

TENTH ANNUAL MALONE UNIVERSITY

STUDENT

RESEARCH SYMPOSIUM

A Celebration of Scholarship and Creative Expression

SATURDAY **2018** **APRIL 21**

10 A.M. - 12 NOON

East Campus Multipurpose Room

Malone University campus



MALONE UNIVERSITY
CHRIST'S KINGDOM FIRST

www.malone.edu/research-symposium



TENTH ANNUAL MALONE UNIVERSITY

STUDENT

RESEARCH SYMPOSIUM

A Celebration of Scholarship and Creative Expression

SCHEDULED **PERFORMANCES**

10:45 a.m.

**Winners from the annual
Malone Writers Prize**

AWARDS PRESENTATION

11:50 a.m.

People's Choice Award
(vote by 11:30 a.m.)

PROJECT **ABSTRACTS**

I. Nick Gotschall, Austin Cole

Faculty Mentor: Lora Wyss

Examining Self-Efficacy among Migrant Workers with Type Two Diabetes

The purpose of this study was to determine the self-efficacy of agricultural migrant workers from Latin American countries in regards to the management of their health and diabetes mellitus type two. Migrants diagnosed with type two diabetes were surveyed using the Diabetes Self-Efficacy Scale. This semantic scale consisted of eight questions related to the management of type two diabetes. In order to record some of the participants' latest 2017 health information, the subjects' medical records were accessed. The health information obtained included: height, weight, body mass index, blood pressure, electrocardiogram, lipid profile, cardiac markers, and hemoglobin A1C. Participants were encouraged to attend an educational seminar to learn and ask questions about the management of their diabetes. The seminar was held at their campsite. After attaining education about type two diabetes, the participants were re-administered the same Diabetes Self-Efficacy Scale. Because of better understanding of diabetes and its management, the majority of participants showed significantly increased self-efficacy ($p < .05$). Research shows that the understanding, concern, and effort put into managing type two diabetes was largely affected by culture, education level, and limited resources. Within the migrant population, fatalism, machismo, low educational level, economic status, and the poor conceptualization of semantic scales affected the self-efficacy, motivation, and ability to manage type two diabetes. However, increased self-efficacy was still noted.

2. Kristin Cole

Faculty Mentor: Kathleen Flaherty

Transition Readiness and the Impact of Health Related Quality of Life in Adult Patients with a Congenital Heart Defect

Transition management for chronically ill young adults has become a significant area of concern as more children with a chronic illness reach adulthood. As chronically ill children grow older, they are expected to begin the process of independently managing their own health. However, the difficulties and nuances associated with a chronic illness can complicate this process. Adolescents and young adults with congenital heart defect (CHD) do not have a standardized process to assist them with the transition to adult congenital heart cardiologists. A number of patients are failing to make the transition, leading to a lapse in their healthcare and an overall decline in their health (Uzark, et al., 2015). The purpose of this study was to explore the relationship between health related quality of life (HRQoL) and transition readiness in 18-25 year olds with CHD. In addition, transition, age at transition, and the effects of CHD on HRQoL were explored. A cross-sectional study of adolescents and young adults with CHD was completed using the Transition Readiness Assessment Questionnaire and PedsQL 3.0 Cardiac Module during a regularly scheduled office visit. Barriers to access to the sample population were found and are discussed. Four participants completed the study with resultant data that provides insight to these important transitions. Barriers to the completion of data collection were not fully anticipated. However, it is expected that the study will be continued with university and agency support to include a change in participant sample to include young adults experiencing multiple chronic illnesses. Current MSN-APRN nursing students will continue implementation of this important study after institutional review board approval.

