies to Reduce Elderly Patient Hospital Falls

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Objective. This case study was implemented in an attempt to reduce the number of hospital in-patient falls by utilizing the Modified Hendrich Scale. **Background.** According to the Centers for Disease Control and Prevention, the average cost for in-hospital falls is $34 billion dollars per year while more than 80% of the falls reported are from patients who are 65 and older. Falls with injuries are among the 10 top reported sentinel events for the elderly patient. **Methods.** Fall data from all units in a selected regional hospital were recorded prior to and after an educational intervention session on fall prevention. The number of occupied beds with patients over the age of 65 and the length of stay and the number of falls for each unit were recorded for 32 weeks. The fall audit tool was used to analyze fall score; monitored fall risk scores, fall signs, bed and chair alarms and fall risk for patients wearing the red socks identifier. **Results.** 72% of the patients had fall signs. Among patients audited before the implementation of the protocol, 16% experienced at least one fall. Among the 217 patients audited after the implementation of the protocol, 10% experienced at least one fall. The Fisher's exact test indicated that the patient's fall was statistically significantly lower after the implementation of the protocol ($p = 0.044$). **Conclusion.** The implementation of an evidence-based fall protocol was suggested to be effective and a significant contributor to decreasing patient falls.

Increasing Hospice Nurses' Knowledge and Improving Attitudes on Pain Assessment in Dementia Patients

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Objective. The purpose of this evidence-based practice (EBP) project was to increase hospice nurses' knowledge and improve attitudes on pain assessment in dementia patients by implementing an EBP training program on utilizing the *Pain Assessment in Advanced Dementia Scale* (PAINAD). **Background.** Dementia patients have difficulty articulating pain due to cognitive deficits in communication, sensation, and overall physical decline from the aging and disease process. Patients with dementia are considered at-risk for uncontrolled pain due to under-assessment, or untreated pain. Current research notes gaps in pain assessment among nurses due to knowledge deficits and attitudes on pain assessment for dementia patients. **Methods.** A before and after project design with pre-test/post-test measurements was used to determine whether providing EBP training on utilizing the PAINAD Scale for pain assessment increased hospice nurses' knowledge and improved attitudes on pain assessment in dementia patients. A total of 44 nurses participated in the EBP training program. **Results.** Comparison of pretest-posttest training measures demonstrated a statistically significant improvement in nurses' attitudes following the completion of the training program with $t = -7.69$ and $p = 0.00$. Hospice nurses' knowledge gains were not statistically significant with $t = -1.10$ and $p = 0.280$ overall, but when the data were evaluated based on nurse level of education, there was significance with $t = -3.21$ and $p = .003$. **Conclusion.** Although gains in knowledge were not attained, changes in attitude should enhance nurse ability and willingness to assess and manage pain in dementia patients.

Resnick Auditorium

Enhancing Student Learning Through the Tenets of Cultural Competence, Social Justice, and Civic Responsibility

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Introduction. An increase in racial and ethnic diversity among US colleges requires multicultural competence. However, there remains a gap in cultural awareness among college students and faculty. A lack of multicultural sensitivity impedes collaborative student learning. A successful learning environment may be achieved by promoting the concepts of civic responsibility and social justice to enhance multicultural awareness. **Purpose.** To examine the barriers to successful learning in a multicultural collegiate setting. Also, to explore ways civic responsibility and social justice can enhance intercultural competencies. **Methods.** Articles were searched between 2014 and 2019 in CINAHL Complete and PubMed. Articles related to multicultural awareness, civic responsibility, and social justice. **Results.** A total of 6 articles were included in this review. Most of the articles (5) were from the United States. Three themes from the articles include: (1) the influence of an organization's environment such as tolerance and sensitivity to cultural competence; (2) awareness of social determinants like access to health care, public safety, and availability of resources; (3) promoting social justice and respecting human rights and preserving human dignity. **Conclusion.** A college-wide program that promotes multicultural competence, civic responsibility, and social justice can lead to a successful, student-centered Enhancing learning environment.

The Effects of Fit 5 and Rosen Therapeutic Garden Program as Health Interventions for Adults with Intellectual Disabilities: Study Protocol for a Randomized Controlled Trial

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Objective. To test the effects of a multi-component program using the Special Olympics (SO) Fit 5 Program (physical activity, diet, hydration education), versus Rosen Garden Program on cardiovascular disease (CVD) risk factors in adults with intellectual disabilities (ID). **Background.** Adults with ID have high prevalence of CVD risk factors. Behavioral health interventions designed to address CVD risk factors (blood pressure, weight, fruit and vegetable consumption, activity) on adults with ID remain limited. **Methods.** A three-arm, randomized, clustered, control pilot study using: (1) SO Fit 5 Program, (2) Rosen Garden Program, and (3) combined Fit 5 and Rosen Garden Programs. Participants were recruited from adult centers, and randomly assigned to the intervention. Assessments performed at baseline, five-week, ten-week, and three months after the intervention. Analyses included independent t-test, chi-square, and mixed linear regression modeling to test the effects of the interventions while adjusting for clustering effect. Covariances such as gender, race, and ethnicity were also included in the analysis. **Discussion.** Results of this study to generate valuable information on the effects of two separate or combined strategies to decrease CVD risk factors in adults with ID. Results of this study will also increase our understanding of the effectiveness of the Fit 5 and Rosen Garden Program as healthy lifestyle strategies implemented in centers for adults with ID.

Power/Load Margin and Persistence in Learning

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Objective. To discover non-academic factors related to student success and persistence in health professions education. **Background.** Howard McClucky developed his Power Load Margin theory to be used for studying, developing, and building realistic educational courses for adult students (Hiemstra, 1981). The formula, which states that the key components of adulthood are load (the demands made upon the individual by self and society) and power (a combination of interacting factors that the individual possesses to sustain the load) is grounded in biological, psychological, and sociological responses. **Discussion.** Many colleges and universities teaching in the health professions find that admitted students who struggle or fail academically do so not because they were unprepared or intellectually lacking, but rather that outside forces increase their load past the point they can cope with the additional stresses of studying. The outside forces can take many forms: a failed romantic relationship, ill health or death of a family member, ill health of oneself. **Method.** Before appropriate measures can be taken to assist the at-risk student, some means of discovering what stressors the student is experiencing. The stressed student may be reluctant or even unable to articulate the difficulties they are struggling with. A self-assessment tool such as the Power Load Margin Indicator is a good first step to identify student stressors and strengths.

An Improved Method for Minimizing Impact of Publication Bias and Study Heterogeneity in Meta-Analysis

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Objective. To develop a novel method to identify and mitigate publication bias (PB) and study heterogeneity (SH) in meta-analysis (MA). **Background.** MA is the preferred method to combine and analyze results of multiple studies to achieve an estimate of effect size. MA is subject to PB and SH which can negatively impact effect size. Methods to address PB and SH include graphical examination of funnel plots for symmetry and sensitivity analyses. **Methods.** A funnel plot is a plot of intervention effect of individual studies plotted against variance effect size. We modified traditional funnel plot analysis with a procedure from regression called reverse-stepping covariate selection. MA is conducted with all selected studies, the overall odds ratio (OR) estimate and the individual study ORs are then plotted. The plot is inspected, and the individual study whose confidence interval (CI) does not overlap the overall OR and CI are eligible for removal. If more than 1 study meets criteria, the study whose OR point estimate has the largest difference from the overall OR is selected for removal. Upon removal, MA is re-conducted, a second funnel plot is generated, and the process continues until the individual study's OR CI overlap with the combined OR CI. Successful reduction of PB and SH was evaluated with I^2 statistic. **Results.** Funnel plot analysis successfully reduced PB and SH from an I^2 of 90% to an I^2 of 40%. **Conclusion.** Meta-analysis PB and SH can be reduced by graphical funnel plot method incorporating individual study confidence intervals.

Use of a Tracking Application to Document Student Participation in Professional Co-Curricular Learning Experiences

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Objective. To capture student participation and evaluation in a co-curricular program using an electronic platform. **Background.** Accreditation standards for Colleges of Pharmacy require the development of a co-curriculum and assessment of its impact. **Methods.** A list of desired community and campus experiences was developed based upon 5 domains (Professionalism, Leadership, Innovation/Entrepreneurship, Self-Awareness and University Stewardship). Students were expected to complete a total of 6 experiences per semester with 3 required and 3 elective experiences.

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Documentation of experiences was captured using a locally developed online software ($events_{RX}$) with an application for mobile devices. Experiences were approved by student services through $events_{RX}$. A code was generated for each event and entered by a designated college representative to confirm student attendance. Students immediately reflected on the value of the activity using their mobile device. Event data was automatically uploaded into the student's electronic portfolio ($folio_{RX}$). Collected data was reviewed at the end of each semester. **Results.** 250 first year students entered a total of 3900 experiences (15.6/student) distributed as Professionalism-2063, leadership-336, Innovation/Entrepreneurship-115, Self-Awareness-674 and University Stewardship-712. Students found the experience to be extremely useful (168), very useful (17), useful (13) and minimally useful (4). **Conclusion.** Co-curricular events were well attended by P1 students who felt the events were useful for professional growth. $events_{RX}$ is very efficient in documenting student experiences. Expansion of the program to an interprofessional focus is desired. **Grants.** None.

Steele Auditorium

Combination Therapies Enhance Immunoregulatory Properties of MIAMI cells

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Background. Mesenchymal stromal cells (MSCs), adult stromal cells most commonly isolated from bone marrow (BM), are being increasingly utilized in various therapeutic applications including tissue repair via immunomodulation, which is recognized as one of their most relevant mechanism of action. The promise of MSC-based therapies is somewhat hindered by their apparent modest clinical benefits; highlighting the need for approaches that would increase the efficacy of such therapies. Manipulation of cellular stress-response mechanism(s) such as autophagy, a catabolic stress-response mechanism, with small molecules prior to or during MSC injection could improve MSCs' therapeutic efficacy. Unfortunately, limited information exists on how manipulation of autophagy affects MSCs' response to inflammation and subsequent immunoregulatory properties. **Methods.** In this study, we exposed BM-MSC precursor cells, "marrow-isolated adult multilineage inducible" (MIAMI) cells, to autophagy modulators tamoxifen (TX) or chloroquine (CQ), together with IFN-g. Exposed cells then underwent RNA sequencing (RNAseq) to determine the effects of TX or CQ co-treatments on cellular response to IFN-**g** at a molecular level. Furthermore, we evaluated their immunoregulatory capacity using activated CD4+ T cells by analysing T cell activation marker CD25 and the percentage of proliferating T cells after co-culturing the cells with MIAMI cells treated or not with TX or CQ. **Results.** RNAseq data indicate that the co-treatments alter both mRNA and protein levels of key genes responsible for MSCs' immune-regulatory properties. Interestingly, TX and CQ also altered some of the microRNAs targeting such key genes. In addition, while IFN-g treatment alone increased the surface expression of PD-L1 and secretion of IDO, this increase was further enhanced with TX. An improvement in MIAMI cells' ability to decrease the activation and proliferation of T cells was also observed with TX, and to a lesser extent, CQ co-treatments. **Conclusion.** Altogether, this work suggests that both TX and CQ have a potential to enhance MIAMI cells' immunoregulatory properties. However, this enhancement is more pronounced with TX co-treatment. **Grants.** This research was supported, in part, by funding from Nova Southeastern University provided to The Cell Therapy Institute, by a President's Faculty Research and Development Grant and by NIH 1R15GM128189-01 to V.B.

Discovery of Novel Targets for Melanoma Drug Discovery

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Objective. To identify target(s) and mechanism of action of novel anti-melanoma lead 2155-14. **Background.** Despite recent advances in melanoma drug discovery, the average overall survival of patients with late stage metastatic melanoma is approximately 3 years, suggesting a need for approaches that identify new melanoma targets. **Methods.** We utilized biotinylated analog of 2155-14 to pull down its targets from melanoma cells. Proteomics in combination with western blot were used to identify the targets. Mechanism of action of 2155-14 was determined using flow cytometry, RT-PCR, microscopy, western blot, and enzymatic activity assays. **Results.** We identified ATP-dependent RNA helicase DDX1 and heterogeneous nuclear ribonucleoproteins (hnRNPs) H1, H2 and A2/B1 as targets of anti-melanoma compound 2155-14. To the best of our knowledge, this is a first report suggesting that these proteins could be targeted for melanoma therapy. Mechanistic investigations showed that 2155-14 induces ER stress leading to potentiation of basal autophagy resulting in melanoma cell death in BRAF and NRAS mutated melanoma cells. **Conclusion.** Identification of mode of action of 2155-14 may provide insight into novel therapies against a broad range of melanoma subtypes**.** These studies were enabled by the novel probe derived from a mixture-based library, an important class of chemical biology tools for discovering novel targets. **Grants.** Auburn University Harrison School of Pharmacy Faculty start-up funds. TPIMS Faculty start-up funds. Auburn University Intramural Grant Program from Office of Vice President for Research. "Target Identification of Novel Anti-Melanoma Compounds". Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida.

Steele Auditorium

Dwindling Effects of Cytosolic and Nuclear Methionine Pools on Prostate, Ovarian and Pancreatic Cancer Cell Metabolism

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Objective. The effects of methionine gamma lyase-deaminase (Mgld) on cancer cells. **Background.** Methionine is a key nutrient required for various metabolic processes. In cytoplasm, methionine is often the first residue that is incorporated into proteins during synthesis. In cytosol, methionine is also activated into S-adenosylmethionine (SAM). SAM is the universal methyl group donor. There are many compounds that are either N or O methylated. Thus, altering the cytosolic methionine pool would result in various consequences that are expected to alter the cancer cells. In the nucleus, methylation of DNA promoter CpG islands suppresses the gene expression. Likewise, histone protein methylation results in heterochromatin formation causing gene suppression. Poor hnRNA-5'G-cap methylation results in destabilized RNA that are prone to degradation. In bacteria, free methionine is degraded by Mgld into methylthiol and the deaminated product a-ketobutyrate (a-KB). a-KB is a key nutrient that is metabolized by bacteria for energy purposes. Mgld is absent in humans. Therefore, methionine cannot be used for energy purposes in humans. **Methods.** In our lab, methionine levels are made lower in cells by transfecting plasmid vector that expresses the bacterial Mgld gene either in the cytosol or nucleus. The effects of cytosolic Mgld and nuclear Mgld were assessed and compared with the control non-transfected cell. **Result.** Our results show that there are differences in cancer cell metabolism due to either cytosolic or nuclear methionine deprivation. **Conclusion.** Methionine deprivation induced cytosolic and nuclear metabolism of prostate, ovarian and pancreatic cancer cells are different and the comparative analysis will be discussed. **Grants.** Supported by NSU HPD.

Nutrient Deprivation and Growth of Cancer Cells Under Normoxia and Hypoxia

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Objective. To study the effects of nutrient deprivation under normoxic and hypoxic conditions. **Background.** Essential Nutrient Amino acid such as methionine is very essential during growth and cell division of normal cells. Normal cell growth and cell divisions are highly regulated process that results in whole body tissues and organs of the human body. In contrast, cancer cells are dysregulated on their growth and cell division process due to any number of mutations that could affect the normal growth and developments. This makes it a challenge for universal targeted therapy for cancers. In other words, each cancer cell line developed from various cancer patients behave differently under in vitro conditions. This attests the fact that each cancer is unique and the patient's treatment customized. Often the cancer that must have developed for example in colon would have metastasized into lung and the cancer cell isolated from the lungs of the patient exhibit features of both tissues in this case, colon and lung. **Methods.** Various Cancer cell lines are being grown in cell culture media under normal and nutrient deprived conditions in either normoxic or hypoxic conditions. **Results.** Nutrient deprivation affects the growth of the cells at varying degrees under normoxia. **Conclusion.** We hypothesize that the process of metastasis and its maintenance in its new niche requires vascularization and normoxia. Under hypoxic conditions, the process of metastasis and the prolonged sustenance of the cells are affected. **Future Directions.** Our ultimate goal is to find a common target for various cancer cell therapies. **Grants.** The study will be funded by HPD Research Grant.

Comparison of Alveolar Macrophage Populations in Fatal Asthma Subjects and Controls

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Objective. Determine the macrophage populations in alveoli of fatal asthmatics and controls. **Background.** We hypothesize that macrophage number would differ in healthy and asthmatic subjects. **Methods.** Stratified, random samples of lung parenchyma were examined and macrophage number was determined. (20 high mag fields/subject). Macrophage counts were expressed as number per mm^2. **Results.** In fatal asthma lungs (12), there was a considerable variation of macrophage numbers averaging 49.14 ±29.82 STD v.s. 5.16 ±2.91 STD / mm^2 in (6) non-asthmatics ($P<0.05$). **Discussion.** Detailed examination of the lung in this study revealed a confounding variation of morphological changes, from hyperemia, edema, atelectasis to hemorrhage. These represent the compartmentalized and extreme variation of the pathological severity. Although the classical involvement of granulocytes and lymphocytes in asthma pathogenesis is relatively well established, there is a staggering heterogeneity of asthma signs and responses to treatments. As lung parenchyma is challenged, the resulting debris increases with each asthma episode, the immigrating macrophages increase in numbers, indicating their participation in asthma pathogenesis. **Conclusion.** The future exploration of macrophage abundance, activation and suppression will yield a fertile ground in elucidating the specific clinical and inflammatory asthma varieties and improve their diagnosis and focused treatment. **Grant.** NSU Faculty Research Grant.

Poster Presentations

Effect of Silver Diamine Fluoride on *Candida Albicans* – Associated with Early Childhood Caries

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Objective. This study was conducted to determine the effect of SDF on the growth of *Candida albicans (C.albicans).* **Background.** It is well established that Silver Diamine Fluoride (SDF), a recently FDA-approved preventive agent for dental caries, exhibits a robust antibacterial effect on *S.mutans*. Although early childhood caries (ECC) affects children in socially disadvantaged populations, there is no cost-effective prevention strategy. Very interestingly, *C.albicans* has been implicated as one of the major contributing factors for the high prevalence of ECC. However, it remains elusive if SDF can also mediate an anti-fungal effect on *C.albicans*. **Methods.** SDF (38%) was applied to the paper disc placed on *C.albicans* cultured on the Mueller-Hinton agar plate (1×105/plate or 1×106/plate) by comparison to Fluoride varnish (5%), Fluconazole (25 µg/ml, positive control) and phosphate buffered saline (PBS: negative control). After incubation at 37°C in aerobic condition for 24 hours, the diameter of the inhibition zone around each disc was measured with a digital caliper. The experiment was performed in quadruplicates and repeated three times. A general linear model (ANOVA) with robust standard errors followed by Tukey's HSD test was employed for statistical analysis. **Results**. SDF (38%) demonstrated a significantly higher inhibitory effect (*C.albicans* growth compared to Fluconazole.) However, fluoride varnish or PBS showed no inhibitory effect on the growth of *C.albicans.* **Conclusions.** This research, for the first time, showed the inhibitory effect of SDF on *C.albicans* growth, suggesting that SDF can not only suppress *S.mutans*, but also inhibit *C.albicans*, in arresting ECC. **Grants.** This study was funded by NSU HPD grant.

