AUGUSTA UNIVERSITY
MEDICAL COLLEGE OF GEORGIA

6th ANNUAL IGNITING THE DREAM OF MEDICINE HIGH SCHOOL AND UNDERGRADUATE CONFERENCE

SATURDAY, FEBRUARY 25, 2017

J. HAROLD HARRISON, M. D. EDUCATION COMMONS (GB)
1301 R. A. DENT BOULEVARD
AUGUSTA, GEORGIA 30912

OFFICE OF STUDENT & MULTICULTURAL AFFAIRS
STUDENT NATIONAL MEDICAL ASSOCIATION

COLLEGE AGENDA	
7:00 am – 8:20 am ***GB LOBBY***	***CHECK-IN & CONTINENTAL BREAKFAST (Exhibitor & Poster Review)***
8:30 am – 8:45 am ***HALL-B*** ***ROOM 1210***	***OPENING SESSION*** ***Kimberly Vess Loomer, EdD*** *Associate Dean, Office for Student & Multicultural Affairs, Medical College of Georgia* ***Paul M. Wallach, MD*** *~ Vice Dean for Academic Affairs, Medical College of Georgia* ***Ijeoma Okoye ~*** *SNMA President, Class of 2019, Medical College of Georgia* ***Linda Strong James,*** *MS* *Assistant Dean for Student Diversity and Inclusion* *Office of Student & Multicultural Affairs, Medical College of Georgia*
8:50 am – 9:40 am ***HALL-B*** ***ROOM 1210***	***CONCURRENT SESSIONS*** ***SESSION A: THE PRE-MEDICAL PATHWAY WITH THE AAMC*** ***Tia Norrington, BS*** *~ AMCAS Outreach Specialist II, Association of American Medical Colleges (AAMC)* ***Dejanira Cruz, BA*** *~ Senior Communication Specialist (AMCAS), Association of American Medical Colleges (AAMC)*
8:50 am – 9:40 am ***HALL-A*** ***ROOM 1220***	***SESSION B: CAREER OPTIONS ~THE MEDICAL PIECE - GOAL SETTING & ACTION PLANNING*** ***Amanda Boland, MS*** *~ Senior Career Advisor for Allied Health, Biology, Dental, Medical, Nursing Augusta University Career Services.* ***(For college students who are undecided on a health profession career path)***
9:45 am – 10:35 am ***HALL-B*** ***ROOM 1210***	***CONCURRENT SESSIONS:*** ***SESSION A: THE MEDICAL SCHOOL APPLICATION-FIRST STEP*** ***AMCAS GENERAL OVERVIEW*** ***Dejanira Cruz, BA*** *~ AAMC*
9:45 am – 10:35 am ***HALL-A*** ***ROOM 1220***	***SESSION B: IT'S A ZOO OUT THERE!*** *Understanding How To Maximize Your Interpersonal Skills* ***Amanda Boland, MS*** *~ Senior Career Advisor for Allied Health, Biology, Dental, Medical, Nursing Augusta University Career Services* ***(For college students who are undecided on a health profession career path and others who are already familiar with the first steps in applying to medical school.)***
10:40 am – 11:25 am ***HALL-B*** ***ROOM 1210***	***SESSION A: THE MCAT EXAM: WHAT YOU NEED TO KNOW*** *Tia Norrington, BS ~ AAMC*
10:40 am – 11:25 am ***HALL-A*** ***ROOM 1220***	***SESSION B: IN-DEPTH VIEW OF THE MEDICAL SCHOOL APPLICATION PROCESS*** ***STEP I – AMCAS CLOSER LOOK*** ***STEP II – SECONDARY APPLICATION*** ***Ms. Esther Holland*** *~ Director of Admissions, Medical College of Georgia* ***(For students who have already taken MCAT and are preparing for the upcoming application cycle)***
11:25 am- 12:00 pm ***GB LOBBY***	***GROUP A – POSTER SESSION & EXHIBITS*** ***GROUP B – LUNCH WITH MEDICAL AND PHYSICIAN ASSISTANT STUDENTS*** ***(MAPS students Lunch & Poster Session Leaders – Students must stay with designated leaders)***
12:00 pm – 12:35 pm ***GB LOBBY***	***GROUP A – LUNCH WITH MEDICAL AND PHYSICIAN ASSISTANT STUDENTS*** ***GROUP B – POSTER SESSION & EXHIBITS*** ***(MAPS students Lunch & Poster Leaders – Please stay with group leaders)***
12:40 pm – 1:25 pm ***HALL-B*** ***ROOM 1210***	***MEDICIAL COLLEGE OF GEORGIA ADMISSIONS PANEL PRESENTATION*** *MCG Admissions Overview* ***Kelli Braun, MD,*** *Associate Dean for Admissions, Medical College of Georgia* *Admissions Committee Members Panel Q & A* ***(Instructions given for afternoon interactive sessions and mock interviews at the end of panel presentation)***
1:30 pm– 3:45 pm ***GB-3RD FLOOR***	***INTERACTIVE ACTIVITIES ~ Students Only - (Pre-assigned~ must stay with assigned group)*** ***Augusta University Interdisciplinary Simulation Center*** ***Leaders*** *– Christina Hopkins, M2; Erika Rucker, M1; MarQuenda Sanders, M2; Chinemelum Orizu, M2* ***MINI MOCK INTERVIEWS~ MCG Admissions Committee Members (Pre-assigned)***
3:45 pm – 4:00 pm ***HALL-B*** ***ROOM 1210***	***WRAP-UP & CLOSING REMARKS*** ***Prizes ~ Caterina Hernandez, PhD & SNMA Leaders*** ***Closing Remarks*** *~ SNMA Co-Advisors* *Vanessa Spearman-McCarthy, MD & Linda James, MS*