3. Elise Coudriet

Faculty Mentor: Claire Wilson

Nurse Practitioners' Perceptions of their Role in the Acute Care Setting

Purpose: The main objective of this research was to explore the perceptions of Acute Care Nurse Practitioners (ACNPs) working in the acute care setting and how they perceive their role in relation to patient care. **Sample:** Four ACNPs who are working within the ICU group at Summa Health System. **Method:** The ACNPs were interviewed individually using 15-predetermined, but untested questions. These interviews were recorded, written down, and then analyzed. **Analysis:** This study used the Consensual Qualitative Approach. This data was then broken into domains and then finally broken into positive and negative perceptions within these common themes. **Results:** Positive perceptions that were consistent are positive perceptions of family and patient interactions with the ACNPs, positive physician-clinician interactions, positive perception of role fulfillment regarding privileges, and the positive perception of experience being a determining factor in success within their profession. The negative perceptions are the negative perception of the benefit of requiring ACNPs to achieve a doctorate prior to licensure and the negative perception of ACNPs that are present in some physicians who are not familiar with ACNPs. Five out of the seven themes were positive which aligns with previous research that has determined that positive self-perceptions increase job satisfaction for ACNPs.

4. Kerri Johnson, Lucas Roshong, Kacy Napolitan, Ashton Purdy

Faculty Mentor: Stephanie Burgess

Impact of Breakfast Consumption on BMI in Adolescents

It is a recurring question whether eating breakfast affects a growing adolescent's weight status and overall health. The purpose of this study is to understand the effects eating breakfast has on an adolescent's body mass index (BMI). This study was done with correlational and descriptive statistics. In our research regarding whether breakfast affects BMI, we distributed a survey to 260 students in Louisville High School to infer whether BMI is affected by their choice to consume breakfast or to skip breakfast. The sample demographics were derived from a rural school district in Northeast Ohio. Using Microsoft Excel programs the researchers correlated the adolescents' reported BMI with their reported breakfast consumption, age, gender, and types of breakfast consumed. In conclusion, our study findings state that eating breakfast is positively, weakly correlated with a lower BMI.

5. Kayla Lindgren, Erin Friday, Lydia Waters, Robin Mussig
Faculty Mentor: Stephanie Burgess

The BMI Dispute: Does Eating Fruits and Vegetables Work?

Adolescent obesity has been a growing concern in the United States, especially in regards to the rise in chronic illnesses, such as diabetes and cardiovascular disease. Because of this concern, potential causes have been researched through the Malone University Aultman Ambassador Program in conjunction with a northeastern Ohio high school. The study was aimed at exploring the correlation between student's body mass index (BMI) and their daily consumption of fruits and vegetables. 243 high school students had the opportunity to participate in an anonymous survey distributed during the school's lunch period. The survey had a variety of questions regarding demographics and eating habits. Unfortunately, no correlation between BMI and the student's consumption of fruits and vegetables were found. However an analysis of central tendency found a weak correlation between students in the obese BMI category and their fruit and vegetable consumption. The study also discovered that students have a misunderstanding about how many servings of fruits and vegetables they should consume daily. Because of this, further education regarding recommended daily servings and the benefits of consuming fruits and vegetables is suggested as well as further studies exploring the cause of such deficits.

6. Aubrey Elder, Hannah Campbell, Yamima Sharma,
Stephanie Vaughn, Annie Stull
Faculty Mentor: Stephanie Burgess

Exercise and BMI Among Adolescence

Educating adolescents about the importance exercise has on maintaining a lower body mass index (BMI) is vital to prevent obesity and overweight issues at a young age. The purpose of the study is to examine the relationship between the amount of exercise and its effect on BMI in high school adolescence, using a descriptive correlational study. The study involved two-hundred and fifty-seven students from a high school in Northeast Ohio who voluntarily filled out surveys during their lunch period. The students ranged from ninth through twelfth grade, between the ages of 13-18 years old. The mean age was 16 years old with an average BMI of 24.1. Surveys included questions based on daily amounts of physical activity and what motivates them to participate in exercise. Findings showed that 61% of the sampled students exercise regularly throughout the week. After examining the BMI of those who work out versus those who do not, the hypothesis was supported, showing that those who do participate in physical activity have a healthier BMI than those who do not. In conclusion, the hypothesis of this study reinforced that being physically active has a negative correlation with maintaining or acquiring a healthy BMI.