Analyses of Extracellular ATP Present in GCF of the Patients with Periodontitis

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Objective. Endogenously released damage-associated molecular patterns (DAMPs) can initiate sterile inflammatory response. As one of DAMPs, extracellular adenosine triphosphate (exATP) is released from damaged cells and elicits inflammatory responses. However, in the context of periodontitis, the expression and role of exATP remain unclear. The purpose of this study was to monitor the levels of exATP in gingival crevice fluid (GCF) isolated from patients with periodontitis, and to determine the effects exATP on productions of IL-1β from epithelial cells and lymphocytes *in vitro*. **Methods.** GCF was collected from healthy and diseased sites of patients with periodontitis (n=10) to investigate the levels of exATP and IL-1β using bioluminescence ATP assay and ELISA, respectively. Monocytes and neutrophils that were freshly isolated from peripheral blood of healthy subjects and gingival epithelial cell line (OBA9) were stimulated *in vitro* with E. coli LPS or BzATP (modified ATP with extended half-life) to evaluate the productions of exATP and IL-1β. **Results.** The levels of exATP and IL-1β in the GCF collected from diseased site were significantly higher than those detected in healthy sites ($P<0.05$). There was also a significant positive correlation between exATP and IL-1β detected in GCF ($r=0.568$, $P<0.05$). The level of exATP in saliva was remarkably lower than GCF isolated from healthy sites. In contrast to stable ATP resolved in PBS, exATP present in GCF drastically diminished within one hour, suggesting a possible mechanism that degrades exATP in GCF. In response to *in vitro* stimulation with LPS, monocytes, neutrophils and epithelial cells released exATP. BzATP induced the production of IL-1β from monocytes and neutrophils, but not epithelial cells. **Conclusion.** Results suggest that ATP may represent a novel proinflammatory biomarker. Further studies are required to evaluate the pathophysiological role of ATP in periodontitis, which may lead to the development of a novel anti-inflammatory approach for periodontitis.

Transitioning Children with Autism from Individualized Dental Care to Traditional Dental Settings

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Objectives. The objective of this study is to examine characteristics associated with the retention of patients at Nova Southeastern University (NSU) dental clinics. **Background.** Although children with Autism Spectrum Disorder (ASD) develop strong bonds with their pediatric dental provider, as they age, transition to other providers is necessary. Low rates of successful transition, coupled with the need for long term care, highlights the importance of understanding the transition process. **Methods.** A retrospective chart review of patients with an ASD diagnosis was conducted. Data such as demographics, insurance status, and household income were collected. A logistic regression analysis was conducted to examine patient factors associated with transition to an NSU clinic. **Results.** Data were collected for 101 children (89.1% male & 10.9% female) required to transition between 2015-2019; Medicaid was the most frequently reported insurance type (68%). In terms of transitions, 42% of patients transitioned to an NSU clinic, 5.9% sought care privately, and the remaining were lost to follow up. Regression analysis indicated that insurance type was significantly associated with transition to NSU. Children with Medicaid were 7 times more likely to transition to an NSU clinic than to seek private care (OR = 7.156; [CI: 2.931, 17.472]; p=0.000). **Conclusion.** Results demonstrate that insurance may play a major role in a family's decision to seek care at a facility. Since many studies have shown that Medicaid acceptance is low among private dental care providers, these findings suggest that this may be a major barrier in finding facilities to transition children with ASD. **Grants.** Funded by Nova Southeastern University, College of Dental Medicine, Health Professions Division and the Health Resources and Services Administration Grant Number D88HP20126.

Inclusion of an Outer Sphere Effect in Solvent Proton Relaxation Enhancement Studies of the Enzyme Myeloperoxidase

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Objective. This study was conducted in order to estimate the contribution of outer sphere effects on the solvent proton paramagnetic relaxation enhancement rates in solutions of the enzyme myeloperoxidase. The purpose of this is to ultimately better understand the dynamics of small molecules that participate in reactions of myeloperoxidase. **Background.** Myeloperoxidase normally found in neutrophils, is well known for its protective antibacterial and cytotoxic effects. However, it is now known that this enzyme also plays important roles in more than 20 different diseases. In previous studies it was assumed that the paramagnetic relaxation enhancement effects on the solvent protons in solutions of myeloperoxidase were caused only by exchange of solvent protons with binding sites near the paramagnetic heme iron. In the cases of some other hemeproteins arguments have been presented in the literature that an outer sphere effect caused by solvent protons just passing near, but outside the heme site might be significant. Making a theoretical estimate of this effect can be very problematic. For that reason, an empirical approach has been used here to estimate this effect. **Methods.** In order to estimate this effect, a complex was made with the enzyme that is known to block the access channel to the heme iron without changing the iron spin state. Proton relaxation enhancement was measured. **Conclusion.** The outer sphere effect is a major contributor to the paramagnetic relaxation enhancement. **Grants.** The author acknowledges previous HPD Grant support for the study.

Optimization of Nanoparticle Gene Therapy for Stem Cells Using Cell Penetrating Peptides

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Objective. This study was conducted to determine the optimum gene therapy delivery platform for primary human mesenchymal stem cells (hMSC) using cell penetrating peptide (CPP) coated fluorescent nanoparticle quantum dots (QD). **Background**. Earlier research has shown that CPP loaded QDs can effectively transfect human cells. This technology allows for the development of transfection platforms for the delivery of gene therapy molecules directly into human cells of interest. hMSCs are primary cells which are notoriously difficult to transfect but which have great therapeutic potential as bioreactor therapeutic cells. The CPP-QD platform can be optimized for gene transfection of hMSC, to achieve this goal. **Results**. The lower the loading level of targeting CPPs versus control peptides (10% versus 90%) as well as the identity of the targeting peptide (hCT versus CPMLKE) showed differences in cell uptake

in hMSCs, as quantified by fluorescent intensity, and also affected the efficacy of therapeutic delivery of the cargo DNA, as quantified by observed expression of the delivered red fluorescent protein gene under fluorescent microscopy. **Conclusion**. The peptide identity and ratio of loading onto the QD nanoparticle determines the efficacy of therapeutic DNA delivery into hMSCs. **Grants**. This study was partially funded by a grant from the NSU President's Faculty Research Development Grant.

Increased Whole Cell Conductance and Sodium Selectivity in Xenopus Oocytes Incubated with Exogenous Lentivirus Lytic Peptide 1 (LLP-1) Domain of the HIV-1 gp41 Protein

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Objective. This study was conducted to determine if the LLP-1 domain of the HIV gp41 protein increased whole cell conductance of *Xenopus laevis* oocytes and determine which ion(s) are responsible for the increased conductance. **Background.** Many attempts have been made to explain the "balloon degeneration" of HIV infected cells observed in culture. The LLP-1 domain of the cytoplasmic tail of gp41 models to form an amphipathic α-helix. Previous work show exogenous LLP-1 peptides form an α-helical structure in the presence of lipids and can disrupt large unilamellar vesicles (LUVs). **Methods.** For this study, *Xenopus laevis* oocytes were incubated with exogenous LLP-1 peptides, then whole cell conductances were measured by two electrode, whole-cell voltage clamping in a continuously circulating medium. Medium that lacked one of Na^+, K^+, Cl^-, or H^+ could be substituted to determine each ion's contribution to the increased conductance observed. **Results.** 25 and 75μM concentrations of peptide increased whole cell conductances and shifted reversal potentials of resting membranes to more positive resting potentials. Removing Na^+ from the medium decreased whole cell conductance and made resting membrane potentials more negative. **Conclusion.** LLP-1 peptides may act as a pore to allow increased Na^+ across the membrane.

Potential Impacts of Sargassum Blooms on Resident Mobile Fauna

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Objective. This study was conducted to examine effects of sargassum blooms on the resident mobile fauna. **Background**. Pelagic forms of the brown algae (Phaeophyceae) Sargassum spp. form large mats over areas of open ocean and constitute an important habitat, harboring a diverse array of marine life. The Sargassum species S. Fluitans and S. Natans provide a nutrient rich environment, exploited by juvenile forms of economically and recreationally important fish species. Since 2011 massive sargassum blooms have occurred, resulting in large mats blanketing areas of the Caribbean sea, Gulf of Mexico and the Atlantic ocean. In 2019, the bloom reached proportions equal to or greater than prior years. These patterns are expected to continue due to climate change, deforestation, and other causes. **Methods**. Sargassum clumps of equal displacement volume were collected from May 2019 through August 2019 using established methods at nearshore, intermediate, and offshore locations. Samples were divided by Sargassum species, and mobile fauna were identified, categorized, and then released. **Results**. Reductions in both numbers of a given species and species diversity were observed as compared to prior studies. This trend continued into the late summer months. **Conclusions.** Although further studies are required, these preliminary findings suggest a trend that may have far reaching impacts on important fish species, and the pelagic environment.

Atypical PKC (aPKC): A Novel Therapeutic Target for Treatment of Inflammatory Bowel Disease

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Objective. The goal of our research is to unravel the pathophysiological mechanisms that underlie the development of Inflammatory Bowel Disease (IBD). **Background**. It is widely accepted that the loss of integrity of intestinal barrier is the major factor that perpetuates the disease, facilitating the diffusion of pro-inflammatory molecules into the body's fluids. We study the cellular signaling proteins that set and control the permeability of the intestinal epithelium, in

particular the atypical protein kinase C (aPKC). Our previous results have confirmed an essential anti-inflammatory role of this molecule. The normal expression of aPKC is destabilized under pro-inflammatory conditions, as indicated by decrease of aPKC in biopsy samples from IBD patients. We have shown before that reduction of aPKC levels observed in inflamed intestine is mediated by a member of Bag1 protein family Bag-1M. Our central hypothesis is that inhibition of Bag-1M interaction with intermediate filaments-based Hsp70 chaperoning machinery will restore physiological levels of aPKC. **Methods**. We have developed a decoy synthetic N-terminal Bag-1M domain peptide (K-Bag peptide), which interferes with Bag-1M binding to intermediate filaments. We have administered this peptide to the cultured intestinal epithelial cells to test its effect on aPKC expression. **Results**. The data we acquired demonstrate that Bag1-M inhibition results in reduction of expression of pro-inflammatory cytokines and restores the normal levels of aPKC. **Conclusion**. Bag1-M inhibition has a potential to reduce intestinal inflammation and is indeed the promising starting point to design a novel pharmacological intervention. **Grants**. This work is supported by PFRDG awarded to AM.

Yeast in Space: An Overview of the Effects of Microgravity on Saccharomyces Cerevisiae

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Objective. This study was conducted to examine the effects of the microgravity of space on yeast growth, cell cycle, and gene expression. **Background**. Earlier studies show that the microgravity of space has profound effects on the growth of yeast and in their gene expression. In addition to the microgravity of space, other methods of simulating microgravity also have effects on yeast. **Methods**. For this study, the yeast Saccharomyces cerevisiae was grown under microgravity conditions using the true microgravity of space, a rotating wall vessel with shear stress offset for gravity, Ficoll with buoyancy as an offset for gravity, and magnetic levitation as an offset for gravity. The yeast were grown under each condition, then fixed using ethanol for later analysis by flow cytometry, optical density growth measurements, and gene expression studies with PCR. **Results**. Yeast exhibited differential gene expression, cell cycle patterns, and growth patterns under the various microgravity conditions. Spaceflight studies yielded a decrease in gene expression of SSA4 (35%) and YILO52C (45%), both important to the yeast stress response. **Conclusion**: With this study, we found stimulus specific, dose dependent, and synergistic effects of independent physical forces in Saccharomyces cerevisiae. **Grants**. This study was partially funded by LaSPACE and the Department of Veterans Affairs.

Effect of Isaxonine on Microtubule Dynamics

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Objective. This study was undertaken to determine if the neurotropic action of isaxonine is associated with an effect on tubulin-microtubule dynamics. **Background.** Isaxonine (Nerfactor) has been shown to accelerate peripheral nerve regeneration and successfully treat facial palsy and polyneuritis. Although the neurogenic activity of isaxonine has been suggested to be associated with stimulation of cellular microtubule assembly, no direct evidence for this mechanism has been presented. **Methods.** The effect of isaxonine on microtubule dynamics in the presence and absence of guanosine triphosphate (GTP) was examined. **Results.** In the absence of GTP, isaxonine (12.6 mM) was found to stimulate microtubule assembly equal to that of 1 mM GTP. The lowest concentration of isaxonine with measurable stimulatory activity on microtubule assembly was 2.1 mM. The effect of isaxonine (12.6 mM) on microtubule assembly was found to additive to that of GTP at optimal concentration (1.0 mM). In addition, isaxonine was shown to increase the rate of microtubule formation and stimulate microtubule formation at 4°C. Isaxonine was also shown to allosterically enhance [^{3}H]-GTP binding to the exchangeable nucleotide binding site (E-site) of tubulin. Removal of the E-site nucleotide with alkaline phosphatase enhanced the microtubule stimulatory properties of isaxonine. **Conclusion.** Isaxonine is capable of stimulating microtubule assembly in the absence of GTP and stabilizing formed microtubules against cold-induced disassembly. Together with previous findings, these results further implicate that isaxonine's action on the nerve fiber is at the microtubule level. **Grants.** This work was supported by NIH Grant RR03020 (RCMI) and NIH/MBRS/DRR Grant RR08111.

Assessment of Reading Function in Low Vision Using Traditional and Digital MNRead Charts

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Objective. This study was conducted to assess reading function in low vision patient using traditional printed and digital MNREad charts. Additionally, comparability of printed and digital MNRead charts was evaluated. **Background.** The use of traditional printed MNRead chart for assessment of reading function has been evaluated and validated in multiple studies for normally sighted and low vision patients. More studies are needed to validate the digital iPad version of MNRead chart. **Methods.** For this study, we used traditional and digital iPad-based MNRead charts to assess reading function in low vision patient using vision assistive device (VAD) for reading. We assessed and analyzed the comparability of plate-based traditional MNRead chart and digital version of MNRead chart for the evaluation of low vision patient's reading performance. Four parameters of reading performance with and without vision assistive device were measured, including maximum reading speed, critical print size, reading acuity, and reading accessibility index. **Results.** We found that without VAD, maximum reading speed was higher for larger print size (logMAR 1.3 and 1.2) with conventional chart than with the digital chart, critical print size was about the same, and reading acuity was better with iPad MNREAD. The reason for the increased maximum reading speed with larger size print was that the minimum built-in magnification of VAD made large size print too large to fit into the device screen which caused the patient to take more time to view the text, thus, reducing maximum reading speed. On the other hand, better reading acuity on digital MNREAD could be attributed to higher contrast of iPad chart as compared to the conventional chart. We also found that critical print size measurement with and without VAD were about the same with both types of MNREAD charts which suggests both charts are equally reliable and valid for estimating critical print size. Additionally, our comparative analysis showed that reading acuity with the VAD was better when tested with conventional MNREAD chart (logMAR -0.2) than with the digital MNREAD version (logMAR 0.15). This discrepancy is explained by the resolution limitation and smallest available size on digital MNREAD chart. Specifically, the smallest available print size on conventional chart is-0.5 logMAR (20/6.3 Snellen equivalent) while it is -0.1 logMAR (20/16 Snellen equivalent) on the digital chart. **Conclusion.** Digital iPad-based MNRead chart is comparable to traditional MNRead chart for assessment of reading function in low vision patients using vision assistive devices. iPad resolution and screen size limitations account for differences in estimating reading acuity and maximum reading speed with the conventional and digital chart versions.

New Gene Therapy Treatment for Retinitis Pigmentosa

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Objective: This study was conducted to educate health care professionals on Luxturna (Voretigene neparvovec), a novel FDA approved gene therapy for retinitis pigmentosa, and on identifying and testing procedure for potential candidates for the gene therapy. **Background.** The most common hereditary condition that leads to low vision is Retinitis Pigmentosa (RP). Low vision patients have a significantly decreased quality of life and ability to perform daily life activities. Low vision is the leading cause of disability in the U.S. that affects 3.8 million people. On December 19, 2017, FDA approved Luxturna **(**Voretigene neparvovec), a new gene therapy intraocular injection, developed by Spark Therapeutics and Children's Hospital, Philadelphia. Luxturna is indicated for treatment of retinal dystrophy due to biallelic mutation of gene coding for RPE65 (retinal pigment epithelial 65kDa protein). **Methods.** For this study, we reviewed FDA Luxturna Clinical Memorandum and Luxturna Phase 1, 2, and 3 clinical trials that will be discussed. We followed with Spark Therapeutic representative on procedure for testing candidates for treatment and obtained Spark Therapeutics testing kits. We discuss Luxturna indications, mechanism of action, dosing and administration, safety and adverse effects, clinical trials, testing kits, patient testing procedure, patient selection criteria, and patient and provider resources. **Conclusion.** Luxturna is a novel FDA approved gene therapy for retinitis pigmentosa. Health care professionals should be familiar with testing procedure, candidate identification, and pharmacology of Luxturna (Voretigene neparvovec).

Review of New Low Vision Technology for Eye Care Professionals

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Objective: This study was conducted to review and educate eye care professionals about new advances in low vision technology for management visually impaired patients. **Background.** Low vision is the leading cause of disability in the U.S. that affects 3.8 million people. Low vision patients have a significantly decreased quality of life and ability to perform daily life activities. The leading causes of vision impairment in the U.S. include AMD, cataracts, and glaucoma. New advances in low vision technology improve mobility, safety, ability to perform daily life activities

and overall quality of life of visually impaired patients. Eye care physicians should be up to date with the new developments in low vision technology to provide quality care to visually impaired patients. **Methods.** For this study, we reviewed novel low vision devices in the following categories: orientation and mobility, wearable electronic magnification, and optical character recognition. Features, advantages, disadvantages, cost, appropriate use, prescribing and fitting recommendations for the said devices will be discussed. **Results.** We found that new low vision technology improves patients' mobility, safety, independence, ability to perform daily life activities, and overall quality of life. Novel orientation and mobility technology includes Sunu Band, a sonar wrist band to be used with white cane, and AIRA, wearable smart glasses with real-time life navigation support platform. Sunu Band and AIRA improve patients' safety, mobility, and independence. Jordy and ESight are electronic wearable technology magnification devices for distance, intermediate, and near that improve patients' reading function, distance identification, ability to perform activities of daily living. Optical character recognition (OCR) technology is life-changing technology for patient with severe visual impairment and visual acuity of hand motion/light perception. OCR device, OrCam, transmits information as text and speaks to patient via ear conduction device, thus, enabling patients to read printed materials as well as signage. **Conclusion.** Optometrists and other health care professionals should be familiar with new low vision technology for mobility, orientation, electronic magnification, and optical character recognition. New low vision devices improve safety, mobility, ability to perform daily life activities, and overall quality of life in visually impaired patients.

Pre-perimetric OCT Indicators of Progression in Early Glaucoma

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Objective. To document two cases exhibiting optical coherence tomography (OCT) progressive retinal nerve fiber layer (RNFL) loss without Humphrey's visual field (HVF) loss or progression. To highlight estimates of RNFL loss (rate of SD-OCT RNFL loss, estimation to conversion to glaucoma). **Background.** (case 1). A 61 year-old female glaucoma suspect demonstrated isolated HVF defects without progression. OCT showed RNFL OU progressive trend, (case 2) a 67 year old female using Lumigan for diagnosed glaucoma. HVF was normal OD with stable inferior arcuate defects OS. SDOCT showed a RNFL and GCC OU progressive trend from baseline. **Results.** (case 1). The calculated rate of AVG RNFL loss were 1.63 and 1.4 um/year (rate of change in average RNFLT -0.41 ± 0.47 um/yr in non-progressors[1], mean global change -0.82 um/yr in non-converters to glaucoma[2], mean RNFL loss 0.90 um/yr in non-progresors[3]. The estimated years to glaucoma conversion was 5 and 6 years OD and OS respectively. Treatment was initiated, (case 2) the calculated rate of AVG RNFL loss was similar following treatment as documented for non-progressors[3], 0.80 and 0.54 um/year OD and OS respectively. No additional medications were indicated. **Conclusion**. Although current evidence suggests no preference for structural or functional loss in early glaucoma, cases exhibiting significant rate loss or decrease RNFL should be prudently considered to represent structural progression even if no progression is evident on visual field assessment. Estimation of the rate of progression of RNFL loss associated in progressors vs. non-progressors and the time of conversion to glaucoma may contribute to justify management. **Grants**. N/A.