HIGH SCHOOL AGENDA	
7:00 am– 8:20 am GB LOBBY	***CHECK-IN & CONTINENTAL BREAKFAST (Exhibitor & Poster Review)***
8:30 am – 8:45 am HALL- B ROOM 1210	***OPENING SESSION*** ***Kimberly Vess Loomer, EdD*** *Associate Dean, Office for Student & Multicultural Affairs, Medical College of Georgia* ***Paul M. Wallach, MD*** *~ Vice Dean for Academic Affairs, Medical College of Georgia* ***Ijeoma Okoye ~*** *SNMA President, Class of 2019, Medical College of Georgia* ***Linda Strong James,*** *MS* *Assistant Dean for Student Diversity and Inclusion* *Office of Student & Multicultural Affairs, Medical College of Georgia,*
8:50 am – 9:40 am HALL-A ROOM 1220	***CAREER OPTIONS ~ THE MEDICAL PIECE – GOAL SETTING & ACTION PLANNING*** ***Amanda Boland, MS*** *~ Senior Career Advisor for Allied Health, Biology, Dental, Medical, Nursing* *Augusta University Career Services.* ***(All High School Students)*** ***(Instructions given for interactive activities at the end of this session.)***
9:45 am – 12:15 pm GB 3RD FLOOR	***INTERACTIVE ACTIVITIES ~ (Pre-assigned - Students must stay with assigned group)*** ***Augusta University Interdisciplinary Simulation Center***
12:15 pm – 12:50 pm GB LOBBY	***LUNCH WITH MCG MEDICAL STUDENTS & RESIDENTS AND MAPS STUDNETS*** ***(High School Students Only)*** *~ Designated Lobby Area* ***(MAPS students Lunch & Poster Session leaders – Students must stay with designated leader)***
12:50 pm – 1:40 pm GB LOBBY	***POSTER REVIEW AND DISCUSSION*** ***(MAPS students Lunch & Poster Session leaders – Students must stay with designated leaders)***
1:45 pm – 2:35 pm HALL-A ROOM 1220	***APPLYING TO COLLEGE – DO'S AND DON'TS*** ***Ming Chen, BS*** *~ Admissions Counselor, Office of Academic Admissions, Augusta University* ***MEDICAL SCHOLARS PROGRAM – BS/MD PROGRAM*** ***Elizabeth Gorman, MA*** *~ Professional Scholars Program Manager, Augusta University*
2:40 pm – 3:45 pm HALL-C ROOM 1110	***SESSION A: MALE MENTORING – FILLING THE GAP ~ ADDRESSING UNDERREPRESENTATION IN MEDICINE (Students Only)*** *MCG Medical Students and Residents* ***Facilitators ~ Thomas Hodo, M3; Chijioke Ohamadike, M2; Ehizele Osehobo, M2; Virgenal Owens, M1***
2:40 pm – 3:45 pm HALL – B ROOM 1120	***SESSION B: FEMALE MENTORING – FILLING THE GAP ~ ADDRESSING UNDERREPRESENTATION IN MEDICINE (Students Only)*** *MCG Medical Students and Residents* ***Facilitators ~ Raeonda Williams, M3; April Hobbs, M3; Chinemelum Orizu, M2***
3:45 pm – 4:00 pm HALL-B ROOM 1210	***WRAP-UP & CLOSING REMARKS*** ***Prizes ~ Caterina Hernandez, PhD & SNMA Leaders*** ***Closing Remarks*** *~ SNMA Co-Advisors* ***Vanessa Spearman-McCarthy, MD & Linda James, MS***

SPECIAL SESSIONS FOR PARENTS AND ADVISORS (HIGH SCHOOL AND COLLEGE)	
10:00 am –11:00 am ***GB LOBBY***	***HIGH SCHOOL ADVISORS AND PARENTS*** *Tour of Education Commons Building ~ Simulation Center, Academic Houses* ***(Advisors and parents- please do not go with students to interactive sessions)***
11:25 am – 12:25 pm ***HALL-D*** ***ROOM 1120***	***LUNCH ~ PARENTS AND ADVISORS (HIGH SCHOOL AND COLLEGE)*** *Roundtable dialogue with AAMC representatives, MCG Admissions Dean, Director and Counselor, and other Augusta University representatives* ***(Advisors and parents do not attend lunch with students)***
1:45 pm – 2:35 pm ***HALL-A*** ***ROOM 1220***	***HIGH SCHOOL ADVISORS AND PARENTS*** ***APPLYING TO COLLEGE – DO'S AND DON'TS*** ***Ming Chen, BS*** *~ Admissions Counselor, Office of Academic Admissions, Augusta University* ***MEDICAL SCHOLARS PROGRAM – BS/MD PROGRAM*** ***Elizabeth Gorman, MA*** *~ Professional Scholars Program Manager, Augusta University*
2:40 pm – 3:00 pm ***GB*** ***ROOM 1238***	***ADVISORS AND PARENTS Q & A WITH MR. CHEN AND MS. GORMAN*** *Follow-up from previous session* ***(Advisors and parents please do not go to mentoring sessions with students)***
3:10 pm – 3:40 pm ***GB LOBBY***	***TOUR OF OAK HALL AND ELM HALL –*** ***On-campus housing for undergraduate and graduate health professional students***
3:45 pm – 4:00 pm ***HALL-B*** ***ROOM 1210***	***WRAP-UP & CLOSING REMARKS*** ***Prizes*** *~* ***Caterina Hernandez, PhD & SNMA Leaders*** ***Closing Remarks*** *~ SNMA Co-Advisors* ***Vanessa Spearman-McCarthy, MD & Linda James, MS***

Note* - Parents and advisors are welcome to attend any sessions other than those indicated for students only.

IGNITING THE DREAM OF MEDICINE INTERACTIVE SESSIONS

HIGH SCHOOL STUDENTS (10:00 am – 12:15 pm)	*COLLEGE STUDENTS (1:30 pm – 3:45 pm)*
Investigation Diagnosis ***Physical Diagnosis*** ***High Definition Simulations*** ***IV Skills*** ***Suturing***	***Investigation Diagnosis*** ***Physical Diagnosis*** ***High Definition Simulations*** ***IV Skills*** ***Suturing*** ***MD/PhD Demonstrations*** ***Mock Interviews***

Students must remain in pre-assigned sessions as indicated on name conference badge (No Exceptions!)

CONFERENCE OBJECTIVES

- To help students develop or refine an individual action plan with realistic, achievable goals for becoming a doctor or other health professional
- To help students develop a specific action plan for becoming a competitive health profession school applicant and develop contingency plans for unforeseen outcomes
- To help students gain useful pre-medical and pre-health tips and strategies from the Association of American Medical Colleges representatives, Augusta University/MCG Admissions representatives and professional students
- To encourage and motivate high school students to set goals for pursuing rigorous pre-health college majors that lead to competitive health profession school entry
- To introduce participants to our state of the art medical simulations that are used in interdisciplinary healthcare training at the Augusta University Health Sciences campus
- To engage in scholarly activities
- To establish networking and mentoring opportunities

BRIEF OVERVIEW OF EDUCATIONAL WORKSHOPS AND SESSIONS

THE PRE-MEDICAL PATHWAY WITH THE AAMC - The Association of American Medical Colleges (AAMC) will guide you on the career to medicine with their timely resources and quick tips. This presentation will cover how you can better prepare for the MCAT exam, apply to medical school with the AMCAS application, and much more.