7. Brittany Miller, Alissa Courtney, Arris Owens, Chelsey Warden, Victoria Webb

Faculty Mentor: Stephanie Burgess

Fast Food and Sugar Sweetened Beverage Impact on BMI

The research topic we are focusing on is the impact of fast food consumption and sugar sweetened beverages and the effect it has on body mass index. The study supports that the factors influencing adolescents to increase their fast food consumption include accessibility, convenience, price, family upbringing, and peer influence. Callista Roy's Adaptation model guides our study of the adolescents environment and possible changes to healthier eating habits. We completed a study of 238 students from a Northeast Ohio high school. There were 127 females and 109 males and 2 others. A correlational design was used. Factors that cause adolescents to consume fast foods and sugar sweetened beverages were compared with body mass index. It was found that there was an inverse relationship between a BMI over 30 and a decrease water intake. The most significant factor causing an increase of fast food consumption was accessibility. The main finding within the research study is with an increase of fast food consumption and sugar sweetened beverages, a strong correlation is represented in accordance to BMI.

8. Rachel Grace Koons, Tiffany Casturo, Maggie Cunningham, Elizabeth Rhoads, Rachael Smith

Faculty Mentor: Stephanie Burgess

Sleep and BMI Among the Adolescent Population

Due to a rising trend of obesity in adolescents and related health problems, this research aims to determine if there is a correlation between increased body mass index (BMI) and poor sleeping habits among the adolescent population. The research results were obtained by asking 270 local high school students survey questions related to demographics and amount of sleep and technology use before bed. The study was conducted ethically, as permission was granted to enter the school and consent was obtained by the right to refuse to take the survey. 29 surveys were dismissed due to incomplete information, inappropriate responses, or unclear answers. Using Microsoft Excel 2013 to analyze the sample of 241 surveys used, the researchers found a weak correlation between sleep time, time spent using technology before bed, and BMI. The correlation became stronger as the adolescents reported less time sleeping and more phone time before bed, allowing the researchers to conclude that there is a relationship between poor sleeping habits and an increased BMI. The researchers recommend further research be done with this topic to further examine the strength of the relationship between poor sleep habits and increased BMI.

9. Rachel Skledar, Amanda Paugh, Desira Carpenter, Megan Ritts, Diana Deleon

Faculty Mentor: Stephanie Burgess

Technology's Relationship with Body Mass Index

Previous studies of technology use have been associated with unhealthy body mass index (BMI) scores. More recent studies, however, are being conducted on health promoting forms of technology such as fitness applications and their ability to affect BMI. The purpose of this study was to identify the relationship between technology use and BMI scores among adolescents. A descriptive correlational design was used to analyze the voluntary, self-report surveys handed out at a northern Ohio high school to 259 students. Of the 35 multiple choice and fill in questions included in the survey, 10 questions were utilized for this study. Only 247 surveys were included in the data analysis, and the mean age of participants was 16 years old. Results indicate that television and BMI show a weak positive correlation ($r=0.05$), and phone usage and BMI show a weak negative correlation ($r=-0.05$). Out of the 247 students, only 94 of them reported using health applications, and 57% of these participants had a BMI that fell within the normal range. This study presents some support for the benefit of health applications in relation to BMI, and shows a need for further research on this topic in the future.

10. Camden Baucke

Faculty Mentor: Lauren Seifert

Thematic Analysis of Migraine Stakeholders Using Online Artifacts

What are stakeholder perspectives in migraine? How do stakeholders like clients/patients, caregivers, and providers communicate about their views and goals? The foregoing questions are part of an approach to management of chronic conditions called Health Co-Inquiry. This method promotes person-centered care, stakeholder activation, evidence-based practice, and integrated care. A primary objective is to improve outcomes through mutual respect and cooperation. How can we discover the views of stakeholders? I used a unique, bifurcated method to assess them. Online posts served as a source of data, collected via a WebCrawler. In cooperation with my supervisor, I evaluated themes at websites related to migraine. In addition, I used word frequency data from the WebCrawler. Prevailing themes were providing information, giving support, looking to peers and providers for assistance, and advertising products/services/clinical trials.

**11. Mary Grace Baker, Keith Harris-Virden, Ashley Tyna,
Jeanette Soricelli**

Faculty Mentor: Lauren Seifert

*NCAA Division II Athletics and Disordered Eating: A Comparison
Between Female Athletes and Female Non-Athletes*

The college-age population is at risk for body image disturbances and eating disorders. Typically, the latter challenge appears with greater frequency among females than males. Another issue is whether the incidence is higher in athletes than in non-athletes, due to the focus on physical conditioning, diet, and performance. Research on athletes and eating disorders is mixed, with some studies indicating less disturbance among athletes. Our survey sought to better understand potential links between varsity athletics and eating behaviors at Malone University. We conducted an anonymous and voluntary survey in five professors' classes in order to sample from among many academic majors. Overall, our results indicate that the chance of having or developing an eating disorder is the same when female athletes are compared to female non-athletes.