Quantifiable Correspondence of Onset of RAPD, Visual Field Defects and RNFL Loss in Glaucoma

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Objective. To establish further evidence supporting the relationship of a 0.6 log unit afferent pupillary defect (APD), quantifiable retinal nerve fiber layer thickness (RNFLT) and mean deviation (MD) loss in subjects who have converted to glaucoma. **Background.** Evidence based data suggest that at the point where subjects converted to glaucoma the RNFLT was 75.3 um, 83 um and 87.5 um for the mean, superior and inferior values respectively, relative to the HVF threshold db values. From the mean RNFL normative values this represented approximately 17 %, 27.8%, and 25.8% loss respectively. Relative to the MD the mean RNFLT loss was 76.7 um or 17% loss.The average RNFL thickness in subjects at the time of conversion to glaucomatous HVF was 75.0 or approximately 18% loss. **Results**. A 0.6 log unit RAPD correlates with approximately 17-25% RNFLT loss. From data extrapolation a MD of 7 db corresponds approximately to 75.3 um RNFLT loss in glaucoma subjects. A 0.6 log unit RAPD correlates with a MD of 6 db. **Conclusion.** Evidence based data suggest a quantifiable relationship between RAPD, average RNFL and MD loss

when subjects converted to glaucoma. A lesser RNFL quantifiable loss may correspond to the MD and RAPD if ganglion cell count values and/or RAPD determined by automated pupillometry is taken into account. **Grant.** N/A

The Use of Ancillary Testing in the Diagnosis and Management of Uveitis Due to Malignancy

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Introduction. Multiple myeloma is a hematological malignancy of older adults where there is an abnormal proliferation of plasma cells. Malignant diseases can masquerade as intraocular inflammation and often be misdiagnosed as chronic idiopathic uveitis. Ancillary tests like Spectral Domain Optical Coherence Tomography (SD-OCT) can be utilized to detect signs of intraocular inflammation in the anterior chamber. We report a case of multiple myeloma mimicking a bilateral anterior uveitis. **Case Report.** A 60-year old black female presented with complaints of tearing, mild redness, pain and photophobia OU. PMHx is positive for multiple myeloma. BVA was 20/20 OD, OS. Biomicroscopy revealed trace cells in the anterior chamber OD and 1+ cells in the anterior chamber OS. No cells were visible with SD-OCT in the anterior chamber OD. SD-OCT revealed a couple of cells in the anterior chamber OS. **Discussion.** Due to the typical clinical picture of conjunctival hyperemia with circumlimbal injection and anterior chamber cells, we prescribed anti-inflammatory therapy, but also recommended she consult with her oncologist regarding re-evaluation of her multiple myeloma. **Conclusion.** Ophthalmic involvement associated with multiple myeloma is rare; however, with that, ancillary tests, such as SD-OCT serve as an additional tool in our armamentarium that can be utilized when evaluating and managing cases of intraocular inflammation.

Annual Follow-ups Using Telerehabilitation to Identify and Manage Reductions in Low Vision Patients' Functional Ability to Complete Important Near Tasks

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Objective. To determine if there were any changes in reading ability in visually impaired individuals one year following their device training session, using telerehabilitation involving live video conferencing. **Background.** Many low vision patients fail to return for in-office follow-up visits due to limitations related to transportation or other co-morbidities. A year ago, we used telerehabilitation involving live videoconferencing to provide training in the use of newly dispensed magnification devices for reading to low vision patients at-home, who were evaluated by their optometrist at the Low vision clinic. **Methods**. Three low vision patients who participated in earlier training sessions through the use of live videoconferencing were contacted one year following their training session for a follow-up telerehabilitation session. Rasch analysis of the Activity Inventory questionnaire was conducted to assess changes in difficulty performing reading activities. **Results**. Two patients reported increased difficulty with several reading tasks on the Activity Inventory at the one year follow-up. Both of them had maintained regular visits to their ophthalmologist for treatment over the past year, with no reported change in vision per those visits. Neither scheduled an annual visit with their low vision optometrist, despite increased difficulty with near tasks. Recommendations were made for each patient based on their visual complaints during the telerehabilitation session. **Conclusion.** Telerehabilitation can be used for follow-ups with patients who fail to return for annual in office visits despite increased difficulty with near reading. **Grants**. This study was funded by a grant from the American Academy of Optometry Foundation

Adhesive Properties of Natural Polymers Commonly Used in Oral Dosage Forms

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Objective. Investigate in vitro adhesive properties of natural polymers commonly used in the formulation of mucoadhesive dosage forms. **Background.** Extending the release of a drug can extend its half-life hence its effect and

it can be achieved by increasing retention of the dosage form in the body. Several polymeric excipients are used to increase drug retention in the gastrointestinal tract by adhering to the mucosal membrane. Studying adhesive properties of such polymeric excipients helps optimize adhesion and thus the retention of the drugs. **Methods.** Oral films of sodium alginate, sodium carboxymethylcellulose (CMC) and chitosan at various polymer contents (0.5-3.0%) were prepared by solvent casting method (40°C, 24 hr). Adhesive force was measured using Texture Analyzer (CT3) in compression mode in the presence of artificial saliva (pH6.8). Maximum negative force recorded by the TextureProCT (V1.4) software was reported as the adhesive force. **Results.** CMC showed the highest adhesion while chitosan showed almost no adhesive properties. This could be due to the pH dependent solubility of chitosan as it is only soluble in acidic media. Our results also show lower polymer contents result in increased adhesive forces. This is due to higher saliva/polymer ratio, which results in faster film hydration and subsequently stronger adhesion. This is confirmed by increasing the contact time of the polymer with the substrate when high solid films are used. **Conclusion.** Among tested polymers, CMC showed highest adhesion. Furthermore, the adhesive force increases as the polymer content of the films decreases due to the faster hydration rate. **Grants.** This study was supported by NSU Grant335114.

Development of an In Vitro Adhesion Test to Screen Mucoadhesive Polymeric Drug Carriers Using Texture Analyzer

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Objective. Developing an in vitro adhesion test to evaluate mucoadhesive oral films using texture analyzer. **Background.** Adhesive polymeric excipients are the integral part of many oral and topical dosage forms. These are used to increase retention of the drug at the site of application or in the gastrointestinal tract enhancing drug absorption and half-life. Ex vivo tests on animal tissues are commonly used to characterize mucoadhesion, however it is hard and costly. To differentiate adhesive properties of such polymers in mucoadhesive platforms, a fast-screening in vitro adhesion test is desirable. **Methods.** Commercial oral films were tested using Texture Analyzer CT3-1000g by mounting them on the bottom of the TA10 probe using VHB-double sided acrylic tape. The maximum negative detachment force was recorded against various substrates (agar 5% and filter papers) in the presence of artificial saliva (pH 6.8) in compression mode. The effects of test parameters on the adhesive force were investigated. **Results.** Compared to filter paper, agar did not offer reproducible results. Target force of 100g resulted in adequate contact of samples with substrates. Artificial saliva volume of 200 µl found to sufficiently hydrate (but not to dissolve) the films and express adhesion. Hold time of 15 sec was found desirable as longer hold time resulted in the dissolution of some films and shorter hold time did not provide enough hydration. Test speed of 0.1mm/sec generated more reproducible adhesive forces. **Conclusion.** An in vitro adhesion test was developed and was able to differentiate between various mucoadhesive film platforms. **Grants.** This study was supported by NSU Grant#335114.

The Effect of Polymer Type and Molecular Weight on Mechanical Properties of Oral Films

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Objective. Investigate mechanical attributes of oral films composed of common pharmaceutical polymers affecting their manufacturing. **Background.** Oral is the preferred route of drug administration for its safety and patient compliance. Oral films are relatively new dosage forms with the potentials of replacing tablets and capsules for their ease of production and administration. However, the formulation of oral films is challenging as the selection of the appropriate drug carrier can influence the performance of dosage forms to a great degree. Therefore, selecting the right carrier with adequate mechanical properties is the first step in designing such dosage forms. **Methods.** Oral films of sodium carboxymethylcellulose (CMC) and chitosan at different molecular weights (MW) were prepared by the solvent casting method (1% film solution dried at 40°C, 24 hr). Rupture test was performed on the samples using a Texture Analyzer (CT3-4500) equipped with TA33 probe. Puncture strength (PS) and elongation at break (EB) were calculated for all samples. All measurements were performed in triplicates. **Results.** Chitosan films showed higher PS and EB% values than CMC films at different molecular weights indicating that chitosan films are stronger and more flexible. Compared to commercial oral films, both CMC and chitosan films showed higher PS and EB%. Moreover, the mechanical properties of CMC films were affected by MW (p-value <0.05), while chitosan films prepared at different molecular weights displayed similar properties. **Conclusion.** Mechanical properties of oral films can be tuned

and adjusted using different polymers and polymers possessing different molecular weights. **Grants.** This study was supported by NSU Grant 335114.

A Quantitative Assessment of Health Status of the Arab Descent Community in South Florida

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Objective. This study is aimed to extend our understanding of the health status and related risk factors among Arab descent Americans in South Florida. **Background**. Arab descent Americans constitute a growing and increasingly important segment of American society. Yet there is surprisingly little quantitative research about the health status and related risk factors of this segment of population because the U.S. Census does not collect specific information on this population, and, as a result, we know very little about the basic demographic characteristics of Arab descent Americans. With the current sociopolitical climate, here in the US, it is important to take steps to better understand the stigma associated with this ethnic group and how such discrimination and stereotypes impact one's general health status and health outcomes, such as health services utilization and medication adherence. An understanding of these issues will provide a platform from which necessary steps can be taken to create and implement the needed interventions. **Methods**. This study will use a quantitative survey to explore the health issues affecting this understudied population. A convenience sample of 325 participants will be recruited. Eligible study participants will be invited to participate in an online survey after passing a pre-screening tool. **Results**. Data analysis will include descriptive statistics, factor analysis, and univariate and multivariate linear and logistic regression. Findings from this study will translate into recommendations to public health professionals in regards to health issues affecting this population. **Grants**. This study was funded by a grant from the HPD Research Grants.

Development of the Asthma Medication Therapy Management (MTM) Protocol

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Objective. To describe the process of developing an asthma Medication Therapy Management (MTM) protocol with the aim of improving the clinical and humanistic outcomes of asthmatic patients. **Background.** Asthma is one of the most common chronic diseases which affects approximately 26 million Americans. Achieving a controlled asthma regimen is challenging because ineffective therapy can lead to poor outcomes and serious complications. Pharmacists' involvement in patient care can optimize outcomes and deliver patient-centered care. One of the services known to optimize outcomes for the pharmacist is an MTM program. Despite this, little is known about a standardized model to integrate an MTM pharmacist for the care of asthmatic patients. **Method.** An asthma MTM protocol was established after an intensive literature review. The protocol was developed with the help of the primary investigator, the NSU Pharmacy team, and the MTM ICUBA Cares Call Center using the Global Initiative for Asthma (GINA) 2019 guidelines and retrospective literature. The protocol was approved by the NSU institutional board review as a part of an MTM pilot program for this population. **Result.** The asthma MTM protocol was developed to determine whether the goals of asthma therapy are being achieved and asthma is controlled. The protocol comprised of core elements of MTM, such as performing medication therapy review, providing a personal medication record, completing a medication-related action plan, providing recommendations and/or referral, and scheduling a follow-up visit. **Conclusion.** This paper is the first to describe the process of creating an asthma MTM protocol. It is anticipated that the developed asthma MTM protocol will be utilized to demonstrate that MTM service leads to improvements in the clinical and humanistic outcomes of this population. **Fund.** This program was funded by the HPD Grant.

HDAC Inhibitor SAHA Sensitizes Metformin-Induced Cell Death in A2780 Ovarian Cancer Cells

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Objective. The study was conducted to assess the efficacy of metformin in combination with SAHA in ovarian cancer cell line (A2780). **Background**. Ovarian cancer is the seventh most common cancer among women with the highest mortality rate. The high mortality rate of ovarian cancer is attributed to the fact that most women are diagnosed at an advanced stage with poor survival rate. Recently, many studies have confirmed a profound effect of the known anti-diabetic drug, metformin, on various types of cancer including the ovarian cancer. Our study aims to repurpose metformin, by sensitizing A2780 cells with SAHA (pan-HDAC inhibitor) at lower doses. **Methods.** For this study, MTT assay was conducted with A2780 cells treated with metformin or SAHA, combination of metformin and SAHA at different doses for 24, 48 h. Western Blotting analysis was conducted to assess the protein expression levels of cytochrome C and p21. **Results.** Combination of metformin 0.1mM and SAHA 10 µM was able to significantly reduce cell viability after 48 h compared to metformin and SAHA alone. Moreover, the combination of metformin 0.1mM and SAHA 10 µM demonstrated significant upregulation of cytochrome C and p21 levels comparing to metformin and SAHA alone. **Conclusion**. Our results indicate that the reduction in cell viability, and upregulation of cytochrome C and p21 levels may be due to the sensitizing effect of SAHA to metformin. **Grants**. This study was funded by the Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida.

Deterrent Properties of Thermally-Manipulated High Molecular Weight Poly(ethylene oxide) (HMW PEO)

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Objective. In this study, we aimed to manipulate the pure HMW PEO and the tablets containing HMW PEO to evaluate the structural and functional properties of the PEO and the PEO tablets under abuse conditions. **Background.** In Abuse deterrent formulations (ADFs), the HMW PEO offers extraction resistance properties. They have the potential to decrease opioid abuse by preventing chemical (e.g., drug extraction) tampering. **Methods.** HMW PEO powder (Sentry™ Polyox™ WSR-301, Mw 4,000,000 Da) was spread over a glass plate, and heated in an air-circulated oven at 180°C for 1 hr. A single station compression press tableting machine was used to prepare tablets (200 mg HMW PEO and 300 mg Avicel) using a direct compression method. The tablets were also heated in an air-circulated oven at 180°C for 1 hr. The dissolution study of tablets was done in 0.1% HCl at 25°C. **Results.** The FTIR spectra of the HMW PEO powder treated at 180°C indicated an oxidative degradation at 1720 cm^{-1}. The rheological behavior including viscosity and yield stress of the PEO solutions confirmed a pseudoplastic flow behavior for the controlled solution of HMW PEO, whereas the heat-treated sample showed almost no viscosity when manipulated at 180°C. The dissolution study of cured tablet showed that 36.34±10.28% of drug was released after 1 hr; whereas, 19.19±2.13% of drug was in dissolution medium containing control tablet. This confirms that the oxidized PEO backbone (Due to heat-treating to 180°C) releases the drug faster than PEO chains backbone. **Conclusion.** HMW PEO is extremely sensitive to thermal manipulations. If the dosage forms containing this polymer are thermally manipulated at temperatures as high as its degradation temperature, almost all deterrent features of this polymer will be lost as evidenced by dramatic changes in its structure and flow behavior.

The Impact of Heat on Mechanical and Drug Release Properties of Tablets Containing Low Molecular Weight PEO (LMW PEO)

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Objective. Evaluate crush resistance ability of LMW PEO that is further improved when the products containing PEO are thermally processed. **Background.** PEO may be used in abuse deterrent formulations (ADFs) to decrease opioid

abuse by preventing physical tampering. **Methods.** Tablets prepared using 200 mg LMW PEO, 275 mg Avicel, and 25 mg dextromethorphan HCl. The mechanical strength of the tablets was determined using a ball-mill grinder. Tablets (control and heated) were placed in the mill and subjected to steel balls revolving at full speed at a frequency of 25 Hz for 5 min. Particles were then sieved to determine particle size distribution via sieve analysis. Furthermore, the dissolution study of both control and heat-treated tablets was carried out in 0.1% HCl dissolution medium. **Results.** As it was previously mentioned, the more particles smaller than 500 µm, the less crush resistant tablets are. In control tablets 61.86±11.4% of particles are smaller than 500 µm and this amount decreased to 5.24±5.66 in cured tablets at 80°C (P). **Conclusion.** Tablets containing LMW PEO can offer significant mechanical resistance and tunable drug release if heated at temperatures above the melting point and well below the degradation temperature of the polymer.

Cytotoxicity of Thermally Manipulated Ethylene Oxide Polymers Used in Abuse Deterrent Formulations

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Objective. Evaluate human Gingiva derived stem cells (GMSCs) and Osteoblasts like cells (MG63) cells viability on heat-treated high and low molecular weight PEO films. **Background**. Features like low toxicity, lack of immunogenicity, antigenicity and excellent biocompatibility of PEO make it a preferred polymer in abuse deterrent formulations. However, PEO properties can change at higher temperature of abuse leading to oxidation and potential toxicity that is studied here. **Methods.** LMW (10% solution) and HMW (2% solution) PEO films were prepared by casting their solutions in glass petri-dish. The cells cultured on to a flat bottom 24 well plate with a density at 1X 10^5 were exposed to 60 mg/mL of sterilized PEO samples and allowed to incubate for 24 hours in 37°C. The cytotoxic effect of the PEO was assessed and the viability of the cells was determined by using the commercially available Live/Dead assay kit (Molecular probes Invitrogen detection technologies, Carlsbad, CA) **Results.** Cell viability in the presence of HMW 180°C and HMW 80°C films were compared with PEO control. The cell viability of both GMSCs and MG63 significantly reduced in HMW 180°C, while the cell viability in HMW 80°C was comparable to HMW control. **Conclusion.** Regardless of its molecular weight, PEO can become cytotoxic when heated at above 80°C. This is particularly important as abuse-deterrent tablets containing PEO are generally heated at high temperatures in order to abuse by injection and insufflation.

Sunflower Oil-Based Polyol-Urethane Nanoparticles for Sustained Delivery of Olanzapine

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Objective. A facile route based on cyclic carbonate ring-opening reaction has been utilized to synthesize a bio-based polyol-containing urethane bond [polyol-urethane (POU)] as a nanoparticulate drug delivery system of olanzapine in order to enhance its bioavailability. **Background.** The forefront horizon of biomedical investigations in recent decades is parceling-up and delivery of drugs to achieve controlled/targeted release. In this regard, developing green-based delivery systems for a spatiotemporal controlling therapeutic agent have drawn a lot of attention. **Methods.** The biodegradable and biocompatible hyper-branched POU containing several hydroxyl and urethane bonds, was synthesized via an easy method of cyclic carbonate ring opening reaction followed by ethanol amine addition. After characterization, the nanoparticles were also estimated for in vitro release, toxicity, and pharmacokinetic studies. **Results.** As olanzapine has shown poor bioavailability and permeability in the brain, the sustained release of olanzapine from the designed carriers could enhance pharmacokinetic effectiveness. POU in the aqueous solution formed micelles with a hydrophobic core and embedded olanzapine under the influence of its hydrophobic nature. Drug release from the nanoparticles (90 ± 0.43 nm in diameter) indicated a specific pattern with initial burst release, and then a sustained release behavior ($82 \pm 3\%$ after 168 h), by the Higuchi-based release mechanism. Pharmacokinetics assessments of POU-olanzapine nanoparticles were carried in male Wistar rats through intravenous administration. **Conclusion.** The obtained results paved a way to introduce the POU as an efficient platform to enhance

the bioavailability of olanzapine in therapeutic methods. The POU is a safe drug carrier due to bio-based materials used in its preparation.

Zoledronic Acid Induced Hepatotoxicity: A Review of Case Studies to Identify Possible Mechanisms of Toxicity

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Objectives. This study examined evidence from case studies to reinforce hepatotoxicity as a rare but serious possible adverse reaction to zoledronic acid. **Background.** Zoledronic acid, a bisphosphonate derivative, is a potent inhibitor of bone resorption. It is mainly used to prevent osteoporosis in postmenopausal women, treatment of Paget's and Behcet's disease, and bone metastases. **Methods.** A search was made on PubMed for english, peer-reviewed case studies, published between 2013 through 2019. The keywords were "zoledronic acid", "hepatotoxicity", and "case reports". Four cases studies met the inclusion criteria. **Results.** Hepatotoxicity after intravenous infusion of zoledronic acid was found in all four case reports. All patients were postmenopausal women whom received zoledronic acid for prevention of osteoporosis due to menopause, Paget's disease or Behcet's disease. In all four cases, patients experienced signs of hepatotoxicity evidenced by elevated AST, ALT, and GGT levels between 1 to 3 days post intravenous infusion of zoledronic acid. In one case, the patient received zoledronic acid on two additional occasions, with concomitant administration of liver protective agents, within a 1-year interval. There was a slight increase in AST, ALT and GGT levels after the second infusion, but levels remained normal after the third infusion. **Conclusion.** Zoledronic Acid induced hepatotoxicity is a rare adverse event that may occur in postmenopausal women. The pathogenesis of hepatic injury is postulated to be a specific immune mediated response. Liver function enzymes should be monitored before and after administration, and the drug should be used with caution in patients with liver disease.