AMCAS WORKSHOP - Let the American Medical College Application Service (AMCAS®) help you make applying to medical school as smooth as possible! Have your questions answered and learn insider tips for a stronger application.

HEALTH PROFESSION PROGRAMS AND OPPORTUNITIES AT AUGUSTA UNIVERSITY – Learn about programs and opportunities at Augusta University Medical College of Georgia and College of Allied Health Sciences from deans, faculty and admissions representatives

CAREER OPTIONS ~ THE MEDICAL PIECE - GOAL SETTING & ACTION PLANNING - This session highlights successful strategies and tips on goal setting and planning for becoming a competitive college applicant and making the most of college for ultimate health profession school entry and success. The presenters will: 1. Guide students in gaining insight into their own skills, interests, personality and what they value; 2. Help them gain an understanding of why it's important for them to know who they are before making life long decisions. 3. Guide them in health career choices and options at Augusta University. 4. Review resources available to them.

IT'S A ZOO OUT THERE! ~ UNDERSTANDING HOW TO MAXIMIZE YOUR INTERPERSONAL SKILLS - This session will be an interactive exercise that will help students identify their personality traits and ultimately guide them in being most effective in communicating in groups and with individuals.

THE MCAT EXAM: WHAT YOU NEED TO KNOW – Hear the latest MCAT updates from AAMC representative.

IN-DEPTH VIEW OF THE AMCAS APPLICATION PROCESS AND MEDICAL SCHOOL SECONDARY APPLICATION- For advanced college and post-baccalaureate students who have immediate plans for applying to medical school, this session takes students steps further through the medical school application process.

MEDICAL SCHOLARS PROGRAM –BS/MD PROGRAM - The Medical Scholars Program Coordinators will discuss the application process and benefits of the Medical Scholars Program at Augusta University. This highly competitive, seven-year BS/MD program is unique within the state of Georgia and provides a noteworthy foundation and opportunity to matriculate into the Medical College of Georgia at Augusta University.

MENTORING -This session connects participants with medical students and residents with potential for participation in an ongoing SNMA mentoring program.

MEDICAL COLLEGE OF GEORGIA ADMISSIONS PRESENTATION AND PANEL - The medical school application process is one of the most competitive of any profession. In a Q & A format, the MCG Admissions Committee provides information that will help students better understand the competitive medical school admissions process.

INTERACTIVE CLINICAL SKILLS ACTIVITIES – These activities demonstrate how medical students make decisions applicable to common clinical scenarios encountered in the clinical setting. Conference attendees introduced to some basic skills essential for performing a medical history and physical examination and engage in hands-on high fidelity simulation that mimics real clinical practice. In addition, students learn suturing and IV-skills.

POSTER SESSION - The scientific poster presentations give students the opportunity to showcase their scholarship and network with other students involved in research.

WORKSHOP PRESENTERS

Tia Norrington, BS is the AMCAS Outreach Specialist II for the Pre-Med Outreach group at the Association of American Medical Colleges (AAMC). This group works to help pre-health students actualize their goals of becoming physicians. Tia specializes in social media, web communications, and event coordination for the pre-med services. Tia also manages much of the presentation material for the AAMC's Pre-med services. Connect with Tia and the AAMC Pre-med Team on Facebook and Twitter (@AAMCPreMed) for information and resources about a career in medicine. Also, you may ask specific AMCAS questions on Twitter (@amcasinfo).

Dejanira Cruz, BA is the Sr. Communications Specialist for the American Medical College Application Service (AMCAS), and is a part of the Pre-med Outreach team at the Association of American Medical Colleges (AAMC). Dejanira specializes in strategic communication and outreach for the AMCAS team. Connect with Dejanira and the AMCAS Outreach Team on Twitter (@amcasinfo), and with the entire Pre-med Outreach Team on Facebook and Twitter (@AAMCPreMed) for information and resources about a career in medicine.

Kelli Braun, MD, a 2004 MCG graduate, is associate dean of admissions for the medical school and associate professor in the Department of Obstetrics and Gynecology at the Medical College of Georgia at Augusta University. A Georgia native, Braun joined the faculty in 2008 after completing her obstetrics and gynecology residency at MCG and AU Health. While maintaining a busy clinical practice, she has also focused on undergraduate and graduate medical education. She is the director of simulation training and virtual education for the OB/GYN residency program and is known nationally for her curriculum design and low-fidelity modeling for surgical education.

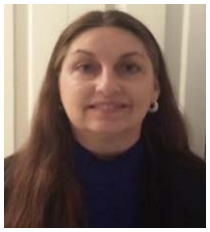
Amanda Boland, MS, LPC, Senior Career Advisor, joined the Career Center as a Career Advisor after completing her Master of Clinical Psychology degree at Augusta State University in 2007. Following her passion for working with students in transition, she incorporates her counseling and interpersonal strengths to guide all students in choosing a major, finding employment or gaining acceptance in medical, dental, law or other graduate and allied health programs. Additionally, she continues to build strong relationships with academic departments, local employers and professional representatives from various graduate schools. Certified as a Career Development and Transitions Coach, Ms. Boland is also a Licensed Professional Counselor in Georgia. She was recently promoted to Senior Career Advisor and will eventually focus her work with the Dental, Medical, Nursing and Allied Health students only.

WORKSHOP PRESENTERS

Lester Pretlow, **PhD** is the Associate Dean of Academic Affairs for the College of Allied Health Sciences, Augusta University. He is a tenured professor in the Department of Medical Laboratory, Imaging and Radiologic Sciences where he has taught clinical biochemistry and research since 2001. Dr. Pretlow is formerly Captain Pretlow of the U.S. Army where he directed the clinical laboratory at the Dwight D. Eisenhower Army Medical Center in Augusta.

Elizabeth Gorman, MA is the Augusta University Professional Scholars Program Manager**,** Department of Biological Science. In this capacity, Ms. Gorman assists students with advising, scheduling, professional development, educational information sessions, coordination of volunteer sites, and shadowing experience. Additionally, she serves as a faculty and staff liaison and assist with policy development. Ms. Gorman earned her Masters of Arts at the University of Iowa and Bachelor of Arts at the University of Northern Iowa, and has been assisting students in the collegiate environment for the past seven years.