12. Marissa Cooney

Faculty Mentor: Lauren Seifert

The State of Sex Education According to University Students

Sex education in schools has been a widely discussed and debated topic throughout American history. Parents, teachers, students, organizations, and government entities have left many questions open regarding the proper provision of sex education to minors in schools. Since the Reagan administration in the 1980's, policy has praised abstinence-only sex-based education (SBSE) programs. However, evidence suggests that this is not the most effective form of education in preventative practice (Jarmillo, Buhi, & Corliss, 2017). This lack of support of comprehensive teaching and understanding of sexual health and behavior has led me to conduct a survey regarding school-based sex education of Malone students to find evidence about comprehensive SBSE. The study focuses on what has been taught versus what has been helpful regarding SBSE and is based on the retrospective perceptions of university students. I predict that the results may point to a gap between SBSE content and what information students have perceived as helpful.

13. Megan Sullivan, Victoria Hall, Kara Brathwaite
Faculty Mentor: Eb de Oliveira

Walking and Talking:
Outcomes Related to Time Spent in Faith-Based Preschools

Based on the Jewish practice of Shema Yisrael and Christian education, this study examines the relationships between social and motor outcomes with time spent in faith-based preschools. We investigated the family demographics in relation to attendance, as well as the children's characteristics and parenting perspective taking that are related to social and motor skills. The participants included 47 children who attended either a Jewish or Christian preschool, as well as their parents, in Canton, Ohio. Parents completed a demographic form in addition to a) Behavior Style Questionnaire (Carey & McDevitt, 1995), a measure of child temperament and b) Perspective Taking Subscale of the Maternal Empathy Scale (Walker & Cheng, 2007). Teachers also reported on children's social and motor skills using a 3-point Likert scale based on developmental landmarks from the literature. Correlation analysis revealed a negative relation between attendance and paternal education as well as maternal perspective-taking. There was also a positive relation between attendance and child motor skills as reported by teachers. Children reported by their fathers to be less distractible were also found to show higher levels of motor skills. Overall data suggest that faith-based preschools benefit children.

14. Donald Brown Jr.
Faculty Mentor: Jacalynn Stuckey

Water Scarcity and Conflict: The Role of Drought in the Syrian Civil War

From 1998 to 2012, the Eastern Mediterranean region was hit by a significant drought. Syria was one of the countries hit hardest by this drought. Most research and news surrounding the Syrian Civil War has focused on the significant religious divides and crackdown on protesters during the Arab Spring demonstrations as the key causes of the Syrian Civil War. However, I believe the drought played a primary role in provoking the underlying religious and class-based tensions in Syria, which caused the Syrian Civil War. The link between water scarcity and conflict in Syria is important because of possible future conflicts caused by water scarcity and drought due to climate change. The focus of this research project is on the drought and the effects it had on the agriculture industry and urbanization during the 1998-2012 time period. Secondary research will focus on the religious, social, and economics tensions prevalent in Syria historically. The research used in this project will include primary and secondary sources, such as academic research, economic and environmental data, news articles, and interviews with Syrians conducted during the earliest days of the conflict. I will be analyzing the sources from a historical and sociological perspective.

15. Tanaja Davis

Faculty Mentor: Jaccalyn Stuckey

Racial Discrimination and Generational Poverty

As a result of slavery and centuries of institutional racism, African Americans are concentrated in neighborhoods with outrageously high levels of poverty and violence. The possibility of upward mobility is very limited because zip code is one of the single most important predictors in our success. We have no choice but to acknowledge that factors such as socioeconomic status, educational level, neighborhood and crime rate still hinder the black community disproportionately because of institutional racism and generational poverty. Though laws have changed and overt racism has declined, the same trends continue in the African American community as is demonstrated by various statistics presented by Pew Research Center and U.S. Data and Statistics. African Americans cite their own experiences in dealing with discrimination and demonstrate how that has been an obstacle for them in various interviews and literary works. Also, history is our best teacher in that it provides us with many examples of how our actions, even previously, have major consequences in the world we live in today. I intend to draw from these sources in an attempt to highlight where the inequality stems from so that we can become increasingly aware of what it is we can do as a community to put an end to these injustices.