Effect of Prescribed Potassium and Blood Pressure Control Among African Americans in the United States: NHANES Survey 2005-2015

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Objective. To evaluate the relationship of prescribed potassium supplementation and BP control among survey participants self-reporting as Black and having a hypertension. **Background**. Small published studies have found a negative association between dietary potassium intake and BP control but no large-scale studies have evaluated the relationship of oral potassium supplementation and BP control among the Black population which has a higher prevalence of hypertension. **Methods**. A cohort study using the cross-sectional National Health and Nutrition Examination Survey data from 2005 – 2016 will include participants self-reporting as non-Hispanic Black, age between 18-80 years, informed by doctor of hypertension or taking a prescribed medication for BP or a BP measurement of >=140 or 90 mm Hg at the time of survey physical examination. Included participants must have a creatinine clearance of >=30ml/min/1.73m2. Exposure is defined as those reporting use of potassium chloride in the past 30 days since survey interview and the main outcome is BP in mm Hg. An independent t-test will be used to assess whether the average BP across potassium use or no use is significantly different using an alpha of 5%. **Results**. Survey participant socio-demographics, insurance coverage status, history of cardiovascular disease, diuretic/ARB/ACEi use, renal status and body mass index will be described along with the statistical association of potassium use and average blood pressure. **Conclusion**. Evaluating the relationship of potassium supplementation and BP in the Black population will help determine whether it could be an alternative method in managing hypertension.

Poster Presentations

Levofloxacin-Induced Bilateral Leg Edema: A Review of Case Reports

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Objective. The aim of the study is to examine the evidence available from case studies and other literature to support bilateral leg edema as an adverse reaction to levofloxacin. **Background.** Levofloxacin is a third-generation fluoroquinolone antibiotic with broad-spectrum activity commonly used for the treatment of bacterial infections. It acts by inhibiting DNA gyrase in susceptible organisms, thereby inhibiting DNA replication, transcription, repair and recombination. **Methods.** A search for English peered-reviewed case studies from 2013 to 2018 about levofloxacin–associated bilateral leg edema was conducted on PubMed and yielded 3 cases. **Results.** Levofloxacin induced bilateral edema was found in 3 case reports. However, 1 of the reports was a letter to the editor and did not describe the patient's clinical characteristics. The patients reviewed were elderly individuals between the ages of 64 to 81 years. Bilateral leg edema presented between days 3 to 11 after initiation of levofloxacin. Symptoms observed resolved after withdrawal of levofloxacin in all 3 cases. The Naranjo probability scale was utilized to evaluate the probability of causation. The patients' Naranjo probability scale score was 6, indicating a probable causal relationship. Unfortunately, a score could not be obtained for the case reported in the letter to the editor due to a lack of information. **Conclusion.** One factor for clinical consideration prior to treatment with levofloxacin is the patient's age. Although, bilateral leg edema is an uncommon side effect of levofloxacin, practitioners should consider the risk of developing this adverse reaction secondary to levofloxacin administration in the geriatric population.

Oral P2Y12 Antiplatelet Use Among U.S. Adults Over 40 Who Suffered a Recent (< 2 years) Myocardial Infarction: NHANES 2011-2016

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Objective. The main purpose of our study is to explore the effect of Age, Race, and Diabetic status on the use and prescribing patterns of $P2Y_{12}$ oral antiplatelet therapy in patients older than 40 years old who have experienced a myocardial infarction within the past two years. **Background.** Oral P2Y12 antiplatelet therapy is currently indicated for the treatment of Myocardial Infarction patients. While current guidelines recommend the administration of Clopidogrel, Prasugrel, or Ticagrelor, there are currently no studies that show a clear benefit of one versus the other nor how to select one agent over another. **Methods.** A secondary database analysis of a cross-sectional study survey was conducted using data that was retrieved from the National Health and Nutrition Examination Survey (NHANES). Patients were grouped based on their Age, Race, and Diabetic status. **Results.** The data showed 36% of the sample population to be on $P2Y_{12}$ Therapy. 70% were on clopidogrel and 30% were on Prasugrel. For the factors of Age, Race, and non-diabetics, 66%, 70%, and 83% of the sampled population, respectively, were on Clopidogrel. As clinical guidelines recommend dual antiplatelet therapy for recurrent myocardial infarction prophylaxis, 72% of the sampled population was found to be undertreated. **Conclusion.** The factors age, diabetes, and race did not show a statistically significant effect on the trend of prescribing oral $P2Y_{12}$ antiplatelet agents. Considering post-myocardial infarction mortality rates, the high level of undertreatment negatively impacts long term patient health outcomes. **Grants.** This study was not funded by any third party.

Metformin Induced-Hydrogen Sulfide Modulates Prostate Cancer Redox Status Promoting Antiproliferative Effects

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Objective. To determine the role of metformin-induced hydrogen sulfide (H_2S) in regulating prostate cancer redox status and apoptotic induction. **Background.** Prostate cancer is the second leading cause of cancer related death among men in the United States. Despite, current therapeutic approaches, the rate of new cases of prostate cancer continues to increase yearly. Over the last decade, several in vitro and clinical studies demonstrate evidence for the possible use

of metformin in cancer therapy. Recently, these effects have extended to the potential role of metformin in stimulating hydrogen sulfide production. We hypothesized that metformin treated prostate cancer cells will promote hydrogen sulfide production which will further potentiate metformin apoptotic-related effects. We further hypothesized that metformin-induced H_2S alters mitochondrial functions and modulate transsulfuration pathway in prostate cancer cells. **Methods.** Using an ion-selective electrode, hydrogen sulfide content of the LNCaP androgen sensitive prostate cancer cells was measured. Real Time- quantitative polymerase chain reaction, Liquid Chromatography/ Mass Spectrometry and Apoptosis Assay was used to assess the role of metformin-induced H_2S on the redox status and prostate cancer survival. **Results.** Metformin significantly decrease metabolites associated with transsulfuration and glutathione pathway. These effects were concordant with an increase in gene expression of H_2S-synthesizing enzymes. These effects potentiated the apoptotic effect of metformin by increasing the gene expression of apoptotic-related gene and induces cell death. **Conclusion.** Metformin-induced H_2S regulates prostate cancer redox status inducing apoptosis.

Rheological Behavior of Carbopol® 981 in Intravenous Drug Abuse

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Objective. Examine the rheological properties of Carbopol 981 in different solvents, varying in polarity and ionic strength, under different shear rates to assess the polymer's intravenous extraction-resistant capacity. **Background.** Carbopol 981 is a carbomer homopolymer with wide pharmaceutical applications. Upon neutralization, the polymer forms viscous gels, resisting the withdrawal of opioid drug solutions into a syringe. This in turn deters drug abuse by injection. In this study, we evaluated the rheological behavior of the neutralized polymer under different chemical and physical conditions of drug IV abuse. **Methods.** 0.5% w/v Carbopol 981 solutions were prepared in water, normal saline, and 40% v/v ethanol. The mixtures were neutralized using NaOH to pH 6–7. A cone & plate rheometer was used to measure the rheological properties of the prepared solutions (Brookfield DV-III Ultra, spindle 2.4 cm, 25°C). The viscosity versus shear rate rheograms were obtained and compared among the different solvents. **Results.** Viscous solutions were obtained in water and 40% ethanol, while the viscosity of the polymer in normal saline was minimal. The carbomer exhibited a shear thinning behavior in all the solutions, where the viscosity was significantly reduced from 1318 to 140 cP in water, from 253 to 33 cP in saline, and from 2314 to 140 cP in the alcoholic solution over the shear rate of 37-1537 sec^{-1}. **Conclusion.** Carbopol 981 produces abuse-deterrent viscous gels in non-ionic solvents, however its deterrent properties is adversely affected under shear and in the presence of ions. **Grants.** NSU PFRDFG Grant 335081.

Structural and Rheological Properties of Polyacrylate Homopolymer Upon Thermal Manipulation

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Objective. Evaluate the structural and solution flow properties of Carbopol 981, upon thermal treatment of the solid polymer. **Background.** Polyacrylate polymers are viscosifying agents that could be utilized in the development of extraction-resistant abuse-deterrent formulations (ADFs). In this study, we evaluated the tolerance of the polymer to thermal manipulation, indicated by its structural and rheological stability. **Methods.** Solid Carbopol 981 was heated (air-circulated oven, 80 and 180 C, 1 hr.); the polymer (125mg) was dissolved in 25 mL solvent (water, 40% v/v ethanol, and saline), and the mixtures were adjusted to pH 6–7 using NaOH. Non-treated control samples were also prepared. The rheological properties of the prepared solutions were measured using a cone & plate rheometer at 25°C. The structural stability of the solid polymer samples was assessed using DSC and FTIR. **Results.** Changes in solution viscosity between the control and heated polymer at 80°C were <20% in all solvents, with pseudoplastic flow behaviour over the shear rate of 37-1537 sec^{-1}. On the other hand, the aqueous mixtures of the heated polymer at 180°C showed significant reduction in viscosity along with polymer precipitation. Reproducible results could not be obtained for such samples due to the presence of solid powder in solution which interfered with the measurement. The DSC and FTIR analysis confirmed structural changes with the 180°C-heated powder. **Conclusion.** Carbopol 981 is sensitive

to thermal manipulation at high temperatures, rendering the carbopol-based compositions abusable by the intravenous route. **Grants.** NSU Grant 335081.

A Carbomer-Based Composition for Deterring Opioid Drugs Abuse

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Objectives. Develop and evaluate a carbomer-based composition for deterring drug abuse. **Background.** Most of the developed abuse-deterrent products utilize PEO as a deterring agent. Abusers have found atypical methods to manipulate the PEO-based formulations. In this study, we have developed a new approach for deterring drug abuse. Compositions containing carbomer interpolymer type B (CITB) deters the intravenous drug abuse by forming insoluble complexes with the opioid drugs, reducing the amount of the free drug that could be extracted in solutions for subsequent injection. **Methods.** Dextromethorphan HBr (25 mg) and CITB (200 mg) were vortexed (30 sec.) in extracting solvents (10 mL), differing in their polarity and ionic strength. The mixtures were centrifuged (1500 rpm, 5 min.) and the supernatants were filtered (0.2 µm and 0.45 µm syringe filters). The samples were analyzed by a UV-Vis spectrophotometer (276 nm). The UV absorbance values were correlated to calibration curves established in each solvent, and the drug concentration was determined. The percentage of the extracted drug and, eventually, the percentage of the complexed drug were calculated. **Results.** The highest drug complexation (63%) was obtained in water. The complexation was ~ 10 – 20% less in the ionic solvents and significantly reduced in the less polar alcoholic solution (51%, 43%, and 28% complexation in saline, vinegar, and 40% ethanol solutions, respectively). **Conclusion.** The carbomer interpolymer type B shows potential for deterring the intravenous drug abuse. Future work is required to improve the deterrence capacity in the alcoholic and ionic solvents. **Grants.** NSU Grant 335081.

Entrapment Efficiency of the Carbomer Interpolymer Type B with Different Drug Molecules in Different Solvents

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Objective. Determine the entrapment efficiency of the carbomer interpolymer type B (CITB) with cationic and neutral drugs in different types of solvents. **Background.** CITB is a hydrophobically-modified poly(acrylic acid) polymer that can entrap cationic and non-ionic drugs via electrostatic complexation and hydrophobic association, respectively. This study evaluated the carbomer's entrapment efficiency with a cationic model drug (dextromethorphan HBr, DEX, representing the electrostatic interaction) and a non-ionic model drug (acetaminophen, APAP, representing the hydrophobic interaction) in different solvents (water, saline, 40% v/v ethanol, vinegar). **Methods.** Dextromethorphan and acetaminophen were blended with CITB (1:8 ratio) in 10 mL solvent. The preparations were centrifuged and the drug percentage in the supernatant was determined (UV spectrophotometer). The percentage of the entrapped drug was calculated using a mass balance. The sediments after centrifugation were analyzed (DSC, 25–350°C @ 10°C/min.) to confirm CITB-drug entrapment. **Results.** The DSC thermograms showed that CITB could entrap cationic and non-ionic drug molecules. On the other hand, the UV spectroscopic analysis showed that higher entrapment was obtained with DEX as compared with APAP in all the examined solvents. 63% DEX entrapment versus 19% APAP entrapment in water, 28% versus 7% in 40% ethanol, 51% versus 12% in saline, and 43% versus 8% in vinegar. Furthermore, the results indicated the higher sensitivity of the DEX-CITB entrapment to the solvent type. **Conclusion.** The entrapment efficiency of CITB is significantly affected by the ionic nature of the drug molecule to be entrapped and the type of solvent. **Grants.** NSU Grant 335081.

Poster Presentations

Promethazine-Induced Acute Orofacial Dystonia: A Rare Adverse Effect

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Objective. This study examined peer-reviewed case studies to better understand the rare side effect, acute orofacial dystonia, associated with the use of promethazine. **Background.** Promethazine is a first-generation antihistamine used primarily for its antiemetic effects in anesthesia, as well as perennial and seasonal allergies. **Methods.** A search was done via PubMed to find case reports using key words 'promethazine', 'acute orofacial dystonia' and 'case reports'. Case reports were included if they were peer reviewed studies in English and conducted from 2013 – 2018. Additional searches were conducted using the FDA package insert database for promethazine, as well as literature review on PubMed to determine the prevalence of such occurrence. **Results.** Promethazine related acute orofacial dystonia was found in one case study involving a 68-year-old female patient. Dystonia symptoms persisted until the patient received botulinum toxin. The Naranjo ADR probability scale was utilized to evaluate the probability of causation. The patients' Naranjo probability scale score was 8, indicating a probable causal relationship. **Conclusion.** Promethazine induced acute orofacial dystonia has never occurred in patients this old, but has been reported in children. A cause and effect relationship is probable based on the lack of risk factors, the immediate onset of adverse effects upon promethazine initiation, along with symptom cessation with discontinuation. The anti-dopaminergic traits of promethazine play a role in the development of dystonia, possibly by creating an imbalance with cholinergic systems in the basal ganglia. Healthcare practitioners should therefore consider patient history related to dopaminergic deficits when administering promethazine to elderly patients.

Effect of Angiotensin III on Akt in Wistar Rat VSMCs

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Objective. We investigated whether angiotensin (Ang) III induces Protein kinase B (commonly known as Akt) phosphorylation in rat vascular smooth muscle cells (VSMCs). **Background**. The molecular mechanisms involved in Ang III biological effects have not been fully investigated. Most studies have shown that Akt mediates Ang II inflammatory effects in VSMCs. VSMC inflammation is a critical action associated with cardiovascular diseases including hypertension. The role of Ang III to induce Akt in VSMCs is unknown and was the focus of these studies. **Methods**. VSMCs were isolated from the thoracic aorta of adult Wistar rats by the explant technique. VSMCs were grown to confluency and growth arrested cells were treated with 0.1 nM to 1000 nM Ang III for 10 minutes, or with 100 nM Ang III for 1 minute to 30 minutes. The Western blotting technique was used to determine the effects of Ang III on Akt protein phosphorylation. **Results**. Ang III caused a dose-dependent increase in Akt protein phosphorylation. The effects of the peptide on Akt phosphorylation were maximal between 100 nM and 1000 nM. The peptide's effects were rapid, occurring within minutes of treatment, and the maximal effects on Akt phosphorylation were observed after 15 minutes of Ang III treatment. **Conclusion**: These findings provide insight into the molecular nature of Ang III actions and offer a possible molecular mechanism by which Ang III physiological actions occur in VSMCs. **Grants**. This study was partially funded by a Metabolic & Cardiovascular Research fund established in the College of Pharmacy.

Neuregulin-1/Phosphatidylinositol 3-kinase Signaling Regulates Expression of Genes Involved in Cellular Cobalamin Uptake and Processing

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Objective. To determine whether the Neuregulin-1/Phosphatidylinositol 3-kinase signaling transcriptionally regulates proteins involved with the uptake and processing of Vitamin B12 (cobalamin) in SH-SY5Y neuroblastoma cells. **Background.** Cobalamin is required as a cofactor for methionine synthase, which transfers folate-derived methyl groups to homocysteine to form methionine. Cobalamin must be imported and processed by cells into activated species. The antioxidant glutathione is needed to process intracellular cobalamin. Neurotrophic factors, such as neuregulin-1, increase glutathione in neurons. Neuregulin-1 and downstream phosphatidylinositol 3-kinase (PI3K) signaling promote glutathione-dependent cobalamin processing and methionine synthase activity in SH-SY5Y cells. In the work presented here, we sought to understand whether neuregulin-1/PI3K signaling might additionally regulate cobalamin status via parallel mechanisms complementary to stimulating glutathione formation. **Methods.** SH-SY5Y cells in 6-well plates were maintained under low-serum conditions. Cells were exposed to 1 nM neuregulin-1 for 1- or 4h. Cells were pre-treated with PI3K inhibitors pictilisib or wortmannin for 30 min and then some cells were co-treated with neuregulin-1 for 1h. Real-Time quantitative polymerase chain reaction (RT-qPCR) was used to assess gene expression of cobalamin-interacting proteins. **Results.** 1h neuregulin-1 generally increased expression of cobalamin processing genes, which was blocked by PI3K inhibitors. However, PI3K inhibitors increased expression when given alone. Transcripts were decreased or no longer increased after 4h exposure. **Conclusion.** Neuregulin-1 regulates expression of cobalamin-related genes in a temporal- and PI3K-dependent manner. **Grants.** This research was supported with a fellowship from the American Foundation for Pharmaceutical Education (AFPE).

The Impacts of Pre-cART Versus cART Era on HIV-associated Neurocognitive Disorders: A Meta-Analysis

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Objectives. The objective of this presentation is a systematic literature review to consider HIV-associated neurocognitive disorder (HAND) rates before and during the cART era. **Background.** This paper is a combination of literature reviews, observational studies, prospective studies and retrospective studies. A second objective of this systematic review is to identify and summarize recent studies that examine asymptomatic neurocognitive impairment in HAND during pre-cART and cART era. **Methods**. A systematic literature review was conducted to include English-language articles published from 2009 to 2019 on July 19th, 2019. A total of four electronic databases were used including MEDLINE, PUBMED, EMBASE, and PsycINFO and were searched to identify potentially relevant articles. The search combined free text and MeSH terms with HIV-associated neurocognitive AND combination antiretroviral therapy with asymptotic neurocognitive impairment OR mild cognitive disorder OR HIV-associated dementia. From these results, a meta-analysis was conducted using STATA, a software package used for interactive, or batched, statistical analysis. **Results**. Despite enhanced research efforts and effective cART, a high prevalence of HAND within the HIV-infected population remains. Although the most severe form of HAND, HIV associated dementia (HAD) is much less common in cART era, researchers still pose questions about any long-term benefit of cART with respect to milder forms of HAND. Preliminary findings have shown that patients with ANI will progress more quickly to more severe forms of HAND than those without ANI. Given this, the relevance of the correct diagnosis of ANI is crucial where well over 50% of all HIV-infected patients suffer from some stage of HAND mentioned above. **Conclusions.** There are various social, economic, and public health implications surrounding HAND. The burden of disease is increasing at an exponential rate but we are still unaware of the long-term survival with chronic immune activation. Future studies should assess the will this impact the aging population, the role of medication adherence, and the impact of comorbidities affect on HAND. **Grants.** HPD Grant, NIH Exploratory/Developmental Research Grant Award (R21) R25MH083617-09

Pharmaceutical Formulations for the Treatment of Preoperative Anxiety in Children

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Objective. To evaluate the availability of alternatives to current pharmaceutical formulations specifically designed for treatment of preoperative anxiety in children. **Background.** Surgical procedures generate high levels of anxiety and stress for children which have resulted in negative behavioral changes and poor treatment outcomes. Sedative drugs are routinely given preoperatively to help minimize the anxiety levels in children prior to surgical procedures.