Ming Chen, BS received his Bachelor of Science Degree with a major in Psychological Sciences from Augusta University in May 2016. During his undergraduate years, he was heavily involved with student life and engagement and served two years as an orientation leader, Vice President of the Inter-Fraternity Council, and Homecoming King for the 2015 year. Academically, he participated as a student researcher in the fields of Chemistry, Psychology, and Biology. As a college admissions counselor, Ming works with local area, Savannah, middle-Georgia, and international students to help navigate the undergraduate admissions process and to share with them his love of Augusta University.



Esther Holland, an expert in the MCG application process, secondary application and state residency determination, is the director of admissions for the Medical College of Georgia at Augusta University. During her 25 year career at MCG she has worked as an admissions counselor, an administrative assistant to the Associate Dean and as a coordinator in Student Affairs.

POSTER PRESENTATION TITLES AND ABSTRACTS

PROCESS EVALUATION ASSESSING A MULTICOMPONENT DIALYSIS FACILITY INTERVENTION TO INCREASE REFERRAL FOR KIDNEY TRANSPLANTATION

Loren Cobb[1], Jennifer C. Gander, PhD[1], Mohua Basu, MPH[1], Laura McPherson, MPH[1], Leighann Sauls, RN[2], Teri Browne, PhD[3], Laura Plantinga, PhD[1], Eric Gibney, MD[4], Laura Mulloy, DO[5], Stephen O. Pastan, MD[1], Rachel E. Patzer, PhD[1]
Spelman College, Atlanta, Georgia, Emory University, Atlanta, Georgia

Georgia has the lowest kidney transplant rates in the United States, and racial disparities in access to early steps in the kidney transplant process exist in the Southeast. The Southeastern Kidney Transplant Coalition developed the randomized, dialysis facility-level Reducing Disparities In Access to kidney Transplantation (RaDIANT) Community Study to address racial disparities and low rates of kidney transplantation (KTx) in Georgia. The RaDIANT Community Study was a randomized, dialysis facilityâ€"based, controlled trial involving more than 9,000 patients receiving dialysis treatment from 134 dialysis facilities in Georgia. Dialysis facilities with either low transplant referral, or an African-American (AA) vs. white racial disparity in referral, were selected in December 2013 to participate in this End Stage Renal Disease (ESRD) Networkâ€"led study. The multicomponent intervention consisted of transplant education and engagement activities targeting dialysis facility leadership, staff, and patients from January through December 2014. The primary outcome was the proportion of prevalent ESRD patients in a facility referred for transplantation within one year, and AA vs. white racial disparity was examined as a secondary outcome. For this project, we aim to evaluate the effectiveness, feasibility, and sustainability of the RaDIANT intervention activities.

ROLE OF GRP78 IN PROSTATE CANCER CELL LINES

Victoria Daudu, Nitta Takayuki
Savannah State University, Savannah, Georgia

Prostate cancer is cancer of the prostate gland in the male reproductive system. It affects 80% of men under age 65 and 1% under age 50. African American men are 1.6 times more likely to be diagnosed with prostate cancer and 2.4 times more likely to die from the disease than Caucasian men. Prostate specific antigen (PSA) is a protein which is produced by cells of the prostate gland. The blood level of PSA is often elevated in men with prostate cancer and African American men show higher levels of PSA than Caucasian or other populations. Glucose-regulated protein 78 (GRP78) is a member of the heat shock protein family of molecular chaperons, required for ER integrity and stress induced autophagy, which is ubiquitously expressed in mammalian cells; its role in signaling the unfolded protein response. GRP78 is involved in prostate cancers, breast cancers, leukemia and other diseases; it binds to PSA-alpha 2 macroglobulin (A2M) complex and could promote prostate cancers. The main goal in this study was to determine if GRP78-PSA interaction enhances the development of prostate cancer in African American men. To this end, expressions of GRP78 in prostate cancer cell lines derived from African American and Caucasian men was examined. The prostate cancer cells were treated with Thapsigargin (Tg), A2M and A2M* (activated A2M by methylamine), then GRP78 in the cell lysates were detected by western blotting with antiGRP78. The African American prostate cancer cells showed slightly higher GRP78 expression in basal level and Tg treatment enhanced GRP78 expression in all cells, which was comparable among cells. A2M* enhanced the expression of GRP78 in the African American prostate cancer cell. E006 AA Par, but not in the Caucasian prostate cancer cells, DU145, which suggested that GRP78-PSA interaction might enhance prostate cancer development in African American men.

THE PAST AND THE PRESENT OF THE BIRTH CONTROL AND ITS IMPACT ON WOMEN'S HEALTH MYTH, PREJUDICE AND BENEFITS: A PILOT STUDY

Anna Koss, Soma Mukhopadhyay, Ph.D.
Augusta University, Department of Biological Sciences, Augusta, Georgia

This presentation is an effort to showcase a comparative study between the history of previously used methods and the positive impact of the scientifically approved contraceptives on women's health. Before the discovery of the oral contraceptive pill, women used dangerous tactics to combat pregnancy dating back to 3000 BC. These tactics included drinking blood and urine, inserting acids and other materials up the vagina, and anything else socially accepted in preventing pregnancy. Though it was not publicized, there were numerous cases where those unsafe methods led to infertility and even cost the life of the woman. The need for a safe, convenient contraceptive was critical for women's liberation and health, although society was and remains resistant to its importance. Since the legalization and production of the pill in the early 20th century, the science behind developing contraceptives and the social impact of these methods has evolved considerably. A survey has been designed to collect responses from people in different age groups and professions regarding their knowledge about the pioneers of birth control pills, convenience in their use for birth control and potential health benefits associated with their use. Data will be collected after IRB approval and will be presented in the future.