16. Abigail Woodward

Faculty Mentor: David Hahn

History of the Malone Mathematics Program, 1957-2018

My thesis is focused on how Malone University has developed and changed from when it first became a liberal arts university, specifically in the implementation and development of the Mathematics major and program, and how this particular program continues to advance within Malone's overall progression and growth. I am researching from the time of Malone's move to Canton in 1957 to present day. Through comparisons to other Christian universities near Canton, I will be able to assess the Malone math program's state and locate areas where further growth and development can occur. I am gathering data from Walsh University, Bluffton University, Geneva College, and Mount Vernon Nazarene University in the areas of yearly tuition costs, number of majors offered, and yearly headcount of undergraduates for general campus comparisons. Furthermore, I am looking at the numbers for yearly headcount by major, number of mathematics courses offered, and headcount of the Mathematics Department faculty to more accurately and quantifiably compare the math major of those universities to Malone's. Historical context of Malone and this part of Northeast Ohio in general will be considered when evaluating why specific changes, whether growth or decline, have occurred in my data.

17. Avery Caldwell

Faculty Mentor: Jack Ballard

Good Enough For Jazz

While jazz is best known as an acoustic style, in recent years live and recorded microphone techniques have improved overall sound and performance. There is some controversy regarding which microphones and setups are the best for jazz bands and musicians. Is there a proper way to hook up a microphone to each instrument, or should the sections or the entire ensemble be recorded instead? Big bands, funk bands, jazz with orchestra, and vocal jazz take different approaches to recording and live sound reinforcement. The paper outlines industry practice as to which setups work best for a variety of instruments, bands, and styles. There is not any single setup that will work for all instruments and performances since many artists and producers prefer a different result. The paper emphasizes industry consensus, drawing on the experience of producers and bands that have successfully recorded or performed live in the past.

18. Wesley McBride

Faculty Mentor: Jason Courter

Microcomputers and Remote Data Collection of Avian Microclimates

Rapid advancements in technology in the past decade has lead to the creation of low-cost computing devices, such as the \$35 Raspberry Pi, a fully functional and modifiable microcomputer. Devices such as this are of particular interest to researchers due to their low cost and flexibility, yet the literature on using microcomputers for remote sensor is still in its infancy. Using a Raspberry Pi we created five remote data collection devices equipped with a camera and sensors to measure temperature and wind speed at birdfeeders. Each device was equipped with a unique combination of low to high-cost sensors with prices ranging from \$165-\$300. The devices were set up at five residential locations in Stark County, moved to new locations weekly, and recorded data daily from 9:00am-12:00pm. A human observer recorded data alongside the device once a week for 20 minutes. Data were analyzed to determine if there was a significant difference between data collected by a human observer and the devices. Temperature data were compared to local weather reports and pictures were analyzed to determine the total percentage of usable data collected. We suggest that these devices will be useful for studying microclimates of feeding and nesting sites in the future.

19. Ryan Weber

Faculty Mentor: Jason Courter

*Changes in Nesting Phenology and Delayed Incubation
of Tree Swallows in Ohio from 1966-2016*

Birds must work to optimize nesting success by raising young during periods of high food abundance which is becoming earlier in the spring as food resource availability changes with climate change. We assessed 1780 Tree Swallow nesting attempts recorded at the Holden Arboretum in northeast Ohio from 1966-2016. We found that first egg dates have advanced over time and are now laid at higher degree-day accumulations than in the past. We also found that incubation intervals have increased over time and this is even more common earlier in the spring. These results indicate an insufficient attempt to remain in sync with food resources and as a result Tree Swallow populations have declined in the United States over the last 50 years according to Breeding Bird Survey (BBS) data. Increasing incubation period duration may be a strategy that is used to optimize nesting success in warming climates with more erratic weather events. These findings could help us to better understand the mechanisms that birds can use to adapt to climate change in temperate regions.