However, these sedative medications are commonly given as liquid formulations that have bitter taste, leading to poor acceptance and challenging administration. **Methods.** A comprehensive computerized literature search was conducted to evaluate the current and alternative treatment options used for pediatric preoperative anesthesia. The key words "pediatric" and "preoperative anesthesia" were searched within both the US National Library of Medicine (Medline) and PubMed™. In addition, a patent search was conducted using the online United States Patent and Trademark Office (USPTO) database, with the phrase "pediatric preoperative anesthesia" having the Boolean operator "AND" between each expression. **Results.** It was discovered that there is a scarcity in preoperative anxiety treatment options for pediatrics that are convenient, palatable, rapidly functioning, and child friendly. Current commercially available formulations and treatment options do not allow for easy administration to children. **Conclusion.** This study will bring a refining contribution to the evaluation of the needs and priorities that support the development of suitable pharmaceutical formulations for pediatric patients in the treatment management of their preoperative anxiety. **Grants.** Grant Submission to the Health Professions Division Research Grant currently under review.

Extraction-Resistant Composition Containing Activated Charcoal for Deterring Opioid Drugs Abuse

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Objective. Examine the resistance efficiency of activated charcoal against opioid drugs extraction in different aqueous solutions. **Background.** Activated charcoal is a porous material with large surface area and high capacity for adsorbing different molecules. In this study, we evaluated the efficiency of charcoal in adsorbing dextromethorphan HBr (DEX) in different aqueous solutions, minimizing the amount of the drug that could be extracted for abuse by injection. **Methods.** In 1:8 weight ratio, DEX and charcoal were mixed in 10 mL aqueous extracting solvents, most commonly used by abusers. The samples were centrifuged at 1500 rpm for 5 min. The supernatant was separated from the sediment and analyzed by UV-Vis spectroscopy (276 nm) to determine the % of the drug extracted by the different solvents. The sediment was analyzed by DSC (heating from 25 to 350 °C @ 10 °C/min.) to confirm the drug adsorption on the charcoal. **Results.** Drug extraction varied across the different solvents. Minimal drug extraction (< 20%) was achieved in water, 0.1% sodium bicarbonate, and saline solutions. Modest extraction (~ 25%) was achieved in 0.83 M acetic acid, and the highest drug extraction (~ 60%) was achieved in 40% ethanol. The DSC thermograms confirmed the adsorption of the drug on the charcoal particles. **Conclusion.** Activated charcoal-based compositions could effectively reduce opioid drugs extraction in most of the extracting solvents. Further work is required to improve the deterrence efficiency of such compositions in the hydroalcoholic solutions. **Grants.** NSU Grant 335081.

Impact of Drug Nature and Solvent Type on Charcoal Adsorption Efficiency

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Objective. Investigate the effects of the ionic nature of the drug and the type of solvent on the adsorption efficiency of charcoal. **Background**. Activated charcoal is widely used as a detoxifying agent for its efficient adsorption of various molecules. In this study, we evaluated the effect of the drug ionic nature and the effect of solvent type on the charcoal's adsorption efficiency. **Methods**. Cationic dextromethorphan HBr, anionic diclofenac sodium, and non-ionic acetaminophen were separately mixed with charcoal (1:8 ratio) in 10 mL different solvents. The samples were centrifuged, and the supernatant was analyzed for drug content (UV-Vis spectroscopy). The % of the adsorbed drug was calculated from mass balance. The sediment was analyzed (DSC, 25–350 °C @ 10 °C/min.) to confirm the drug adsorption onto charcoal. **Results**. >90% drug adsorption in HCl. The results in the other solvents varied among the drug molecules. For dextromethorphan, >90% adsorption in saline and $NaHCO_3$, ~70–80% in water and vinegar, and ~40% in 40% ethanol. For diclofenac, >90% adsorption in water and vinegar, ~70% in ethanol and saline, and minimal adsorption (6%) in $NaHCO_3$. For acetaminophen, >90% adsorption in water, ethanol, and $NaHCO_3$, ~80% in vinegar, and ~40% in saline. The DSC results confirmed the drugs' adsorption on the charcoal. **Conclusion.** Charcoal has in general an effective adsorption capacity in water and acidic solutions for all drugs regardless of their nature. The

charcoal adsorption capacity in other solvents is affected by other drug properties (e.g., lipophilicity). **Grants.** NSU Grant 335081.

Management of Sickle Cell in the African American Population ◆

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Objective. This research is intended to demonstrate the importance of increasing the awareness of the management of SCD in the African American population by evaluating active clinical trials, current pharmacological and non-pharmacological treatments. **Background.** Sickle Cell Disease (SCD) is the most common rare disease in African Americans with a prevalence of one in 365 African American births. The problem with improving health outcomes is a lack of patient education. SCD is a recessive condition that affects the body's red blood cells, causing misshapen cells. This shape alteration causes difficulty in traveling through small blood vessels and can lead to other severe problems. **Methods.** An elaborate search using journals was completed on PubMed using keywords such as rare diseases in the African American population, pain crisis, and treatment. **Results.** Pain is a hallmark symptom of SCD and since it is subjective, it has been a major factor in the mistrust of medical professionals as it relates to the dissemination of painkillers. Research in the pipeline include study (HGB-205) where Bluebird Bio Inc. is focusing on gene editing using LentiGlobin BB305 to evaluate hemopoietic stem cell transplantation due to the lack of access to chronic transfusions, hydroxyurea, and bone marrow transplant due to lack of patient education and economic hardships. **Conclusion.** As pharmacists, we can show more compassion and implement multidisciplinary collaboration within the healthcare team, where all parties involved are aware of the patient's medical history to personalize treatments and increase positive outcomes. **Grants.** No grants were utilized for this study.

Instructional Methods and Performance Assessments of Hand Hygiene Techniques

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Objective. To review various hand hygiene procedures and explore advances in measurement techniques that can provide insight into teaching and assessment methods to guide best practices for sterile compounding. **Background.** Hand hygiene procedures are important measures taken to minimize contamination from pathogens and keep compounded medications sterile when prepared in pharmacy cleanroom settings. However, various handwashing methods from the United States Pharmacopeia (USP) and World Health Organization (WHO) do not provide exact instructions and offer no guidance on methods of assessing skill. This has raised questions as to the effectiveness of different teaching methods and learner assessment. Moreover, modern strategies and tools for evaluating effectiveness of hand hygiene methods are sought. **Methods.** A comprehensive review of the relevant literature will be conducted using online research databases. Study outcomes of the learning strategies and assessment instruments will be recorded to determine the most reliable combination for learning and evaluating hand hygiene performance. **Results.** The results of this study will have direct implications that can optimize pharmacy student learning and demonstrate knowledge of theoretical principles and skills for sterile compounding. Additionally, effective assessment methods further permit the capability of evaluating the effectiveness of different published standards of hand hygiene practices. **Conclusion.** Due to the risks associated with touch contamination, training and testing of hand hygiene practices should be visually observed and further assessed using modern instruments. These methods must be reliable and allow proper documentation to be practical for educational environments and workplace clinical practices. **Grants.** None.

Rebuilding Pharmacy One Block at a Time

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Overview. Pharmacy methodology is ready for change. As we dive into the world of big data, machine learning and artificial intelligence, older practices have become less efficient. As pharmacy innovation continues to press forward,

older methods of conducting various functions must be addressed. The goal in this current medical landscape is more personalized medicine with the hope of optimizing therapy. Currently, drug prices are rising, clinical trials are feeling the effects of being on a time and financial crunch and provider communication is increasingly becoming more necessary. One potential solution could be the original technology known as blockchain. Blockchain technology serves as a potential malleable vehicle to help expedite the beginning stages of pharmacy embracing the new brave world of technology. The purpose of this paper was to survey the current literature landscape regarding blockchain usage within the pharmacy realm and provide commentary on researcher's findings thus far in pharmacy's infant use of the technology. The following text serves as a guide to what thought leaders currently believe about the merits and applicability of blockchain technology. **Methods**. The following databases were used to find the most recent text on pharmaceutical applications and their relation to blockchain technology: PubMed, EMBASE and Google Scholar. Various key phrases included "Blockchain and Pharmacy" "Pharmacy and Blockchain" "Blockchain Use" "Blockchain Hacked" "Blockchain Pilot Programs AND Pharmaceuticals." After combing through the literature, I selected which articles focused on aspects heavily involved in pharmacy such as clinical trials, pilot programs regarding drug recycling and the security of the technology. **Results**. Ultimately, nine articles were chosen with two websites detailing the inner workings of the potential threats to the blockchain. **Conclusion.** Blockchain technology is still in its infancy. Most of the thoughts and applications of the technology itself are theoretical. Although the technology has tremendous promise and potential, promise and potential are not tangible entities. Blockchain potential within the drug supply chain is intriguing but many moving parts must be put into place before anything can come to fruition. As with any major technological shift, there is a reticence that must be addressed before full utilization of the technology within the pharmacy ecosystem.

Optimization of Immunoprecipitation Protocol of Protein hnRNPH2 from Melanoma Cells

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Objective. Despite advances in melanoma drug discovery, the average survival of patients with late stage metastatic melanoma is approximately 3 years, suggesting a need for approaches that identify new melanoma targets. **Introduction.** We identified heterogeneous nuclear ribonucleoprotein (hnRNP) H2 as such a target (*Palrasu et al.*, *Cell Physiol Biochem*, 2019;53:656-86). Mechanistic investigations showed that targeting hnRNPH2 induces ER stress leading to potentiation of basal autophagy resulting in melanoma cell death in BRAF and NRAS mutated melanoma cells. Our project focused on optimization of isolating and purifying hnRNPH2 from melanoma cells. **Methods.** Antibody-bead crosslinking, immunoprecipitation (IP), silver stain, Coomassie stain, and western blots were used. **Results.** Initial experiments showed low levels of isolated H2. In order to obtain greater quantity of the protein, we scaled up antibody/bead complex 10 times resulting in higher H2 levels in eluate. Overall, we were able to isolate 10ug of pure H2. In the future, we are planning to obtain 100ug of pure H2 to perform protein biochemistry and biophysics. **Conclusions.** It was shown that multiple cycles of IP along with higher scales of antibody/bead complex ratio were required to obtain sufficient amount of the protein to be visible on the western blot stain.

Supernumerary Left Renal Vein and an Implication of Secondary Renal Hypertension

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Introduction. This case study draws conclusions regarding the history of hypertension and cerebrovascular accident in a cadaveric specimen with a supernumerary, or additional, renal vein as a contributing factor. There has not been extensive investigation into the contributory mechanisms of a supernumerary renal vein and its associations with hypertension. **Case Presentation.** Through dissection, this 96-year-old female cadaver was found to have a supernumerary left renal vein. The patient's medical history and cause of death included hypertension as well as a cerebrovascular accident. The patient had no other identifying factors that could be associated with persistent hypertension. **Deviation From the Expected.** Studies have suggested a prevalence of a supernumerary left renal vein being as little as 3.6% as compared to a supernumerary right renal vein which is much more prevalent at 32.67% (Gupta 2011). **Discussion**. Due to an additional renal vein in parallel and a lower venous resistance, there is an increased flow to the kidney. Thus, the arterioles of the kidney will vasoconstrict through autoregulation, leading to an increase in arteriole resistance. The result is a left renal system with a higher arteriole resistance and lower venous resistance. However, a higher ratio of arterial resistance to venous resistance, and a decrease in capillary pressure, results in the activation of the Renin-Angiotensin-Aldosterone System, possibly causing secondary renal hypertension. **Conclusion.** Being aware of this anomaly may help guide physicians towards individualized patient treatment rather than routine pharmaceutical management of hypertension. Identifying such anomalies could also help guide retroperitoneal surgical planning.

Risk of ACL and Meniscus Injury, and Subsequent Surgical Repair Increased in Tobacco Users: A Case-Controlled Retrospective Cohort Study of Over 3 Million Patients

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Objective. The purpose of this study was to determine if individuals who use tobacco are at increased odds of: (1) Meniscus or ACL injury; (2) meniscus or ACL reconstructive surgery; and (3) in-hospital lengths of stay (LOS). **Background.** While literature demonstrates associations between tobacco use and ligament reconstruction complications, there is little data analyzing risks that tobacco use may have on the injury development, need for subsequent surgery, or impact on lengths of stay (LOS). **Methods.** An insurance claims population was retrospectively analyzed using ICD-9 and ICD-10 codes. Patients who used tobacco were matched to controls according to age and medical comorbidities. Outcomes analyzed included: meniscus or ACL injury; (2) meniscus or ACL reconstructive surgery; and (3) in-hospital LOS. A p-value less than 0.05 was considered statistically significant. **Results.** Tobacco users had increased odds (3.43 vs. 3.28%; OR: 1.10, $p<0.0001$) of meniscus tear and odds (0.48 vs 0.41%; OR: 1.15, $p<0.0001$) of ACL injury. Tobacco users with meniscus tears were found to have increased odds (0.60 vs. 0.47%; OR: 1.27, $p<0.0001$) of surgical meniscus repair and tobacco users with ACL injury were found to have increased odds (11.45 vs. 9.42%; OR: 1.24, $p<0.0001$) of surgical ACL repair. Additionally, tobacco users were found to have greater LOS. **Conclusion.** This analysis of over 3 million patients demonstrates that tobacco use increases incidence and odds of both meniscus and ACL injury, surgical repair and LOS. Additionally, tobacco use appears to increase the need for subsequent surgical repair after meniscus or ACL injury.

What Factors Affect Interpretation of Tissue Dielectric Constant Values?

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Objective. To investigate factors possibly impacting tissue dielectric constant (TDC) values. **Background.** TDC measurements are increasingly used as quantitative adjunctive tools to detect and assess lymphedema but factors affecting TDC values have not been fully studied. **Methods.** The factors of interest in this study were; 1) anterior vs. medial arm measurements, 2) total body water percentage (TBW) and arm fat percentages (AF), 3) TDC measurement depth and 4) skin firmness. In 40 healthy women (24.5±2.5 years) TDC was measured bilaterally on anterior forearm to 0.5, 1.5, 2.5, and 5.0 mm depths using a multi-probe device and on anterior and medial aspects using a compact device. TBW and AF were measured at 50 KHz and skin firmness measured by skin indentation force (FORCE) required to indent skin 1.3 mm. **Results.** Results showed: 1) No statistically significant difference in TDC values between anterior and medial arm, 2) A moderate direct correlation between TDC and TBW (r=0.512, p=0.001), 3) an inverse correlation between TDC and AF (r=-0.494, p). **Conclusions.** The findings provide a framework to help interpret TDC values among many divergent conditions in both research and clinical applications.

Does Increased Environmental Temperature Affect Skin Tissue Dielectric Constant?

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Objective. To determine the effect of elevated environmental temperature on TDC values. **Background.** Because tissue dielectric constant (TDC) values are highly dependent on local tissue fluid content they are used to detect and track localized edema and lymphedema. TDC measurements are done by touching the skin with a probe for less than 10 seconds but the effect of recent prior exposure to elevated temperatures is unclear. It was hypothesized that via heat-activation of eccrine sweat glands, TDC values would rise with increases in environmental temperature due to increased fluid in the glands and possible surface sweating. **Methods.** TDC was measured in 24 young adults their thenar eminence and anterior forearm in triplicate prior to heating, during a 20-minute whole-body heating interval and post heating. During heating, the environmental temperature was increased gradually to a maximum of 42ºC. **Results.** Increasing environmental temperature from (mean±SD) 23.3±1.6ºC to 41.5±1.3ºC increased forearm and thenar-eminence skin temperatures to 37.8±0.5ºC and 37.9±0.4ºC respectively. Corresponding forearm changes in TDC values were at the forearm from 30.7 ± 4.6 to 36.3±5.7 (18.2%) and at the thenar-eminence from 34.7±4.9 to 45.1±5.5 (30%). Post heating measurements allowed the calculation of the time to recovery to baseline TDC values. **Conclusions.** Results show TDC values increase with increasing environmental temperature. TDC recovery-rates indicate temperature-related TDC variability in patients is minimized with a pre-measurement-wait-time of about 15 minutes after their arrival in the office. For patients with bandages or compression-sleeves, TDC measurements should be made no sooner than 15 minutes after covering removal.

Successful Surgical Treatment of Pigmented Villonodular Synovitis in the Distal Radial Ulnar Joint with Sauvé-Kapandji Procedure: A Case Report

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Introduction. Pigmented villonodular synovitis (PVNS) is described as a rare, benign condition seldomly affecting the wrist, elbow, or hand. Although current literature does not describe a standardized treatment for PVNS, surgical intervention, usually total or subtotal synovectomy, is commonly used to treat the disease. This case is one of the first in evaluating the efficacy of the Sauvé-Kapandji procedure as a treatment modality for PVNS of the wrist. **Case Presentation.** A 58-year-old, Hispanic male presented with right wrist pain, worsening for several months and reported an unspecified injury to the wrist approximately 1 year prior. **Deviation From the Expected.** Estimated annual incidence of PVNS in the United States is approximately 1.8 cases per million patients and less commonly

affects smaller joints such as the wrist, which make up about 2.53% of all cases. Likely due to the rarity of the disease, there is no standardized treatment for PVNS. In this case, the decision was made to employ the Sauvé – Kapandji procedure with partial extensor tenosynovectomy. **Discussion.** The Sauvé – Kapandji procedure is a form of arthrodesis for the distal radioulnar joint (DRUJ) and is used to treat a myriad of conditions including various DRUJ instabilities and early synovitis in rheumatoid patients. It was elected for this case because of its increased reliability and durability in treating joint disorders. **Conclusion**. Although PVNS of the wrist is a relatively rare condition with no current standardized treatment, implementation of the Sauvé – Kapandji procedure can lead to favorable patient outcomes.

Influenza Pandemic: How Prepared Is Prepared?

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Objective. A study was conducted to determine whether we, as a community, are prepared for an influenza pandemic. **Background.** The 2009 influenza (H1N1) pandemic has caused concern about the level of preparedness for a future pandemic. It not only affects individuals and communities, but it also increases the strain on our health-care systems and on our economy, making it a public health problem. Due to the ability of the influenza virus to constantly change itself, it's almost impossible to predict when the next pandemic will occur. This presents a unique challenge when developing influenza preparedness protocols. The goal of this study is to analyze past and current influenza preparedness plans and identify areas for improvement. **Methods.** Information for this study was gathered from publicly available preparedness plans and peer-reviewed journals. **Results.** In the past, planning focused on preparing, responding and recovering from a pandemic. Currently, planning is focused on the risk management approach, which emphasizes on prevention and mitigation. Plans also consider multisectoral and multidisciplinary contributions from the government and health-care systems, etc. Apart from this, there were several gaps that should be addressed, which were problematic in the 2009 pandemic. **Conclusion.** Progress has been made in terms of disease prevention, control and treatment. However, there are still gaps in preparing for a future pandemic that need to be addressed. **Grants.** No funding was used in this study.

Barriers to Psychiatrist Involvement with Disaster Victims Post-Disaster

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Objective. This study was conducted to determine what barriers or obstacles prevent psychiatrists from being involved with disaster victims post-disaster. **Background**. Natural and man-made disasters have significant impacts on mental health and these effects can last for months to years after the disaster has occurred. While the role of psychiatrists during the response phase of disaster may vary, psychiatrist involvement with disaster victims during the recovery phase of disaster may prove beneficial in supplementing local mental health services and expanding access to psychiatric care. **Methods**. For this study, an online survey was distributed to psychiatrists at the Hillsborough County-based community mental health center, Gracepoint. **Results.** A total of 11 psychiatrists responded to the survey, including general psychiatrists, child and adolescent psychiatrists, and addiction and substance abuse psychiatrists. The respondents demonstrated a lack of familiarity with the field of disaster and emergency management. The most cited barrier to involvement with disaster victims post-disaster was disruption to daily life in the form of time away from family/friends and time away from work/practice. However, respondents were not uninterested in working with disaster victims. Many of the psychiatrists surveyed indicated they would consider being involved with disaster victims post-disaster via local disaster response organizations and/or via telehealth. **Conclusion**. Disruptions to daily life in various forms are the biggest barriers to psychiatrist involvement with disaster victims post-disaster. However, this can potentially be mitigated by involvement with local disaster response organizations and the use of telehealth.