Effects of ventral tegmental area muscarinic acetylcholine receptor blockade on cue-induced cocaine-seeking

Sofia Walton, E.J. Nunes, A.M. Rajadhyaksha, Dr. NiiA. Addy
Spelman College

Cocaine addiction is a current public health issue that affects approximately 1.5 million users in the United States. Moreover, the abuse of cocaine and attempts to treat withdrawal and pre- vent relapse incurs high societal, economic, and personal cost. Currently, there are no drugs that have are specifically devel- oped to treat cocaine addiction and withdrawal. Cocaine associated cues trigger drug relapse during periods of drug abstinence and withdrawal (Shaham & Hope, 2005; Sinha, 2013). The mesolimbic dopamine (DA) system, including ventral tegmental area (VTA) and nucleus accumbens (NAc), plays a critical role in cue-induced drug craving and drug seeking behaviors, which promote relapse. Specifically, exposure to cocaine-associated cues induces burst firing of VTA DA neurons with subsequent phasic DA release in the NAc that is sufficient to promote seek- ing behavior for drugs of abuse including cocaine (Phillips et al., 2003; Solecki et al., 2013). VTA processes that regulate phasic DA activity, including glutamatergic and cholinergic mecha- nisms, also robustly regulate cocaine-seeking behavior during cocaine withdrawal (Mameli et al., 2009; Solecki et al., 2013; You et al., 2008). Prior work from our laboratory has demon- strated that blockade nicotinic receptors in VTA decreases phasic DA release in the NAc and reduced cue-induced cocaine seeking during withdrawal. In this project, we seek to determine the role of muscarinic receptors on cue-induced cocaine seek- ing during withdrawal.

UTILIZING BENZODIAZEPINE DERIVATIVES TO TARGET GROUP 3 MEDULLOBLASTOMAS INVITRO

Alexandra Ross[1], Laura Kallay[1], James Cook[2], Kashi Reddy Methuku[2], Guanguan Li[2], Daniel Pomeranz Krummel[1], and Soma Sengupta[1]
[1]Winship Cancer Institute, Emory School of Medicine, [2]Chemistry and Biochemistry, University of Wisconsin-Madison

Medulloblastoma (MB) is one of the most common types of malignant primary brain tumors in children. It is classified into four subgroups: WNT, Sonic Hedgehog, Group 3, and Group 4.
Notably, Group 3 MB is the most clinically aggressive of the subgroups, with a survival rate of
20%. It exhibits a molecular signature that is indicative of high expression of GABRA5, which encodes the α-5 subunit of the GABAA neurotransmitter receptor. A main target of this receptor complex is the benzodiazepine class of positive allosteric modulators, which functions to enhance the effect of GABA and increases the influx of chloride into the cell. Our research has shown that GABRA5 is active in Group 3 MB. Additionally, we have recently screened benzodiazepine derivatives in vitro, and they have shown to be particularly effective targeting Group 3 MB cells. We hypothesize that these derivatives lead to cell death by tight binding to the GABRA5 receptor resulting in a significant cellular chloride ion influx. Additionally, we believe that this marked chloride ion influx results in a subsequent accumulation of sodium ions and water into the cell, leading to apoptosis through the intrinsic pathway.

THE ANTIOXIDANT EFFECT OF ECHINACEA ON RAT KANGAROO CELL VIABILITY

Sarah Huson, Azimul Hoque, Roshni Modi, Erika Zelada, Dr. Cindy Achat-Mendes, PhD, Rashad, PhD Simmons, Jennifer Hurst-Kennedy, PhD
Georgia Gwinnett College, Lawrenceville, Georgia

Echinacea is an antioxidant that is believed to help relieve and prevent symptoms of minor illnesses such as the common cold. The purpose of these experiments is to test whether Echinacea affects cell viability in Ptk2 Rat Kangaroo Cells. For this experiment, cell viability was tested using two assays: WST-1 and Trypan Blue Exclusion. The collected data show that Echinacea had no significant effect on cell viability, which is consistent with other published data. In summary, this data shows that Echinacea does not significantly enhance the immune system. However, with the TEAC assay it showed that Echinacea had high antioxidant levels and could still be beneficial to the human body overall.

PHENANTHRENE BASED TRIAZOLE DUAL CHEMOSENSOR

Deanna Y Lazare [1], Dominque Winder, PhD,[2], Karelle Aiken PhD, [2], Debanjana Ghosh, PhD [2]
[1]Savannah State University, Savannah, Georgia, [2] Georgia Southern University, Statesboro, Georgia

Anions and heavy transition metal (HTM) cations are an integral part of the environment, and play vital roles in several biological and physiological processes. An appropriate balance of these ions is necessary for maintenance of human health and environmental sustainability. Fluoride, in particular, has numerous health impacts in areas of dental hygiene and bone health. At normal levels, fluoride helps to strengthen and protect bones and teeth by preventing cavities and reducing risks of hip and spine fractures. However, at high levels (0.5 - 48 ppm or more) in ground water, fluoride overexposure can have detrimental effects leading to dental and skeletal fluorosis which causes brown mottling in the teeth and bone and joint damage, respectively. Copper also provides numerous health benefits and is needed in trace amounts in the body for enzymatic activity, maintenance and repair of connective tissue, carbohydrate and lipid metabolism, among other functions. Copper (II) proteins have even been found to be involved in oxygen binding, electron transfer and the activation of small molecules. In excess, however, copper toxicity is implicated in inflammatory disorders and Alzheimer's disease. Chemosensors or molecular sensors are useful tools in the detection of cations or anions due to the optical or electrochemical signaling capabilities of the sensors upon analyte binding. These sensors can allow for identification, quantification and tracking of target ions. In light of this, the development of small, efficient, effectively designed molecular organic sensors for selective detection of anions and metal cations such as fluoride and copper at physiological concentration levels is a very promising area of study due to potential applicability and usefulness in medical imaging, cancer treatment, drug delivery, and environmental toxicology. A 1,2,3 triazole based fluorescence probe containing phenanthrene and phenol moeities 2-[4-(**ph**enanthren-9-yl)-1*H*-1,2,3-**t**riazol-1-yl]**p**henol ((PhTP)) was synthesized *via* a one step click reaction for the selective detection of cations and anions. The probe, PhTP, was fully characterized using various spectroscopic techniques such as one dimensional and two dimensional nuclear magnetic resonance (NMR) spectroscopy and Ultraviolet-visible (UV-Vis) absorbance and fluorescence studies. PhTP sensing capabilities were analyzed against a series of cations (zinc, copper (II), iron (II), silver, aluminum, cobalt, nickel, iron (III), chromium, cadmium)and anions (chlorine, boron tetrafluoride, dihydrogen phosphate, fluoride, acetate, iodide, bromide, perchlorate); in which PhTP showed the greatest selectivity towards copper (II) cation and fluoride anion through fluorescence quenching and absorption enhancement, respectively. UV-vis absorption and NMR spectroscopic studies confirmed 1:1 binding stoichiometry between the probe and fluoride ion at the phenolic group; and a 2:1 binding stoichiometry between the sensor and the copper (II) ion. In the future, additional studies will be carried out to further investigate the binding site and the interaction between the sensor and copper (II) cation.