20. Pamela Dare

Faculty Mentor: Karyn Collie

*How Have 'Human Element Influences' Affected Animal Taxonomy
Since the 1850s in Comparison to Botanical Taxonomy?*

This thesis researched how humanity has influenced science in the particular field of taxonomy. Although science strives to be unbiased, experiments and their analysis are still conducted by humans. This truth adds some level of personal feelings and ambitions to possibly sway science. The thesis investigated several time periods where there was an increase in contention. Specifically, the 1850s, 1920s, 1960-1970s, and 2000s. Consistently throughout these periods, there were human influences such as pride, ambition, and prejudice that changed the pathway that taxonomy took. An interesting side part of the research was comparing these same trends in animal taxonomy to botanical. The hypothesis is that the subject matter would attract certain kinds of scientists. To find evidence I researched primary sources to discover their wordings and the true emotions and scandals that were occurring at those times. Hearing the actual opinions of the scientists in each of the time periods helped to illustrate their thoughts and where science was. There was some evidence to support this hypothesis. It was illustrated that zoology appears to attract fiery and argumentative scientists, while botanists tend to be rule followers that do not like to argue. In the end, this thesis was able to demonstrate that the humanity of the scientists did influence their work in several different ways.

21. Amber Murphy

Faculty Mentor: Karyn Collie

Seasonal Behavioral Changes and Habitat Space Use by Captive Snow Leopards and Komodo Dragons

Animals in captivity respond to environmental conditions such as temperature and precipitation. This study was conducted from January to April of 2018, and it looked into the seasonal behaviors of Komodo dragons and snow leopards at the Akron Zoo. The Komodo dragons are housed in an indoor exhibit maintained at a constant temperature, and the snow leopards are kept in an outdoor exhibit that exposes them to temperature and precipitation. The snow leopards were expected to have more of a response towards weather and seasonal changes than the Komodo dragons because they were constantly exposed. This study was conducted using a scan sampling application called Zoo Monitor, and it was used to record the behaviors and location of the animals in response to different environmental factors including temperature, precipitation, number of visitors, time of day, and day of the year. Overall, changes in the environment affected snow leopard behavior more than that of the Komodo dragons, since the snow leopards were more exposed to the elements. The results of this study are relevant to the management of snow leopards and Komodo dragons in captivity by giving insight into the array of different behaviors exhibited in response to the environment.

22. Rachel Wentworth, Laura Tweedie

Faculty Mentor: Kathryn Huisinga

*Transgenerational Effects of Diet on Metabolism in *Drosophila melanogaster**

A variety of epidemiologic studies have demonstrated a link between parental diet and transgenerational metabolic effects, including increased susceptibility to diseases such as obesity and type 2 diabetes. Research utilizing the fruit fly, *Drosophila melanogaster*, as a model has shown a correlation between high sugar parental diets and an altered metabolic state in progeny. Here, we compared the paternal and maternal effects from a high sugar or normal sugar/control diet on the metabolic profile of offspring. The parental generation included males and females raised separately on control or high sugar diets to create four different crosses. Progeny were all reared on control diets and the metabolic profile of adult and larval progeny were analyzed. Levels of triglycerides, trehalose, glycogen and glucose were analyzed and compared across the different crosses. Although we did not observe a significant difference in glucose levels between crosses, there was significant variability in the amount of triglycerides. Triglyceride levels were higher in crosses with high sugar males than those with control sugar males. Further analysis will utilize gas chromatography-mass spectrometry for more detailed metabolite measurement. Future experiments will address the role of the *Su(var)3-9* gene in these differences.

23. Lorne Strausbaugh, Erik Melekh

Faculty Mentor: Kathryn Huisinga

*The effect of mitochondrial MDH mutations in *Drosophila melanogaster**

Recent studies in humans have linked mutations in MDH2 (mitochondrial malate dehydrogenase) to children with early-onset severe encephalopathy. This mitochondrial malate dehydrogenase is an essential factor in the conversion of malate to oxaloacetate as part of the Krebs cycle. The aforementioned mutations are in highly conserved amino acids across species, and likely play a key role in MDH structure and function. It is our goal to recreate these mutations in flies using the CRISPR/Cas9 genome-editing system, in order to investigate the effect of the mutation on MDH stability and function. It is hypothesized that with successful mutation, phenomena paralleling those seen in *Homo sapiens* will be observed in drosophila. This semester we have undertaken the initial steps in implementing the CRISPR/Cas9 genome-editing system. So far, three different plasmids which generate guide RNAs (gRNA) that target the drosophila mitochondrial MDH gene have been created and prepared for injection into drosophila embryos. In addition, the donor constructs for the CRISPR/Cas9 system are being designed and constructed. Subsequent work will determine whether these mutations will be successfully introduced into flies, in addition to testing the degree to which they cause any of the of epileptic and encephalopathic pathologies observed in humans.