Poster Presentations

Does Body Fat Importantly Influence Skin Tissue Dielectric Constant (TDC) Values?

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Objectives. To determine if body fat (TBF) and water (TBW) percentages impact TDC values in women who are overweight or obese. **Background.** TDC values are useful to assess lymphedema but the impact of excessive fat with its low dielectric constant is unknown. We hypothesized that greater BMI values would be associated with reduced TDC values especially in overweight and obese women (> 30 kg/m^2). **Methods.** Women (N=32, age 40.0±11.6 years and BMI of 31.8±6.7 Kg/m^2 (23.0-49.9 Kg/m^2) participated. TBF, TBW, intracellular (ICW) and extracellular water (ECW) percentages were determined at 5, 50, 250 and 500 kHz. TDC was measured bilaterally at forearm, biceps, neck and face to 0.5, 1.5- and 2.5-mm depths. For analysis, subjects were divided into groups; BMI<30Kg/m^2 (sub-group A, n=16) vs. ≥30Kg/m^2 (sub-group B, n=16). Tests for statistical differences between sub-groups were based on the non-parametric Mann-Whitney test with a p-value < 0.01 accepted as statistically significant. **Results.** TDC at forearm and biceps decreased significantly (p<0.001) with increasing depth but TDC values and their inter-side ratios did not differ between sub-groups A and B. There was also no significant correlation between TDC and TBW, ECW or ICW. **Conclusions.** Results provide reference TDC values for obese persons and show that in overweight and obese persons TDC values are not confounded by variables such as TBW and TBF. Further, inter-side ratios and their SDs yielded thresholds for forearm and biceps similar to those established for women with normal BMI and extends their use to this group.

Potential Use of Leg to Arm Tissue Dielectric Constant Ratios as a Lower Extremity Edema Index

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Objective. To provide normative tissue dielectric constant (TDC) ratios as reference for assessing lower extremity edema or lymphedema. **Background.** Assessment of leg edema or lymphedema is useful to determine treatment effectiveness. However, clinical assessment is largely visual and tactile and could be aided by a less subjective approach. **Methods.** TDC was measured at the foot, calf and forearm and foot/arm and calf/arm ratios were calculated. The logic of using these ratios was that for most lower extremity edematous conditions, there is little or no effect on arm water. Thus, the ratios provide self-contained assessment parameters independent of possible variations in absolute TDC values among patients. These ratios were measured in 44 young and 64 mature persons equally divided by gender to test for age-related differences. **Results.** Foot/arm ratios of mature vs. young (mean ± SD) were 0.997 ± 0.112 and 1.041 ± 0.184 and did not statistically differ (p =0.157). Calf/Arm ratios were 1.050 ± 0.168 vs. 1.085 ± 0.197 and did not significantly differ (p =0.320). Including both age groups (n = 108) to get combined ratios yielded 1.015 ± 0.146 for foot/arm and 1.013 ± 0.160 for calf/arm. Potential lymphedema threshold ratios, calculated as the mean ratio plus 2SD, were for foot/forearm and calf/forearm 1.307 and 1.333 respectively. **Conclusion.** Based on the present findings it is proposed that a conservative estimate of lower extremity lymphedema presence could be based on a foot/arm or calf/arm TDC ratio exceeding 1.35. The test of these conclusions requires future research.

Poster Presentations

Discoidin Domain Receptor 1 (DDR1): A Putative Suppressor of Intraosseous Breast Cancer Lesions

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Objective. To investigate the role of Discoidin Domain Receptor 1 (DDR1) in intraosseous growth of human MDA-MB-231 breast cancer (BrCa) cells. **Background.** BrCa commonly metastasizes to bone in women with advanced disease, leading to high morbidity and reduced survival. Treatments available for these patients are palliative, but not curative. DDRs represent the only receptor tyrosine kinases that signal in response to collagen, the major organic component of bones. Although DDR1 -one of the two DDR forms- is expressed in invasive BrCa, its contribution to bone metastasis remains unexplored. **Methods.** MDA-MB-231 cells were engineered to express either wild-type (WT) or kinase-dead (KD) inactive DDR1, or no DDR1 (Empty vector:EV). Western blot (WB) was used to assess DDR expression and activation. Cells were inoculated into the tibiae of female athymic nude mice. Three weeks later, tibiae were harvested and processed for H&E staining and immunohistochemistry of cytokeratins (epithelial marker) to identify BrCa cells within the bone. Histomorphometry analysis was performed to measure tumor and bone areas on the entire tibiae. **Results**. WB analysis showed expression of DDR1 in WT and KD but not in EV MDA-MB-231 cells. WT- but not KD-DDR1 was activated by collagen. Histomorphometrical analyses revealed that WT-DDR1 cells formed smaller intraosseous tumors than EV cells, whereas KD-DDR1 cells produced significantly larger tumors ($p<0.05$ Dunn's multiple comparison test, after significant Kruskal-Wallis test). No differences in bone response were noted. **Conclusion.** These results suggest that DDR1 plays a tumor-suppressing role in BrCa cells residing within the bone niche that is dependent on its tyrosine kinase activity.

Crisis Averted: Hepatic Artery Pseudoaneurysm Mimicking a Klatskin Tumor

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Introduction. Classically, hepatic artery pseudoaneurysms (HAPs) arise secondary to trauma or iatrogenic causes. In this case, the patient had no past surgeries or trauma to indicate the mass seen upon imaging was a pseudoaneurysm, hence the diagnosis as a neoplasm. If interventional radiology (IR) had not been consulted prior to biopsy, the pseudoaneurysm would have ruptured during the procedure. In literature, HAPs are discussed in reference to recent liver transplant, never in an otherwise healthy patient. **Case presentation.** A 71-year-old Caucasian male with no significant past medical history presented with painless jaundice and elevated serum bilirubin. Non-contrast CT showed a 4-cm mass in the hepatic hilum and dilitation of the intrahepatic bile ducts. The primary diagnostic consideration was neoplasm with cholangiocarcinoma (possible Klatskin tumor). **Deviation from expected.** This case is unique because the HAP presented with no past or recent trauma and painless jaundice, leading to its false initial diagnosis of a neoplasm. **Discussion.** IR was consulted for possible CT guided percutaneous biopsy. Prior to biopsy, IR ordered a CT of the abdomen with contrast and an ultrasound (US) of the abdomen with Doppler. These exams revealed flow within the mass and HAP was diagnosed. Biopsy was cancelled, and potential massive hemorrhage was averted. IR performed an angiogram and endovascular coil embolization. **Conclusion.** This case demonstrates the possibility of a HAP arising spontaneously, with no apparent etiology. While it is significant to both hepatology and interventional radiology, it also is an example of how collaboration averted a crisis. **Grants**. None

Human Microbiome and Proteus Mirabilis in the Development and Treatment of Rheumatoid Arthritis

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Objective. This study was conducted to determine the significance of Proteus mirabilis as a trigger for the development of Rheumatoid Arthritis based on the human microbiome theory. **Background.** Earlier research has demonstrated the connection between the oral microbiota and the development of Rheumatoid arthritis through the development of citrullinated auto-antigens. However, *Proteus mirabilis*, classically known as a trigger for UTIs has

also been shown to lead to higher levels of anti-citrullinated antibodies in RA patients via specific genetic sequences. **Methods.** This retrospective case study evaluates the new research linking *Proteus mirabilis* to the development of Rheumatoid Arthritis, expanding upon Ebringer's theorical model and comparing his research to new findings. The research supports the use of shared epitope sequences IRRET and ESRRAL, demonstrating molecular mimicry. **Results.** These patients were also found to have higher levels of the IRRET and ESSRAL sequences in *P. mirabilis*, via molecular mimicry to type XI collagen, a part of hyaline cartilage. These findings indicate that a trigger such as a UTI that increases P. mirabilis levels disrupts the natural composition of the human microbiome. **Conclusion.** Current treatment of P. mirabilis involves typical uncomplicated UTI antibiotic theory. However, due to increasing antimicrobial resistance and to limit potential side effects, the development of plant based therapy may have positive future indications in treatment. It has been found that resveratrol, an anti-inflammatory antioxidant from South African plants has been shown to control both P. mirabilis and P. vulgaris. **Grants.** N/A.

Current Practices in Interdisciplinary Disaster Response Education◆

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Objective. This study identifies the current educational practices, effectiveness, and satisfaction across the industry, allowing for the identification of both good practices that may be broadly applicable and training gaps to be considered for improvement. **Background**. The increased utilization of coordinated disaster response in the United States has resulted in the integration of interdisciplinary professions traditionally taught in segregated "silos." The lack of interdisciplinary training has been cited as potentially problematic to effective coordinated response. **Methods**. An anonymous two-page survey identifying current training practices and metrics for effectiveness was distributed, targeting any person potentially involved in a disaster response. **Results**. Responses were received from 72 professionals, subdivided into fire rescue personnel, law enforcement, government emergency management agencies, private emergency managers, mental health professionals, physicians, and health professional students. Of all respondents, 82% received formal disaster training as defined as a pre- determined curriculum involving at least 50% of classroom-based instruction. 77% participated in a full-scale interdisciplinary disaster response simulation; and, 85% had completed National Incident Management System (NIMS) training. Overall, while all groups valued formal and simulation training, physicians, students and mental health professionals were least likely to have previously participated. Additionally, though there was a general trend towards agreement with statements designed to assess efficacy of training, the average response often included "neutral" within the standard deviation of responses. **Conclusion**. Progress towards interdisciplinary training has not been uniform across all professions; and among most professions surveyed, this is not strong evidence of comfort and confidence working as interdisciplinary teams.

Forearm and Biceps Circumferential Variations in Skin Tissue Dielectric Constant and Firmness

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Objective. To determine circumferential variations of skin tissue dielectric constant (TDC) and indentation force (FORCE) at arm sites frequently used to evaluate arm lymphedema. **Background.** Little is known about how these values depend on the circumferential position at which such measurements are made. We sought to provide initial data on this question by determining the extent of circumferential variability among healthy young adult women. **Methods.** Women (N=35, age 18-31 years with BMI of 17.4 to 37.2 Kg/m^2) were evaluated by measuring TDC and FORCE at medial, anterior and lateral sides of the subject's non-dominant forearm and bicep. The sites were 5 cm distal and 8 cm proximal to the antecubital fossa. TDC was measured at 300 MHz by touching skin for about 5 seconds with a coaxial probe. FORCE was measured in milliNewtons by recording the force needed to indent skin 1.3 mm. **Results.** There were small but statistically significant differences among circumferential TDC values at forearm

(p=0.003) and among bicep sites (p<0.001). In the order medial-anterior-lateral, values at forearm were 26.2±2.2, 27.4±2.4 and 27.7±2.5 and at biceps were 23.3±1.9, 26.3±1.9 and 27.7±3.4. Circumferential averages at forearm exceeded bicep averages (27.1±2.0 vs. 25.8±1.9, p<0.001). FORCE values also differed circumferentially at forearm; 59.1±16.8, 73.2±20.8 and 105.3±29.9, p<0.001) and biceps (45.5±17.4, 74.3±21.4 and 64.9±21.9, p<0.001). **Conclusion.** Clinical assessments of TDC and FORCE are best done by standardizing and maintaining the same anatomical site when differences herein reported are of clinical importance. Further research on mature subjects and lymphedema patients is needed.

The Current State of Cybersecurity in the U.S. Food Supply Chain

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Objective. This study examines the cybersecurity measures currently in place to protect the United States food supply chain, identifies gaps in security measures, and suggests areas for improvement. **Background.** Technological innovation and the networked nature of the system have increased the vulnerability of the food supply chain. Further, preparedness and response measures for cyber incidents are limited. **Methods.** Existing literature was reviewed to determine the current state and potential weaknesses of data and electronic systems security in the food supply chain. **Results.** A cyber-attack on any segment of the food supply chain poses a significant threat to the American people and economy. The following are specific cyber threats to the system: theft, public exposure and misinformation, data corruption or loss, data manipulation or falsification, and threats to integrity. Of these threats, data corruption and threats to integrity pose the greatest risk of exploitation by hackers. To improve the security of the U.S. food supply chain, regulations and practices should be implemented to encompass all phases of the disaster cycle: prevention, protection, mitigation, response, and recovery. However, such regulations could not be uniform due to the differing sizes and types of enterprises involved in the supply chain. **Conclusion.** Current cybersecurity measures do little to protect the food supply chain from potential attacks. As such, an investment in preparedness and response would greatly mitigate the risk and potential damage caused by a cyber incident.

Assessing the Minimum Detectable Change Capability of Tissue Dielectric Constant Values as Applicable to Edema and Lymphedema Measurements

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Objective. This study was conducted to determine the minimum detectable change (MDC) capabilities of two tissue dielectric constant (TDC) measurement device types using test-retest measurements from which intraclass correlation coefficients (ICC) could be estimated. **Background.** TDC values of skin are measures of localized water content used as a tool to help detect, characterize, and assess treatment-related changes to edema and lymphedema. However, there has never been a systematic study of in vivo reliability aspects (such as MDC) or comparison of the two types of probes in use: the moisture meter D (MMD) and the moisture meter compact (MMC). **Methods.** Forty volunteer subjects participated, and two measurers (M1 and M2) used each of the TDC devices to measure TDC in triplicate sequentially and bilaterally at the anterior forearm, hand palmar mid-thenar eminence, and hand dorsum mid-web, and were completed by each measurer twice constituting test-retest values (T1 and T2). $ICC_{2,1}$ and MDC at 95% confidence were determined for each site, probe, and for both absolute TDC values and inter-side TDC ratios. **Results.** MDC values for absolute TDC values ranged from 2 to 9 TDC units, and for inter-side ratios ranged from 5.3% to 8.0% depending on anatomical site and the specific TDC probe used. Values obtained for the $ICC_{2,1}$ ranged from 0.765 to 0.982. **Conclusion.** The MDC values for absolute TDC or inter-side TDC ratios obtained in this study provide useful estimates of the MDC that reliably represents a real difference or change when measuring TDC in research or clinical situations.

Poster Presentations

Terrorists Manipulation: How Viruses, Bacteria, Prions, Fungus and Drugs Can Be Used as Weapons

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Objective. This study was conducted to determine if terrorists can manipulate the genetic genome of viruses, bacteria, prions, fungus, and drugs to be used as weapons. **Background.** Terrorist attacks can happen by biological, chemical, radiological, or nuclear warfare. Over the years, scientists have been discovering methods to genetically modify the genomes of diseases to potentially look for a cure. If the research gets into terrorists' possession, they can use this information to create new weapons and possibly generate more deadly attacks. **Methods.** For this study multiple viruses, prions, bacteria, fungus and drugs were selected that can infect the central nervous system or had effects that can be used to mind control the patient. For the chosen diseases, there is no cure and for the drugs, there are already deadly side effects. **Results.** Some diseases that were chosen can only infect animals and have not evolved to humans. Scientists have also not genetically modified every disease and drug that was selected. Specific diseases are common to certain regions and would cause an extreme concern if found in uncommon places. Most of the diseases are hard to obtain and some have unknown origins. **Conclusion.** Genetically modifying naturally occurring diseases and drugs, that already cause deadly consequences, can extremely impact a society and help terrorists create new weapons. **Grants.** This study was partially funded by a grant from the DO Student Body Research Fund.

Effect of a Static Magnetic Field on Menstrual Cramp Pain

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Objective. To evaluate the effectiveness of a concentric multipole magnet with a static magnetic field (SMF) with regard to its ability to reduce dysmenorrhea pain (Menstrual Pain). **Background.** Magnetic therapy is reported effective in reducing pain using magnets of an array of designs. The use of concentric multipole magnets has been suggested to provide an efficacious design but has never been studied in its ability to rapidly relieve dysmenorrhea pain. **Methods.** Women with period pain self-rated as ≥6 on the Numeric Pain Rating Scale (NPRS) participated. After rating entry pain, a magnet or sham was secured to an abdominal site close to the largest source of pain for 40 minutes, after which, the pain was again rated. Outcomes were determined by chi square analysis of the number of subjects in whom pain was or was not reduced. Subjects with NPRS ratings reduced by ≥ 35% were scored as having reduced pain. **Results.** Women (N=24) were evaluated, 14 with magnet and 10 with sham. As of now, 71.4% of those who wore a magnet had a meaningful pain reduction but only 20% of those who wore a sham received a pain reduction, with the data being statistically significant. **Conclusions.** If results maintain with the planned 30/group, this magnet type may be an alternative to traditional pain management useful for women unable or unwilling to take medication or as a non-side effect substitute.

Perception of Weight Status in Relationship to Self-Reported BMI

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Objective. The objective of this study is to assess perceptions of weight status in relation to self-reported height and weight (BMI) among individuals ages 16 years and older. **Methods.** A face-to-face, validated survey was conducted on 5964 participants. Interviewers conducted the Sample Person Questionnaire using the Computer-Assisted Personal

Interview (CAPI) system to gather data on topics related to body weight. Analysis was completed using Descriptive and Chi-Square tests, level of significance was 0.05. **Results.** Males who self-reported normal BMI, 18% considered themselves underweight and 77.6% the right weight. Males who self-reported overweight BMI, 58.3% considered themselves right weight and 2.2% underweight ($\chi 2$=1276.285, *p*=0.000). Females that self-reported normal weight, 7.8% considered themselves underweight and 76.2% right weight. Females who self-reported overweight, 31.5% considered the right weight and 1.8% underweight ($\chi 2$=1612.828, *p*=0.000). Out of the total males who self-reported overweight, 39.1% want to remain the same weight and 7.8% want to gain weight ($\chi 2$=1169.259, *p*=0.000). On the other hand, females who self-reported overweight, 19.9% want to remain the same weight and 8.4% want to gain weight ($\chi 2$=1162.907, *p*=0.000). **Conclusion.** When self-reported BMI is normal, males and females share similar perceptions on considering themselves the right weight, although more males consider themselves underweight. When self-reported BMI was higher perceptions varied between males and females. Significantly more males considered themselves to be the right weight compared to females in the overweight category. Furthermore, in the overweight range, males report wanting to remain the same weight significantly more than females in the same BMI range.

Dietary Added Sugar Intake and Risk for Depression in Individuals Receiving Interventions to Improve Health Literacy

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Objective. The study was conducted to determine the relationship between added-sugar consumption and risk for depression in individuals with low baseline levels of health literacy participating in the FLIGHT/VIDAS II clinical trial. **Background**. Health literacy is critical to understanding one's general health, chronic disease management, and influencing lifestyle preferences. It is demonstrated in the literature that there is a relationship between dietary quality and health literacy, but this relationship has not been well explored. Furthermore, recent studies have begun to evaluate the association between depression and diet, specifically the intake of dietary added sugars (DAS) and added sugar from sugar sweetened beverages (SSB). **Methods.** Results from the NHANES Dietary Screener Questionnaire for 165 participants were collected at baseline. Algorithms defined by the National Cancer Institute were used to calculate DAS and SSB in daily teaspoons of added sugar. A multivariate analysis was conducted using Center for Epidemiologic Studies Depression Scale (CES-D) scores above threshold (>16), Gender (Male/Female), and DAS and SSB as dependent variables. Level of health literacy was accounted for as a covariate. **Results**. There were statistically significant interactions between CES-D scores above threshold and gender on the combined dependent variables DAS and SSB where $F(6,318)$, $p < 0.05$, Wilks' $\Lambda = 0.851$. **Conclusion.** Preliminary evidence from baseline assessments demonstrates a relationship between intake of DAS and SSB and the risk for depression, in individuals identified with having a low baseline level of health literacy. Further studies may consider the effects of interventions aimed at improving health literacy on dietary quality and the intake of DAS and SSB. **Grants.** This study was supported by grants R01HL096578, R56HL096578 and R01MD010368 (Ownby, PI) from the National Heart, Lung, and Blood Institute and the National Institute on Minority Health and Health Disparities

Does Hand Dominance Impact Inter-arm Systolic Blood Pressure (IASBP)?