COMBATTING ANTIBACTERIAL RESISTANCE USING CHALCONES AS EFFLUX PUMP INHIBITORS

Minh Nguyen, Maya Wallace, Sara Gremillion, PhD, Sarah Zingales, PhD

The average human life expectancy has doubled over the past century, due to the improved nutrition and the control of infectious disease that followed the discovery of antibiotics. Although advances in medical technology and pharmaceuticals have significantly reduced fatalities from a wide spectrum of diseases, mortality rates are increasing in diseases caused by antimicrobial resistance (AMR). The Center for Disease Control and Prevention (CDC) estimates that each year more than 2 million people become infected with drug resistant bacteria and that greater than 23,000 people per year die as a direct result of AMR. AMR can be attributed to a variety of causes, including over-prescription of antibiotics, misuse or incorrect use of antibiotics, and increased use of antibiotics in farming and agriculture. Current research has shown that chalcones, natural occurring products found in plants, have antimicrobial properties. In Dr. Zingales' research lab, we synthesize a variety of different chalcones to test for these characteristics. Our aim is to create a library of chalcones from a variety of ketones and aldehydes via the Aldol Condensation reaction and to determine their antimicrobial characteristics. Initial testing showed that our chalcones are not successful antibiotics. As a result, our research has turned toward examining the chalcones as efflux pump inhibitors. Efflux pumps are defensive proteins that push out undesirable chemicals, such as antibiotics. Inhibiting the pumps allow drugs to stay inside the cell. In order to examine the chalcones' efflux pump inhibitory functions, microbroth dilution assays were performed to show whether the chalcones killed pathogens. The results showed that the pathogens are still active after administering chalcones. Currently, fluorescent efflux and checkerboard assays are being performed to ultimately prove the chalcones' inhibitory functions to allow antibiotics to stay inside the cell.

EFFECTS OF PARENTAL AND EARLY LIFE EXPOSURE TO METALS ON GENOME METHYLATION IN TWO ANURAN SPECIES

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Amphibians respond to metal contaminants in a variety of ways. Species and populations differ in their tolerance to elevated levels of metals in the environment, yet little is known about the mechanisms driving this variation in tolerance. DNA methylation is an epigenetic mechanism that regulates gene expression and can be altered by metal exposure. We designed our study to quantify how 1) early life exposure and 2) parental exposure to heavy metals affect genome methylation of two amphibians, southern toad (Anaxyrus terrestris) and eastern narrowmouth toad (Gastrophryne carolinensis). We collected adults from two metal-contaminated and two non-contaminated wetlands on the Savannah River Site, bred adults in the lab and assigned offspring to one of three copper treatments in a factorial design. Embryos were kept in their treatments until after hatching (GS25), when collected them for DNA extraction. We quantified the relative percent genome methylation in the DNA samples using a 5-mC DNA ELISA kit. We found that relative percent DNA methylation was altered by both Cu exposure and population metal exposure history in both species. Southern toad larvae exhibited reduced methylation when exposed to copper early in development, and offspring from the contaminated site showed lower levels of methylation independent of Cu treatment. Furthermore, Cu exposure appeared to have a weaker effect on methylation levels in offspring from the contaminated site relative to those from the reference site. Narrowmouth toad larvae showed decreasing mean levels of methylation with increasing Cu exposure in offspring from the reference site and increasing mean levels methylation with increased Cu exposure in offspring from the contaminated site. These data suggest that both early life and parental metal exposure could be affecting methylation levels in these species and that an epigenetic mechanism could explain some of the differences in metal tolerance between species and population.

THE APPLICATION OF THIOL-TERMINATED SILICON TO ANTIFOULING

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Silicon surfaces are promising interfaces because they are mechanically and chemically resilient, able to resist wear in aqueous and organic environments, and display good electrical properties. There are a number of methods to conduct a silicon surface thiolation, notably through the attachment of molecules with terminal -SH moieties, which suffers from long reaction times. In present work, we developed a reversible mean for silicon surface modification by introducing terminal thiol groups directly onto the silicon surface. In our experiment, chlorination of the silicon surface (111) was carried out using the procedure developed by Lewis's group firstly. The chlorinated substrates were then placed in a dimethylformamide solution containing NaSH for thiolation reaction. After surface thiolation, small molecules, 1H,1H,2H,2H-Perfluorodecanethiol (PFDT), was coated onto the surface via disulfide reactions and then, the removal of the coating was achieved with a mild reducing agent (a reversible approach). After undergoing the reversible cycle three times, the attachment of PFDT was confirmed by X-Ray Photoelectron Spectroscopy (XPS) and contact angle measurement, which approves the reproducibility and repeatability of our method. The first objective of this project is to test reaction conditions for silicon substrate thiolation. Optimal reaction conditions should provide us with the highest coverage of thiol. The second objective of this project is to use the thiol group-attached silicon substrate for antifouling purposes as thiol group can serve as crosslinker for covalent binding of functional molecules.

TYPE OF INFANT FEEDING, WEIGHT, AND BODY COMPOSITION CHANGES IN EARLY INFANCY

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Childhood obesity and rapid weight gain have been linked to feeding practices during the formative stages of life. The purpose of this study is to examine the influence of types of infant feeding (breastfeeding, mixed feeding, and formula) on infant weight gain and body composition changes in early infancy. This is part of a pilot study that enrolled pregnant women and followed them through 16 weeks postpartum. Infants born at full-term and normal birth weight were scheduled for weight and body composition measurements via the PEA POD at 2, 8, and 16 weeks postpartum. Mothers were required to keep a bi-weekly 24-hour feeding log. At birth, breastfed newborns weighed slightly higher than formula fed infants (3.64 kg vs 3.04 kg, $p=0.029$), and the rate of weight gain was slower among breastfed compared to formula fed infants, although not statistically significant ($p>0.05$). There was a statistically significant difference in percent body fat (adiposity) at 8 weeks postpartum (19.36% vs 12.98%, $p=0.03$) but not at 2 weeks (13.27% vs 12.60%, $p=0.10$) and 16 weeks (22.56% vs 16.63%, $p=0.14$) postpartum between breastfed and formula fed infants. Our preliminary results show that the rate of change in adiposity is faster for breastfed infants compared to formula fed infants, though not statistically significant. Initial observation suggests that early infant body composition is associated with infant feeding type. A further examination of the influence of feeding mode is likely to improve our understanding of the differences in changes in adiposity between breastfed and formula fed infants.