24. Anna L. Hershberger, Kaitlyn M. Hoch

Faculty Mentor: Lisa A. Beltz

The Effects of Tea Extracts and Chemotherapy Drugs on a Monocytic Leukemia Cell Line

Green and black tea extracts inhibit growth of some cancer cells. This study compares effectiveness of green, oolong, black, and red tea extracts and chemotherapy drugs on growth/viability of U937 monocytic leukemia cells to determine which materials alone or in combination most effectively kill these cells. This study hypothesizes that green and black tea extracts will most effectively synergize with anti-cancer drugs. Lyophilized tea extracts were prepared in the laboratory and U937 cells, purchased from the American Type Culture Collection. Cells were cultured in 96-well microtiter plates with a wide range of tea extract and/or drug concentrations for three days. The MTT assay was used to determine relative viable cell numbers. Viable cells turn MTT from yellow to purple. Cultures were read in a photospectrometric plate reader. Results: Red and black teas were most effective in killing U937 cells. Of the tested drugs, Ara-C was most effective, thalidomide less so, and methotrexate increased U937 growth. Combinations of extracts and drugs were tested in a checker-board fashion to determine whether extracts and drug combinations act in an additive or synergistic manner. Conclusions: Red and black tea, not oolong or green teas, are most effective at killing U937 monocytic leukemia cells.

25. Joshua K. Blakeley, Logan G. Galbraith

Faculty Mentor: Lisa A. Bletz

The Effects of a Green Tea Polyphenol and Chemotherapy Drugs on Monocytic Leukemia Cell Growth

Several green tea polyphenols inhibit growth of cancer cells. This study compares effectiveness of epigallocatechin gallate (EGCG) plus two chemotherapy drugs on growth/viability of U937 monocytic leukemia cells to determine whether these compounds alone or in combination most effectively kill these cells. This study hypothesizes that EGCG will act in an additive or synergistic manner with the anti-cancer drugs. U937 cells were purchased from the American Type Culture Collection. Cells were cultured in 96-well microtiter plates in the presence of a wide range of EGCG and/or drug concentrations for three days. The MTT assay was used to determine relative viable cell numbers. MTT turns from yellow to purple in the presence of viable cells. Cultures were read in a photospectrometric plate reader. Results: EGCG killed U937 cells at concentrations at or above 100 μ M. Of the tested drugs, thalidomide and methotrexate were ineffective at concentrations tested. Combination of EGCG with these drugs didn't result in additive or synergistic effects. Conclusions: EGCG killed these monocytic leukemia cells, while the two tested chemotherapy drugs did not at the tested concentrations. Combining EGCG with drugs didn't increase efficacy. Continuing work will test a wider range of drugs and EGCG concentrations and other chemotherapeutic agents.

Symposium Planning Committee

Kathryn Huisinga, Co-Chair

Steve Jensen, Co-Chair

Lisa Beltz

Stephanie Burgess

David Hahn

Linda Hamilton

Special Thanks to

David King, President

D. Nathan Phinney, Provost

AVI Fresh

Aultman Health Foundation

Malone University Honors Program

Malone Physical Plant Staff

Malone University Relations Staff

College of Theology, Arts, and Sciences

In its tenth year as a Malone University event,

Malone University's Student Research Symposium

showcases student scholarship across schools and departments. Excellent projects from such programs as Chemistry, Computer Science, English, History, Mathematics, Nursing, Political Science, Psychology, Social Work, and Zoo & Wildlife Biology are part of this celebration of student achievement. Please, join us in congratulating student participants and their faculty mentors as we come together in community to honor graduate and undergraduate research and creativity.



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