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Objective. To determine if hand dominance affects IASBP in young healthy adults**. Background.** IASBP differences ≥ 10 mmHg have been reported useful to predict future cardiovascular-related morbidities. As dominant arms (DOM)

tend to have greater girth and muscle development than non-dominant arms (NDOM), it was reasoned that cuff pressures needed to obtain systolic blood pressure (SBP) may be greater on DOM arms whether DOM was left or right hand. **Methods.** SBP was measured in left and right-handers (29.4 ± 10.4 years) in whom handedness was clearly defined. Handedness was determined by a multi-question form in 90 young adults (45 male) and IASBP determined via simultaneous measurements done in triplicate on seated subjects. The percentage of left-handers in male and female sub-groups were equal at 37.8%. **Results.** Results show that the absolute IASBP difference in left-handers (mean ± SD) was 4.4 ± 3.8 mmHg and for right-handers was 5.0 ± 4.2 mmHg (P = 0.362). There was statistically significant difference among 1st, 2nd and 3rd measured IASSBP difference for either right or left-handers or differences between right and left-handers. **Conclusion.** Results show no evidence of a higher SBP in dominant arms whether subjects were left or right handed. This finding clarifies the hand-dominance issue as a factor not generally needing to be considered in clinical assessments. A potentially useful secondary outcome was the finding that 14.8% of this group had at least one measured IASBP difference ≥ 10 mm Hg, a finding that was unexpected and may have future relevance. **Grants.** NA

Rab GTPase Protein Expression Changes in Alpha-Synucleinopathy and Tauopathy Disorders

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Objective. Determine Rab GTPase expression changes in α-synucleinopathy and tauopathy disorders. **Background.** Alterations in Rab GTPase function are increasingly implicated in neurodegenerative diseases. In Lewy body disorders, Rab proteins interact with α-synuclein, supporting a potential role in Parkinson disease (PD). Expression of specific Rabs (e.g., Rab1, 8a) rescues α-synuclein associated trafficking deficits. Rab proteins have similarly been linked to Alzheimer disease (AD). However, little is known about the role of Rab GTPases in tau disorders and expression patterns in neurodegenerative disease. **Design/Methods**. We examined expression levels of several Rab GTPase proteins (Rab 3a, 5, 7, 8a, 10, 11a, and 35) in postmortem human brain regions from multiple tauopathy (AD, PSP, CBD), Lewy body (α-Synucleinopathy) disorders (PD, DLB, MSA), and matched controls. Frozen brain samples were homogenized in high salt buffer and analyzed by Western blot with specific Rab antibodies. **Results**. Rab3a expression was significantly increased in the striatum of DLB and MSA, but not PD. Rab8a levels were decreased in frontal and temporal cortex in atypical parkinsonian disorders (APD) compared to control. Rab11a was similarly decreased in frontal cortex in APDs but increased in the striatum and white matter of PSP and CBD. Rab35 appeared unchanged in PD but was significantly decreased in the striatum in APDs. **Conclusions.** These findings represent the first comprehensive analysis of Rab GTPase expression and demonstrate differential expression patterns for Rab proteins in disease-affected regions of tau and α-synuclein disorders. **Grant.** Supported by the Allen-Simmons Atypical Parkinsonism Fellowship. Work performed at the University of Florida by Dr. Parmar under the mentorship of Dr. McFarland.

Rural Community Disaster Preparedness: Developing a Plan

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Objective. The purpose of this study was to analyze the unique challenges rural communities face, examine current disaster preparedness protocols, and identify areas of improvement for future disaster preparedness planning in rural communities. **Background.** Rural communities face unique threats as compared to urban communities in regard to disaster preparedness planning. There are several needs that are overlooked in these communities due to resource limitations and geographic distribution. The goal of this study is to expand knowledge regarding effective disaster preparedness planning efforts so that community resiliency may be maximized during times of catastrophe. **Methods.** The information upon which this synthesis is based was gathered by a comprehensive search of peer-reviewed journals and public websites based on a wide range of key terms including ‘rural community’ ‘preparedness planning’ and ‘disaster protocols.’ **Results.** It was found that rural communities face exclusive economic threats and are home to

vulnerable populations that need to be considered when developing disaster response plans. The vast geographic coverage, demographic diversity, and resource limitations are identified barriers. Also, the potential influence of urban communities on rural communities during a disaster is an additional exacerbation to consider with disaster response planning. **Conclusion.** Rural communities lack resources compared to urban communities posing unique disadvantages when it comes to preparedness efforts. It is important to analyze and expand our knowledge about these challenges in order to overcome them so that recovery potential in a post-disaster state is optimized. **Grants.** No special funding was used to generate this review.

Prevalence of Mycotoxins in the Urine of Patients with Chronic Fatigue Syndrome

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Background. Chronic Fatigue Syndrome, abbreviated as CFS, is a complex disorder characterized by post-exertional malaise, difficulty with cognition, somatosensory pain, and dizziness without any other underlying medical condition. According to the Institute of Medicine (IOM), between 836,000 to 2.5 million Americans suffer from CFS, with a majority of them being undiagnosed. Past studies have shown that viral infections, changes in micro-biome of the gastrointestinal system, genetics, and mycotoxins play a key role in the etiology of CFS. **Methods**. Urine analysis was performed on 137 patients to detect the following mold toxins: Aflatoxin, Ochratoxin A, and Gliotoxin derivative. The results were either informed via Great Plains Lab which utilizes ELISA to quantify the levels of mold toxins and Real Time Lab which utilizes chromatography. **Results**.The results of the urine analysis demonstrate that every single patient has at least one of the following toxins present in their urine in significant amounts. In addition, over 90% of the patients have at least two of the three mold toxins present in their urine. **Conclusion.** This study has further strengthened the existing theory that correlates the relationship between mold toxicity and CFS. **Grants**. No grants were utilized in order to fulfill this research project.

Assessing Vaping Usage and Views Among Medical School Students

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Objective. This study was conducted to determine the views of medical students with respect to vaping and their views on the education they receive toward the usage of vaping products. **Background**. Vaping products were initially seen as a beneficial alternative to cigarettes. According to the Centers for Disease Control and Prevention, however, 2,668 hospitalizations and 60 deaths have been reported in the U.S. alone this year due to electronic cigarette associated lung injury. **Methods**. All students enrolled in NSU-KPCOM were sent an email via listserv with a link to the Google Form Survey regarding vaping. All respondents answered the first section of the survey. If the user had vaped at least once, they completed the remainder of the survey. The survey is a total of 18 questions. **Results**. Out of 252 medical school students, 96.4% believed that vaping is a danger to one's health. Though, 37.7% admitted to vaping at least once in their lifetime. 39.4% of vaping users continue to vape knowing its dangers. 90.4% of those vaping users also did not think that their usage impacted others around them. 67.8% rated their institution's curriculum on vaping as poor or very poor with 76.2% of students responding that their medical school education had no impact on their views about vaping. **Conclusion**. Medical school students are aware of the overall dangers of vaping, however many have at least tried vaping or continue to vape knowing these dangers. Furthermore, although most medical students view vaping as a health hazard, students receive little to no formal education about the detriments of vaping. There is a clear necessity to implement electronic cigarette education into medical school curriculums.

Poster Presentations

Xanthogranulomatous Pyelonephritis: A Rare Presentation

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Introduction. Xanthogranulomatous Pyelonephritis (XGP) is a rare subtype of chronic pyelonephritis. It results in a large renal mass and is challenging to differentiate from other masses/lesions. Most cases affect diabetic middle-aged females with chronic UTIs or nephrolithiasis. **Case Presentation.** A 21-year-old female from Venezuela presented to the ED with two days of LUQ pain, two weeks of watery diarrhea, and 20lbs of unintentional weight loss. She denied any urinary symptoms, history of UTIs or nephrolithiasis. Workup revealed anemia, leukocytosis, and sterile urinalysis. On CT, the left kidney was 15.4x12.2x17.2cm, obliterated by loculated cystic spaces, with staghorn calculi. Adjacent stranding and lymphadenopathy raised concern for pyelonephritis and malignancy. Two percutaneous nephrostomy tubes drained over 450ml of pus that grew Proteus. Urology performed robotic left nephrectomy with pre/postoperative antibiotic treatment, and pathology confirmed XGP. **Deviation from the Expected.** XGP most often affects diabetic middle-aged women with chronic UTIs or nephrolithiasis. Our case emphasizes the variability of this disease. Though preoperative nephrostomy tube drainage is standard, placing multiple tubes is a unique strategy. **Discussion.** Early studies pinpointed XGP in 0.6% of nephrectomies performed for chronic pyelonephritis. Modern incidence estimates are 4-18%. The pathophysiology is mysterious but involves chronic inflammation from infectious/obstructive processes. Abundant lipid-laden macrophages produce a grossly yellow appearance. XGP is often confused for malignancy, but renal tuberculosis, congenital polycystic kidney disease, and pyonephrosis are also differentials. **Conclusion**. XGP may be more common than initially thought. Familiarity is essential, as it is easily confused with other renal masses/lesions. **Grants**. This study was non-funded.

Does Early Mobilization Rehabilitation Protocol Affect Pain Scores, Opioid Consumption, and Return To Activities Of Daily Living In Reverse Shoulder Arthroplasty?

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Introduction. Reverse shoulder arthroplasty (RSA) has demonstrated exponential growth in the US over the past two decades. Literature suggests that early range of motion (ROM) may provide more rapid return of function, however, no studies have looked specifically at how this may impact pain and opioid consumption. The purpose of this study was to evaluate the impact of an immediate mobilization rehabilitation program on pain and opioid consumption following RSA. **Methods.** A retrospective case-controlled study was performed on 65 patients who underwent RSA at a single institution by two fellowship trained shoulder surgeons. Two groups included: immediate mobilization (IM) group (n=29) and delayed mobilization (DM) group which started PT after 4-6 weeks (n=36). Pain scores (NRS and ASES), time to return to work, opioid dependency, and opioid consumption were compared using total morphine equivalents (TME). Statistical analyses included Chi-squared, independent and paired t tests. **Results.** Preoperatively there was no significant difference seen between groups in NRS (5.77 vs 6.35)(p=0.48), ASES for pain (24.2 vs 17.8) (p=0.15), opioid dependence (IM=13% vs DM=11%) (p=0.82) and opioid consumption (IM=69.93TME vs DM=78.69 TME) (p=0.88). Postoperatively, there was no significant difference in opioid dependence (IM=13% vs DM=19%) (p=0.48), opioid consumption (IM=102.39TME vs 155.39TME) (p=0.41) and ASES for pain (p=0.06) between the groups, however there was a significant difference in NRS with lower scores for the IM group (0.61) compared to DM group (2.79) (p=0.02) at 3 months postoperatively. **Conclusion.** Our study showed that the immediate mobilization rehab can achieve lower reported pain scores postoperatively, however this advantage did not translate to less opioid consumption or lower rates of dependence.

Breast Tissue Dielectric Constant (TDC) Assessed in Women Having a Breast Tumor Biopsy

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Objective. Determine TDC values of female breasts and effects of benign vs. malignant tumors. **Background.** TDC values can assess breast-cancer-treatment-related lymphedema. However, little is known about how breast TDC values are impacted by tumor-type (benign vs. malignant). **Methods.** Women (N=38) scheduled for a breast biopsy participated. Prior to biopsy, TDC was measured at; a standard-site bilaterally, over the tumor-site and at a similar healthy-breast site. Standard-site was adjacent and superior to the areola. TDC was measured with a probe that touched a breast for 5-seconds. Malignant-tumor patients (14) were older with larger tumors. **Results.** Standard-siteTDC values of biopsied vs. healthy-breasts (mean ± SD) were similar (30.9±4.3 vs. 30.5±4.7, N=38, p=0.317) and overall equal to 30.7±4.5. Tumor- carrying breast tumor-site values were greater than for healthy-breasts (31.9±6.7 vs. 30.3±6.5, N=38, p=0.009). Malignant-tumor TDC values (N=14) were greater than for healthy-breasts (32.6±6.2 vs. 29.0±5.9, p=0.008). Breasts with benign-tumors (N=24), showed no difference in TDC values between tumor vs. other breast (31.5±7.0 vs. 31.2±6.7, p=0.280). TDC at malignant-tumors was higher than standard-sites, but not statistically different (32.6±6.2 vs. 30.4±3.3, p=0.173.) Corresponding values on benign-tumor breasts were 31.5±7.0 vs. 31.2±4.8, p= 0.843). **Conclusion.** Results provide reference TDC values for standardized breast sites useful as comparison values for future studies about breast edema due to breast-cancer-treatment. Additionally, results show slightly greater TDC values at malignant-tumor sites vs. the contralateral healthy-breast site. However, it is not clear as yet if this difference is sufficient to provide useful diagnostic sensitivity of tumor type.

Dietary Views and Habits of Health Professional (HPD) vs. Non-Health (NHPD) Students

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Objective. To test if HPD students practice healthier nutrition than non-HPD (NHPD) students. **Background**. The National-Research-Council sets a minimum of 25-hours of nutrition-education to inform future physicians on healthy eating. Studies question how effective this program is. **Methods**. A 16 question survey was created and distributed to students in HPD and NHPD programs. Questions targeted student eating habits and their thoughts about healthy food choices. Each question had five options and was worth at most 10 points. Quantification was based on assigning 2 points for the "least-nutritionally-good" choice, 10 points for "most-nutritionally-good" choice and in-between values in 2-point steps. Higher scores were better. **Results**. Of 732 responses (569 HPD-163 NHPD), distributions were; 73.1% female, 50.8% Caucasian, 22.8% Hispanic, 7.7% African-American, 7.6% Asian, 6.0% Asian-Indian, and 5.1% other ethnicities. Results showed no significant HPD-NHPD difference ($p > 0.05$) in any parameter including consumption of sweets, fast food, red meat, caffeine, water, fruit, vegetables but there were gender differences. Expressed as mean±SD, females scored higher (better) than males in red meat consumption (7.34±1.9 vs. 5.96±2.0, $p<0.001$) but lower (less nutritionally good) than males in sweet consumption (6.19±1.74 vs. 6.82±1.66, $p<0.001$), water intake (6.23±1.95 vs 6.85±1.90, $p<0.001$), and protein intake (4.41±1.03 vs 4.90±1.20, $p<0.001$). Females also had a lower exercise score (5.62±3.0 vs 6.36±3.00, $p<0.01$). **Conclusion.** Results suggest that NSU students enrolled in HPD and Non-HPD programs have similar nutritional concepts and eating habits. This may indicate a need to re-think the role of nutritional education in dietary health and wellness considerations among students.

Poster Presentations

Comparison Across Height Groups Between the Forward Functional Reach (FFR) Test and Other Fall Risk Outcome Measures to Identify Fall Risk Among Older Adults

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Background/Purpose. The Forward Functional Reach (FFR) test assesses anterior/posterior movement to identify fall risk. Previous studies have used the same cut value to identify fall risk for all people. The purpose of this study was to determine a correlation between FFR and other fall risk measures based on individual height. **Methods**. Participants age 60 plus were recruited from a senior activity center. Participants' height was measured using a stadiometer then each performed FRR test using the 1-arm reaching method followed by completing: Fall/medical history, Activities Based Confidence Scale, Timed up and Go, & grip strength. Analysis utilized descriptive statistics and a Pearson correlation between FFR and each outcome measure. **Results**. Sixty-six participants were stratified into height groups: < 65", 65" to 69", >69". Using 10" cut value for all groups, low correlations were found between FFR and each measure: Grip Strength: +0.45, ABC: +0.25, Fall history: +0.05 and TUG:-0.33. Only the medium height group was accurately identified as fall risk by the FFR when identified by at least one other measure. FFR only identified 44% in the short height and 53% in the tallest height group as fall risk. **Conclusion.** Using the current criterion of a single value (10") as a cutoff for FFR is not supported by this study; with results of 66% false positives in the short height group and 47% false negative in the tall height group. Future studies should look at individual markers of fall risk for the FFR based on height of the individual.

Multidimensional Pedagogical Model for Educating Students and CF in Gender Diverse Voice & Communication Modification ◆

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Objective. We propose a multidimensional pedagogical model and subsequent study for academic and clinical training of graduate students and clinical fellows interested in delivering voice and communication services to transgender individuals. **Background.** The World Professional Association for Transgender Health Organization addresses the importance of voice modification services in transgender women. Voice is the transitioning feature with which transgender women are least satisfied. **Methods.** The model comprises of nine educational experiences through various modalities and dimension of participation. The experiences include university classroom, university clinic, community conferences, and community outreach. The students write a research paper, evaluate and/or treat a transgender client, attend a Q&A session with a panel of transgender clients, attend and/or present at university and community transgender forums and conferences. **Results.** Voice Disorders is a required course in ASHA accredited Master's programs. A lecture on transgender voice and communication modification may be included; however, students may not meet the standards of clinical, cultural, and collaborative competence to serve the population adequately. Other researchers recognized the need for students to learn about interprofessional collaboration when providing services to transgender persons. SLP and mental health faculty partnered to provide educational programs on gender diversity to students. This forum, where transgender clients engaged students in the classroom, allowed students to learn about voice modification and cultural diversity.

Making the Research on Verbal Fluency Clinically Usable

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Objective. The purpose of this project is to produce a clinical decision-making model and literature review to help clinicians use the extensive literature on phonemic and semantic fluency. **Background**. Measures of phonemic and

semantic fluency assess cognitive and linguistic function, are extremely sensitive, and quick to measure (less than 5 minutes). Because verbal fluency requires both cognitive and linguistic functions and relies extensively on different areas of the brain, it is sensitive to a number of different neurological conditions, and each condition may have its own profile or pattern of characteristic responses to the task. Indeed, phonemic verbal fluency is more sensitive than the *Wisconsin Card Sort* for detecting brain injury (Henry & Crawford, 2002). Although the literature on verbal fluency is extensive, it may be difficult for most clinicians to access. Therefore we have compiled an evidence-based guide for clinicians. **Methods**. After a comprehensive review of the literature, we summarized a clinical decision-making model that can help link clinical performance profiles to diagnoses. We also summarized the available quantitative and qualitative scoring methods. **Results**. A clinical decision-making model for semantic and phonemic fluency has been created and is currently under peer review. **Conclusion**. Considering how quickly verbal fluency tests can be administered, and how sensitive it can be to cognitive-linguistic functions, we recommend using the Semantic (Animal Naming) and Phonemic (F-A-S) tests for many clinical situations. Our clinically-oriented summary of the evidence can help clinicians implement this useful tool in practice.

The Lived Experience of Exemplary Physical Therapist Students in Clinical Education: A Phenomenological Study

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Background and Objective: The academic community has made it priority to determine best practice in the clinical education (CE) of physical therapist (PT) students. The perspective of various stakeholders has been considered in the profession's pursuit of excellence, however, the student, a critical stakeholder, has not been given the opportunity to be heard. To date, no literature has explored the experience of PT students who demonstrate excellence. This study aimed to understand the lived experience of the exemplary PT student in CE. **Methods.** Phenomenological methodology was used. 26 students from the US in their terminal clinical experience or within six months of graduation were recruited. Data was collected via one-on-one semi-structured interviews and analyzed using constant comparison. The trustworthiness of the findings was supported using peer reviewing, thick description, and member checking. **Results.** One overarching (A desire to serve) and nine themes emerged. The nine themes include: 1. Being empathetic, 2. Being adaptable, 3. Being receptive to and seeking feedback, 4. Being reflective in clinical practice, 5. Using the past experiences to inform current performance, 6. Embracing challenges and seeking opportunities, 7. Engaging in a collaborative relationship with their CI, 8. Being skilled at self-care, and 9. Coming into my own as a PT. **Conclusion.** This study's findings echo that of contemporary research related to being internally motivated, having a growth mindset, and being resilient. The results can be used to inform admissions, student preparation for clinical practice, and professional development training in professional physical therapy programs.