TESTICULAR TOXICITY OF BISPHENOL AF: INDUCTION OF MULTINUCLEATION OF SPERMATOGONIA

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Bisphenol A (BPA) is a widely studied endocrine-disrupting chemical (EDC) due to its potential adverse effects on animals and humans. Many BPA analogs such as BPAF have been synthesized and are now used as substitutes for BPA. However, there is a paucity of information available on the effects of these substitutes on human health and the environment. Using an automated multi-parametric high-content analysis (HCA) in spermatogonial cells, we compared these effects on nuclear morphology, DNA content, cell cycle, cytoskeleton integrity, and DNA damage responses. BPAF exhibited higher testicular toxicities, especially the formation of multinucleation (MNG) of spermatogonia as compared to BPA. Induction of MNGs has been reported following gestational exposure EDC, and may link to the testicular dysgenesis syndrome (TDS). However, the molecular mechanism is still unclear. In this study, we tested the hypothesis that the formation of MNGs is due to the failure of cytokinesis after exposure to BPAF, resulting from alterations of mechantransduction pathways such as Src, p190, RhoA, lamin A/C, and LINC complex. Dose and time-dependent alterations of these proteins were examined using Western blot analysis. Furthermore, we developed a single cell based HCA to examine the temporal and dose-dependent alteration of protein expression of lamins, LINC complex components SUN1, SUN2, as well as p190. We found alterations of lamin A/C and p190 were associated with nuclear morphology, cell cycle progression, and cytoskeleton integrity. Understanding the mode of action of BPAF induced MNGs will provide essential information for the risk assessment for the safety of the public.

TARGETING RUNX2 TRANSCRIPTION FACTOR TO INHIBIT BREAST CANCER PROLIFERATION

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Great strides have been made in the prognosis of early stage breast cancer (BC) but more aggressive metastatic cancers remain resistant to treatment. The RUNX2 transcription factor regulates the expression of oncogenes such as the matrix metalloproteinase, MMP13, through all stages of BC, increases metastasis, and is found at high levels in the more aggressive cancer types. Computer Assisted Drug Design (CADD) was used to find compounds that would inhibit RUNX2:DNA binding and transcriptional activity. CADD522 was shown to inhibit RUNX2:DNA binding and decrease the expression of RUNX2 downstream genes. The aim of this study is to find the most effective analog out of those with at least 89% affinity to the lead CADD522 compound, in inhibiting proliferation and colony formation in MCF7 (ER+/PR+/HER2-) luminal and MDA231 triple negative BC(TNBC) cell lines. Cell proliferation assays show that some of the CADD522 analogs inhibit the proliferative and clonogenic ability of MCF7 cells. They also indicate that the more aggressive cancer types (TNBC), although responsive, still have a greater resistance to the drugs. These results provide important information regarding the structural components of Analog 6 or CADD751, the analog with the most favorable therapeutic index. Based on the inhibitory effect of CADD751 on MCF7 cell proliferation, defining the transcriptional regulation of RUNX2 downstream genes would be necessary.
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CHRONIC TREATMENT WITH RISPERIDONE MODULATES MOLECULAR SIGNALING IN THE PREFRONTAL CORTEX AND HIPPOCAMPUS

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Risperidone is a commonly prescribed antipsychotic drug that is used to treat schizophrenia, bipolar disorder and relieve irritability in autistic children. Antipsychotics are believed to work by modulating neurotransmission events such as the synaptic neurotransmitter-to-receptor interactions towards dopamine receptors to improve mood and behavior. Chronic treatment with risperidone may negatively affect learning and memory through mechanisms mediated by epigenetic changes, such as histone post-translational modifications. We completed behavioral and molecular studies and found that the results of the behavioral studies of risperidone treated show that the rats treated with risperidone may be cognitively impaired. Our molecular work showed a trend of decreased total histone H3 protein throughout the hippocampus and the prefrontal cortex and increased acetylation in both the hippocampus and prefrontal cortex after chronic exposure to Risperidone for 180 days via drinking water, potentially indicative of a compensatory mechanism to increase protein expression, attempting to subsist with loss of total protein. If the prefrontal cortex and the hippocampus are not working properly due to a disruption in cellular homeostasis, then there may be an issue with long and short term memory, eventually leading to impaired cognitive processes. Further studies will need to be done such as probing the hippocampus and pre-frontal cortex for additional post-translational modifications to lysine residues such as methylation and expression of proteins associated with the molecular mechanisms that underlie memory function in other parts of the prefrontal cortex and hippocampus to develop a full story of the chronic effects of risperidone.

DEVELOPMENT OF ANTIBIOTICS BY A NOVEL FUSION METHOD

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In the last decade we have witnessed a dramatic increase in the proportion and absolute number of bacterial pathogens resistant to multiple antibacterial agents. Multidrug-resistant bacteria are currently considered an emergent global disease and a major public health problem. Therapeutic efficacy and safety in infections due to multidrug-resistant bacteria can be improved by the clinical development of new compounds and devising new derivatives of already useful antibiotics. Due to a striking global increase in multidrug-resistant Gram-positive, but even more Gram-negative organisms, new antibiotics are urgently needed. Our laboratory has developed a novel technology to develop new broad spectrum antibiotics that can kill both multidrug-resistant Gram-positive and Gram-negative bacteria. The technology has been patented by Claflin University (Patent #U.S. Patent (#8,669,082 B1). Briefly, the method involved fusing two or more species of anaerobic Clostridia that, after fusion, secret new chemicals, some of which exhibit strong anti-bacterial properties. In the last five years we have generated over 800 new species of Clostridia and we need to screen these species for their anti-bacterial (and in the future, anti-viral) activities. We have obtained three different bacterial strains of Gram-positive and Gram-negative bacteria, one of which is multidrug-resistant *Pseudomonas.* Our lab is currently working on screening the Clostridia secretions for their antibacterial activities. As of today, we already have identified several Clostridia with potent antibacterial activities. This spring, our lab will continue to screen the rest of the 800 or so bacterial fluids. Subsequently, we will patent some of the most promising chimeras and approach selected antibiotic manufacturers.