The Sport Supplementation Habits of NCAA Division II Athletes

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The following study was conducted to gain a preliminary understanding of the sport supplementation habits of NCAA Division II athletes. Incorporating sports supplements has previously been shown to increase physiological aspects of sports performance (Cameron et al., 2018; Lun et al., 2012; Shaw, Slater, & Burke, 2016). Data for this study was obtained using a self-report questionnaire that measured supplement consumption, frequency, type, as well as some motivating factors for taking supplements. It was found that most athletes reported protein as their most consumed supplement, predominately in the form of protein bars and whey. Supplements were mostly taken daily and were used for recovery purposes. Also, worth noting, most athletes took into consideration recommendations from their coaching

staff and teammates as their predominant reason for taking a sports supplement. This data serves to build a foundation for understanding the specificity of supplement use in elite-level female athletes.

Feasibility of Two Proposed Efficacy Studies

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Objective. Feasibility findings for two study proposals are reported. Both investigate efficacy of Prolonged Nasal Cul-de-Sac with High Pressure Speech Acts (P*i*NCH therapy) on velopharyngeal (VP) function with pre-peri- and post therapy imaging. One uses videofluoroscopy and the other, nasopharyngoscopy. **Background.** VP inactivity /"surrender," occurs in the absence of positive pressure intraorally, e.g., nasal, glottal and pharyngeal sounds, cleft palate, fistula and VP inadequacy. A structural VP gap is exacerbated by the presence of VP surrender. The extensiveness of VP surgery is determined by VP gap size. The more extensive the surgery, the greater are the risks of serious complications such as OSA. P.*i*.N.C.H.therapy aims at reducing the size of the surrender component of the VP gap so that surgery addresses only the structural component. That way, extensiveness of surgery and its potential complications are reduced. **Method.** Literature reviews, interviews and communication with engineers, a leading manufacturer and voice specialists were conducted. **Results.** Nasopharyngoscopy as a peri-PiNCH evaluation tool was non-feasible in terms of availability and accessibility, and potentially feasible in terms of cost and expertise. Videofluoroscopy as a pre-peri and post evaluation tool was determined to be potentially safe if temporal measures were taken, affordable and accessible. **Conclusion.** Investigating the efficacy of PiNCH therapy is a worthwhile endeavor as the therapy may reduce the extensiveness of VP surgery and consequent complications. Using videofluoroscopy is a feasible method for pre-peri and post therapy study, as the benefits would outweigh the risks.
Grants. None

Measuring the Engagement of Children with Autism Spectrum Disorder Using Eye-Tracking Data

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Objective. To investigate the role of human-animal interaction on children with Autism Spectrum Disorder (ASD). **Background.** Children and adults with an ASD lack sufficient abilities to engage with others. They often misinterpret cues and exhibit the incorrect response. Research studies indicate that a pet can serve as an emotional comfort and can serve as an aid to teach certain skills; mainly, a pet can help children learn about their own emotions and connect with others. **Methods.** Neurotypical children and children with ASD were recruited from the public and from CARD-UM-NSU, Mailman Segal Center, and Nicklaus Children's hospital. Data were collected using the Tobii Pro Nano eye-tracker to measure eye movement, pupil dilation, and gaze fixation. The Tobii Pro Nano lab was used to analyze the imaging eye-tracking data and IBM SPSS V 26.1 was used to analyze the numerical data that were generated. **Results.** The results reveal that children with ASD respond positively to the interaction between a friendly animal and a person similar to children with neurotypical development. Gaze fixation data suggest that children with ASD respond well to the animal and also understand the animal's toy preference. **Conclusion.** The findings suggest that children with ASD can comprehend happiness and can form relationships with a pet to improve learning and social interaction skills. These findings will provide evidence crucial to understanding the impact of pet therapy on the social and learning behaviors of children with ASD. **Grants.** This study was funded by the President's Quality of Life Grant.

Analysis of Epigenetic Modifications in HCC827 and LNCaP cells

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Objective. Our study was aimed to examine the expression levels of DNA methyltransferase in HCC827 (Lung Cancer) cells during SAHA (Suberoylanilide Hydroxamic Acid) treatment**. Background.** Epigenetic changes in chromatin have been found to regulate oncogenesis and cancer cell growth. DNA methylation and Histone modification are some of the most important changes found during cancer growth. Epigenetic therapy using histone deacetylase inhibitors (HDACi) SAHA can induce cell cycle arrest, differentiation, suppressed cell growth, and cell death of cancer cells. DNA methyl transferases are suspected to be involved in SAHA induced cell death. **Methods.** HCC827 cells were treated with SAHA (7.5µM) for 24 hrs. Microarray and western blotting analysis were used to assess the exoression levels of the DNA methyltrasnferase. **Results.** We found that SAHA treatment reduced the expression level of SUV39H1, DNMT3A, and PRMT1 after 24 hrs of treatment using Western blot as well as Microarray analysis. **Conclusion.** These results provide important information regarding that the interplay between histone acetylation and de-methylation under the same treatment, leading to two opposite effects: demethylation of DNA and upregulation of tumor suppressor genes. **Grants.** The Royal Dames of Cancer Research Inc. of Fort Lauderdale, Florida is gratefully acknowledged for their generous support.

Effect of Chemical Modification on tPA on the Integrity of HMBEC Monolayer In Vitro

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Objective. The purpose of this study is to evaluate effect of chemically modified tPA on the HMBEC monolayer integrity. **Background**. Tissue-type plasminogen activator (tPA) has been the only FDA-approved thrombolytic agent for ischemic stroke (IS). However, thrombolytic therapy for IS inherently suffers from intracranial hemorrhage (ICH). Literature evidence pointed out the ability of tPA to stimulate matrix metalloproteinase enzymes (MMP-9) through its interactions with endothelial cell surface moieties, such as LRP-1. The elevated MMP-9 may compromise the integrity of the blood-brain barrier, significantly potentiating the risk of ICH. Previously we have shown that chemical modification of tPA attenuated MMP-9 generation from HBMEC culture *in vitro*. **Methods**. Low-molecular weight heparin (LMWH) was covalently conjugated to tPA, as reported previously. Human brain microvascular endothelial cells (HBMEC) was cultured on 24-well transwell system, in endothelial growth media supplemented with 10% fetal bovine serum (FBS) at 37 C under 5% carbon dioxide. Trans-epithelial electrical resistance (TEER) was monitored under different seeding conditions over a period of ~10 days. Both TEER and Permeability of fluorescein-labelled bovine serum albumin (FITC-BSA) was evaluated when the cells were treated with tPA, the conjugate or vehicle. **Results**. Treating HBMEC with tPA caused significant increase in FITC-BSA permeability and decrease in TEER compared to the control, which was not observed in the LMWH-tPA treatment group. **Conclusion.** Selective chemical modification of tPA may attenuate the MMP-9 generation from HBMEC and may pave a way to developing safer thrombolytic agents. **Grants**. The work was supported in part by NSU President's Faculty Research and Development Grant (PFRDG).

Differences in Reach Distance on the Forward Functional Reach (FRR) Test Between Three Height Groups Among Older Adults

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Background & Purpose. Loss of balance is a significant factor for falls in the aging population. The Forward Functional Reach (FFR) test, developed by Duncan et al (1990), assesses anterior/posterior (AP) balance and identify fall risk. Previous study results using FFR have been variable, possibly because an individual's height was

not considered in reach distance. The purpose of this study was to determine if an individual's height is related to FFR distance. **Methods.** Participants age 60 plus were recruited from a senior activity center. Participants' height was measured using a stadiometer. Each participant performed the FRR test using the 1-arm reaching method per the protocol by Duncan (1990). Analysis done included: Descriptive statistics to describe sample characteristics; Pearson correlation to examine the relationship between reach and height; and ANOVA to analyze differences in reach distance between height groups. **Results.** Sixty-six participants were stratified into height groups: < 65 inches, 65 and 69 inches, >69 inches. A moderate correlation (r=0.63) between height and reach was found. A statistically significant difference between the height groups for the unilateral forward functional reach (p=3.03x10^{-6}). **Conclusion.** Height is a factor FFR distance and should be considered in the interpretation of testing. Using a single value (10") as a cutoff per the current criterion to identify fall risk, is not supported by this study. Each height group should have an identified cut score value for more accurate fall risk identification. Other factors to consider include: quality of movement of the individuals including substitution and movement variability.

Government Contract Procurement API Coupled with CRM Technology Will Open the Door for Hackers to Control the United States' Government by November 2020

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Objective. The impact of Agroterror on United States' government infrastructure and the ease of an attack. **Background**: Recognizing the government's use of Application Programming Interface (API) technology and Customer Relationship Management (CRM) system to streamline the movement of imports, exports, and networking government contractors, led to the realization of the United States' government's potential susceptibility to hacking. Similar to internet surfing, currently, API allows one to communicate directly without having to log on to multiple areas. This leaves room for hackers to use backdoor channels of less protected areas to sneak in. The macro-connectivity of government contracting allows Agroterrorists endless portals that could lead to government takeover in less than 12 months. **Methods.** Coupling (API) technology with a (CRM) system that's designed by the government, research showed the average CRM system is cloud-based to allow direct access from commonly used devices via app. Consequently, the government could be hacked by password breach, leaving officials vulnerable to attack. **Results.** Using a compare and contrast approach, several areas of opportunity were most concerning. Examples are contracting with agricultural countries without proper technological protections, and communications between allied nations who benefit from the acquisition of military protection. **Conclusion.** Agroterrorists are not the commonly known terrorists, but pragmatically use non-aggressive approaches to weaken regions to further their agenda. One must educate themself on the underlying problem of Agroterrorism and what government protections are in place. The United States' government can avoid an attack from Agroterrorist hackers by revamping API and CRM systems and limiting international working relationships.

Giving Voice: Using Mixed Methods to Gauge the Effectiveness of a Health Promotion Intervention for Adults with Intellectual and Developmental Disabilities (IDD)

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Objective. To evaluate the effects of the Special Olympics International Fit 5 program and gardening intervention on the health of adults with IDD as measured through biometrics and quality-of-life instrument. **Background.** People

with intellectual and developmental disabilities (IDD) represent a large, medically under-served population. They experience higher rates of preventable disease, co-morbidities, and reduced life expectancy compared to the general population. Additionally, they experience less access to quality health care and health promotion programs. **Methods.** This mixed methods, randomized control trial, obtained quantitative data from biometrics and quality of life instrument, the Personal Outcomes Scale (POS), and qualitative data from the POS. **Discussion.** The biometric data obtained provides valuable information regarding the effects of the intervention on determinants of health, while the Personal Outcomes Scale (POS) provides an opportunity to dialogue with adults with IDD regarding quality of life. The POS is based on eight quality of life core domains that have been validated through cross-cultural studies. The domains are: personal development and self-determination; interpersonal relations, social inclusion, and rights; and emotional, physical, and material well-being. In addition to the three-point Likert scale, qualitative questions allow adults with IDD to describe what they value, express personal goals, and what may improve quality of life. The outcomes obtained and themes that emerged from the initial POS will be discussed and provide insight into adults with IDD's perceptions of their quality of life. **Grants**. This research is funded by the Nova Southeastern University 2019-2020 President's Faculty Research and Development Grant.

Effect of HDAC Inhibitor on DNA Methylation and Cell Cycle Regulation in Prostate Cancer

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Objective. Our study was aimed to analyse the expression of methyltransferase levels in LNCaP (prostate Cancer) cells during SAHA treatment. **Background.** Prostate cancer is the second leading cause of death in men after lung cancer in the US. Nearly 1 in 8 men will be diagnosed with prostate cancer in their lifetime, and the risk increases significantly once the men cross the age of 70. Recognizing ways to reduce the death of prostate cancer is therefore a top research priority. Epigenetic regulation of gene plays an important role in the controlling cell cycle and tumor growth in various cancers. Epigenetic changes generally occur through alterations in DNA and Histone modification such as acetylation, methylation, phosphorylation, and ubiquitination. SAHA (Suberoylanilide Hydroxamic Acid) is a broad spectram inhibitor of histone deacetylase (HDAC), which is used to modify the status of Histone Acetylation during cancer treatments. However, the impact of SAHA on methyltransferase levels or methylation status of DNA has not been studied in detail. **Methods.** LNCaP cells were cultured in complete RPMI-1640 growth medium and treated with SAHA (7.5 uM) for 24 hours. Western blot technique was used to analyze the expression levels of DNMT3A, SUV39H1, PRMT1, and p21. **Results.** Our experimental results have shown that SAHA treatment reduces the levels of the methyltransferase enzymes listed above. Furthermore, SAHA treatment increased the protein levels of p21, which is a CDKI (cyclin-dependent kinase inhibitor). **Conclusion.** Methylation is an important modification of DNA that can regulate gene expressions. Our results indicate that SAHA treatment, which is known to regulate histone acetylation, can impact the methylation status also through an indirect mechanism and allow for the control of transcription of tumor suppressor genes. **Acknowledgement.** This Research was supported by the Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida.

The Neuroprotective Role of Nimodipine and nNOS Inhibitor Against Bortezomib-Induced Cell Death in Schwann Cells

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Objective. The study was conducted to assess the neuroprotective role of Nimodipine (Nim) and nNOS inhibitor (nNi) against bortezomib (BTZ)-induced cell death in Schwann cells (RT4-D6P2T). **Background**. Schwann cells (SC) are myelinating cells, known to maintain the integrity and regeneration of neurons in the peripheral nervous system (PNS). Our study was designed to determine the molecular mechanisms involved in the use of neuroprotective agents against bortezomib-induced damage in SC. **Methods**. In our study, the cell viability of BTZ-treated cells was measured after 24, 48, and 72 h of treatments, followed by neuroprotective studies with Nim and nNi. Reactive oxygen species (ROS) and mitochondrial membrane potential ($\Delta\psi m$) were assessed using DCFDA and JC-1 staining method. Western blot analysis was conducted for measuring phospho-epidermal growth factor receptor (pEGFR), myelin basic protein (MBP), Protein kinase B (AKT) and phospho-Protein kinase B (pAKT) protein levels. **Results**. BTZ (1 µM) treatment was able to significantly reduce the cell viability after 24 h treatment compared to untreated controls. In addition, pre-treatment with Nim (10 µM) and nNi (1 µM) demonstrated significant upregulation of pAKT levels in BTZ-treated cells, while a significant decrease in MBP expression levels was observed. Interestingly, marginal decrease was observed in Nim and nNi pre-treated cells. **Conclusion**. Our results indicate that the neuroprotective role of Nim and nNi may be due to upregulation of pAKT and related pathways. **Grants**. This study was funded by the PFRDG grant 334818 and the financial support from the Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida.

PD-L1 Expression Due to Epigenetic Modifications During Histone Deacetylase Inhibition in Cancer Cells

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Objective. We analyzed the expression of PD-L1 following inhibition of HDACs (Histone Deacetylase) with SAHA (Suberoylanilide Hydroxamic Acid). **Background.** SAHA is a broad-spectrum HDAC Inhibitor, which plays an important role in regulating the gene expressions to induce cell cycle arrest and cell death in cancer cells. Programmed Cell Death Ligand-1 (PD-L1) can be expressed on the surface of cancer cells, which typically confers aggressive growth and immune-suppression characteristics. SAHA treatment was expected to alter PD-L1 expression in cancer cells. **Methods.** The HCC827 cells were treated with HDACi and used for gene expression analysis using Microarray, qRT-PCR and Western blot. **Results.** SAHA treatment was able to reduce the levels of PD-L1 expression in a dose and time-dependent manner. The PD-L1 level was found to be negatively correlated to the p21 expression in HCC827 cells after treatment with HDACi. Interestingly the qRT-PCR Array analysis revealed significant decreases in the mRNA levels of methyltransferases such as DNMT3A, DNMT3B, PRMT1, SUV39H1, KAT6B, NSD1, SETD1B, and WHSC1. SAHA treatment increased the levels of acetyl forms of H2B, H3, and H4, while decreasing the levels of the methyltransferases. **Conclusion.** HDACi treatment was leading to hyper-acetylation of histones while the levels of methyltransferases were decreased significantly. It is suspected that the decrease in the PD-L1 and methyltransferases levels is due to inhibition of transcription following treatment with SAHA. **Grants.** Research was supported by the Royal Dames of Cancer Research Inc., Fort Lauderdale, Florida.

Effect of SAHA on the Expression of Chromatin Modifying Enzymes in Prostate and Breast Cancer Cells

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Objective. Our study analyzed the effects of HDAC inhibitor SAHA treatment on gene expressions of Chromatin Modifying Enzymes. **Background.** Histone deacetylase (HDAC) inhibitors are one of the important epigenetic

regulators that have enormous therapeutic potential in various diseases, including cancers. For example, SAHA (Suberoylanilidehydroxamic acid) has been known as a potent inhibitor of histone deacetylases that eventually lead to differentiation, growth arrest, and apoptosis of various cancer cells. **Methods.** In our study, we utilized the RT^2 Profiler PCR Array that was specific for the Human Epigenetic Chromatin Modifying Enzymes. We examined the impact of SAHA (7.5 µM) treatment on gene expression patterns of LNCaP (prostate cancer cells) and MCF-7 (breast cancer) cells. **Results.** As a result of SAHA treatment, the expression levels of AURKB (0.11), SUV39H1 (0.23), AURKA (0.4), and SETD7 (0.49) were found to be significantly down-regulated compared to the control in the LNCaP cells. In addition, the mRNA level of KDM6B was also up-regulated (by 2.4 folds) after SAHA treatment. On the other hand, in the MCF-7 cells PAK1 (0.06), NSD1 (0.19), SETD7 (0.24), DNMT3A (0.31), NEK6 (0.34), SETD6 (0.38), PRMT1 (0.4), AURKB (0.4) and SUV39H1 (0.45) were found to be significantly down-regulated after 24 hr of SAHA treatment. **Conclusion.** Our results offer evidence that SAHA can impact the gene expression profile of epigenetic chromatin modification enzymes and exert its anti-cancer effect in both prostate and breast cancer cells. **Grants.** The financial support from the Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida is gratefully acknowledged.

In Vivo Release of Insulin from NPH/Pluronic F127 in Streptozotocin-Induced Diabetic Rats

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Objective. The purpose of this study is to test basal insulin formulations (NPH/Pluronic F127) to streptozotocin-induced diabetic rats. **Background**. NPH insulin exhibits peak at 4-6 hours followed by decline of insulin action. Insulin release from NPH is facilitated by the tissue enzyme activity degrading the protamine moiety that stabilizes NPH. Therefore, an *in situ* hydrogel-forming thermosensitive Pluronic F127 was utilized to attenuate protamine degradation in NPH, thereby reducing the burst release and extending its duration of action. This was confirmed by the previous insulin release studies *in vitro*. **Methods**. Male Wistar rats were given an appropriate intraperitoneal dose of streptozotocin. Plasma glucose was monitored for one week. Insulin formulation (4U/kg) or saline was given to a group of 6 animals. Pluronic F127 concentration was varied from 15% (w/w) to 25% (w/w). Plasma glucose concentrations for each group were monitored over 24h. **Results**. The NPH insulin SC dose of 4U/kg resulted in the minimum plasma glucose level of less than 50 mg/dL, followed by a rapid rise over the course of 12-16 hours. The NPH entrapped in 25% Pluronic F127 exhibited a peak-less glucose dynamics over 24h. **Conclusion**. Insulin release and glucose dynamics by NPH in diabetic rats were altered by the presence of a hydrogel barrier, which may have attenuated the tissue enzyme activity that facilitates NPH action. This system can potentially benefit diabetic patients by providing native human insulin once daily. **Grants**. The work was supported in part by Health Profession Division Grant, Nova Southeastern University.

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