SYNTHESIS OF TRIPODAL PYRAZOLES LIGANDS FOR COMBINED CESIUM, STRONTIUM, AND ACTINIDES COMPLEXATION AND SEPARATION FROM HIGH LEVEL WASTE

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High-level waste (HLW) are highly radioactive materials that are stored in both the Savannah River Site (SRS), located in the Upper Coastal Plain of South Carolina along the Savannah River, and Hanford Site (HR), located in state of Washington in the Columbian River. The presence of strontium (Sr) and actinides (Ac) in the tank supernatants and saltcake, present in both the SRS and HS sites, makes the removal of HLW difficult to accomplish. Pyrazoles with different substitutions and coordinating ability were synthesized. Their solubilities were tested and found that they are readily soluble in lipophilic solvents like dichloromethane and insoluble in water, as desired in order. To extract cesium, strontium, and actinide from the HLW present in SRS and HS, lipophilic ligands are needed. We successfully synthesized: i) of 3,5-(ditert butyl)-1H-pyrazole (N2C11H20); ii) trispyrazole of 4-(phenyl)-1H- pyrazole (N6C42H42); iii) trispyrazole of 3,5-(diphenyl)-1H-pyrazole (N6C60H54); iv) trispyrazole of 4-(bromo)-1H- pyrazole (Br3N6C24H27); and v) trispyrazole of 4-(iodo)-1H- pyrazole (N6C27H36). Synthesis of trispyrazole of 3,5-(ditertbutyl)-1H- pyrazole failed. Complexation studies of tripodal pyrazoles with lanthanides as model compounds for HLW treatment are in progress. Currently, we are trying to coordinate different lanthanide salts, such as samarium nitrate, erbium chloride, samarium chloride and neodymium chloride, with the trispyrazoles synthesized. Among the pyrazoles that were synthesized, trispyrazole with 4-(phenyl)-1H- pyrazole, trispyrazole with 3,5-(diphenyl)-1H- pyrazole and trispyrazole with 4-(iodo)-1H- pyrazole are new compounds, while the rest were already synthesized and reported. All the trispyrazoles were characterized by 1H-NMR and IR, but trispyrazole with 4-(phenyl)-1H- pyrazole was also structurally characterized by single crystal X-ray defraction (SCXD) methods. This research was supported by a Savannah River Solutions LLC award to FIU: Subcontract No: SENS-0000217393 (PI: KK).

DEVELOPMENT OF AN INDUCIBLE HISTONE METHYLTRANSFERASE SYSTEM TO ANALYZE ESTABLISHMENT OF REPRESSED CHROMATIN DOMAINS IN *NEUROSPORA CRASSA*

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H3K27me3 is a molecular hallmark of facultative heterochromatin and results in stable repression of silenced genes. Regulation of H3K27 plays an important role in X-chromosome inactivation and stem cell fate; alternatively, aberrant H3K27me3 is observed in certain types of cancer. Producing an effective model in which to study H3K27me3 deposition may provide insight into the activity of Polycomb Repressive Complex 2 (PRC2), a highly conserved histone H3 lysine 27 methyltransferase. SUZ12, a component of PRC2, is essential for catalytic activity. Our method to study H3K27me3 in Neurospora crassa involves constructing a controlled system through inserting inducible promoters and a FLAG epitope tag in front of suz12 and transforming them into Neurospora crassa through linearized *E. coli* plasmids. Verification of the putative inducible systems will include western blotting with FLAG antibodies, ChIP with H3K27me3 antibodies followed by Illumina sequencing (ChIP-seq). The promoters undergoing transformation are Ptcu-1, Pccg-1, and Pqa-2. The aim of this project is to investigate currently uncharacterized H327me3 kinetics by controlling suz12 expression. Monitoring the spatial and temporal dynamics of H3K27me3 establishment will allow us to predict when PRC2 is recruited. Successful completion of this project will provide insight into a conserved enzymatic complex with important implications in human health and disease.

THE EFFECTS OF OXIDATIVE STRESS ON SICKLE CELL DISEASE

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Sickle cell anemia is a disease in which the body produces abnormally shaped red blood cells. The cells form sickle or crescent shapes hindering their normal function. Due to this abnormal shape, the cells die faster than normal red blood cells. Overtime this leads to anemia. The sickle cells also will become trapped in blood vessels, blocking blood flow. This causes a lot of pain in a person and can also cause organ failure. Even though sickle cell disease was discovered in 1910, there is still a lot that we do not understand. Serendipity and careful observation of the brains of mice with sickle cell disease led to the discovery of iron deposition in the brain. This iron is known to be an inducer of oxidative stress and led us to identify a very damaging species called the hydroxyl radical. This radical can interrupt the production of L- DOPA from tyrosine thus leading to decreased dopamine production. However, we needed to link the production of this hydroxyl radical to a functional consequence (IE decreased dopamine). Addiction, motor coordination, mood, cognition, and learning and memory could all be affected. An oxidative stress is an imbalance between the production of free radicals and the ability of the body to counteract or detoxify their harmful effects through neutralization by antioxidants. An oxidizer is a highly reactive form of oxygen, and in the body assists in cell signaling and homeostasis. Specifically, we are focusing on the effect of oxidizers on tyrosine. When introduced to an oxidizer, a redox reaction occurs creating two isomers, ortho-tyrosine and meta-tyrosine. Tyrosine is one of 22 amino acids, and is responsible for increasing levels of dopamine, norepinephrine, and epinephrine in the body. Dopamine is a neurotransmitter that sends signals to other nerves, aids in the perception of pain, and functions mainly in the reward motivated area of the brain. Norepinephrine is known as the hormone responsible for the flight or fight response. Lastly, epinephrine is known as adrenaline and is a stress released hormone. When tyrosine is changed to ortho-tyrosine or meta-tyrosine it can no longer function to increase dopamine levels. We believe that this occurs in SCD patients, and ultimately hinders them from creating normal hormone levels. Having low levels of dopamine can affect the way a person perceives pain. Specifically, we are focusing on the effect of oxidizers on tyrosine. When introduced to an oxidizer, a redox reaction occurs creating two isomers ortho-tyrosine and meta-tyrosine. Tyrosine is one of 22 amino acids, and is responsible for increasing levels of dopamine, norepinephrine, and epinephrine in the body. Dopamine is a neurotransmitter that sends signals to other nerves, aids in the perception of pain, and functions mainly in the reward motivated area of the brain. Norepinephrine is known as the hormone responsible for the flight or fight response. Lastly, epinephrine is known as adrenaline and is a stress released hormone. When tyrosine is changed to ortho-tyrosine or meta-tyrosine it can no longer function to increase dopamine, norepinephrine, and epinephrine levels. We believe that this occurs in SCD patients, and ultimately enables them from creating normal hormone levels. Having low levels of dopamine, norepinephrine, and epinephrine can affect the way a person perceives pain.

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