



POSTER PRESENTATION

POSTERS 1-23 ARE IN THE MULVA STUDIO. POSTERS 24-41 ARE ON SECOND FLOOR OF THE LIBRARY

1:00-2:00
MULVA STUDIO

1: Grace Schwantes and Quinn Van Oudenhoven:
Increasing laser efficiency through exploration of optical pumping and cell size

2:00-3:00
MULVA STUDIO

2: Nicole Kozlovsky:
Economic Impact Studies

3:00-4:00
MULVA STUDIO

3: Tyler Butts:
Unintended consequences of dredging activity in the lower Fox River on zooplankton density and biomass

1:00-2:00
MULVA STUDIO

4: Jacob Klug and Giovanni Bisi:
The Mineralogy and Petrology of the Mellen Pegmatite

3:00-4:00
MULVA STUDIO

5: Connor Gullstrand:
Virulence of *Flavobacterium columnare* in Zebra fish

1:00-2:00
MULVA STUDIO

6: Colin Dassow:
Cannibalism in Large Mouth Bass: A 28-year Record From a Small North Temperate Lake

2:00-3:00
MULVA STUDIO

7: Nicole Vanderlin:
The Relationship Between Income and Depression

3:00-4:00
MULVA STUDIO

8: Kaitlin Rhode:
Moth Diversity

1:00-2:00
MULVA STUDIO

9: Molly Gallahue and Angelina Pankow:
Petrology of intrusive granites from the Mellen Complex in northwest WI

3:00-4:00
MULVA STUDIO

10: Lenka Craigova and Johnny Shepherd:
Growth and Virulence of an Environmental *Flavobacterium* Isolated from a Copepod in Lake Michigan

2:00-3:00
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11: Halee Martin:
Using Chemical Disruption to Study Organ Regeneration

3:00-4:00
MULVA STUDIO

12: Sophie Mueller:
Analyzing density of *Porites* and *Cervicornis* coral near Bocas del Toro, Panama

2:00-3:00
MULVA STUDIO

13: Sarah Jensen and Shelby VanRossum:
Differences in Sensation Seeking by Age Group and Sex

1:00-2:00
MULVA STUDIO

14: Cole Brennan:
Macroinvertebrate Response to Winterkill Event in Dream Lake

2:00-3:00
MULVA STUDIO

15: Chandler Brennan and Olivia Johnson:
Mapping the Molecular and Cellular Complexity of Planarian Protonephridia

3:00-4:00
MULVA STUDIO

16: Dominic Schaut: (DIGITAL SCREEN)
Investigation of the Downstream Effects of Hippocampal Aromatase Inhibition via RNA Isolation from Zebra Finch Telencephalon

2:00-3:00
MULVA STUDIO

17: Angel Hon: (DIGITAL SCREEN)
Hippocampal Insulin Receptor Labeling in Zebra Finch Brain as Revealed by Confocal Microscopy

1:00-2:00
MULVA STUDIO

18: John Becker:
Analysis of Zooplankton Distribution and Community Composition between Tributary Source Locations and Canal Locations in Gatun Lake, Panama

3:00-4:00
MULVA STUDIO

19: Katie Flesch and Erica Groelle:
A Reexamination of Middle Eocene Rodents From the Bridger Formation of Green River Basin, Wyoming



POSTER PRESENTATION

POSTERS 1-23 ARE IN THE MULVA STUDIO. POSTERS 24-41 ARE ON SECOND FLOOR OF THE LIBRARY

3:00-4:00

MULVA 2nd Floor

- 37: Angel Hon, Emily Steffanus, Lauren Roethlisberger, and Kelly Brofka:
A Comparison of Varying Electrolyte Replacement on Fluid Balance in College Football Players

1:00-2:00

MULVA 2nd Floor

- 38: Jack Roets:
Virulence of *Flavobacterium columnare* mutants in Zebra fish

3:00-4:00

MULVA 2nd Floor

- 39: Andrew Gisi:
On Hans Kelsen's "Zur Theorie der Juristischen Fiktionen"
A Translation and Critical Reflection

1:00-2:00

MULVA 2nd Floor

- 40: Anna Thompson:
From Ariel to Tiana: How do Princesses Influence our Adult Lives?

3:00-4:00

MULVA 2nd Floor

- 41: Paige Navis:
The Relationship Between Individualism-Collectivism and Bullying Prevalence Across 45 Countries



ABSTRACT

ORAL PRESENTATION Mulva 2nd Floor

1 ORAL

1:00-1:30
MULVA : 211

Respecting the Autonomy of an Absent Person

Breanna Everetts, Philosophy

Ben Chan, Assistant Professor of Philosophy

Is it possible to respect the autonomy of an absent person? To place this conceptual question in a concrete setting, I will frame my analysis of autonomy in the context of surrogate decision-making. New standards for surrogate decision-making appear to be promising justifications for such a conceptual expansion. I hope that analyzing autonomy in the context of surrogate decision-making will allow me to demonstrate the possibility of expanding the rigid standard we currently have for autonomy. I will show that people need not make completely internalized, highly rational and self decisions to be respected as autonomous agents.

2 ORAL

1:00-1:30
MULVA : 213

Creative Works Presented at the Sigma Tau Delta National English Honor Society Conference in Minneapolis, MN, March 2-6, 2016

Jonathan Carroll, English

Chryssy Joski, English

Laurie MacDiarmid, Professor of English and
Writer-in-Residence

Jonathan Carroll, "In Defense of Being"

This is a creative short story which explores an individual's psyche of guilt and forgiveness through an inner dialogue, constructed in a multi-layer narrative with influences both Biblical and philosophical.

Chryssy Joski, "Motherhood"

Motherhood is often a glorified status, with only happy stories of glowing mothers and precious babies. However, the truth about parenthood is that there are just as many downs as there are ups. This presentation consists of a collection of flash fiction pieces (very short stories) about the realities of motherhood.

Caroline Cooper, "Violence Against the Poor in Charles Dickens's Oliver Twist"

This essay examines Dickens's attack on the social injustices against the poor in nineteenth century Britain in his 1837 novel Oliver Twist.

Research Projects from Business Administration

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ORAL

1:00-1:30
MULVA : 217

3:00-4:00
MULVA : 217

Economic Analyses of Leading Indicators and of Paradise Lost

Donnie LaBarre, Economics and English

Erika Rettler, Business Administration and Economics

Ed Ridsen, Professor of English

Marc Schaffer, Assistant Professor of Economics

Donnie LaBarre, "Rejection of Grace: Satan's Use of Cost-Benefit Analysis in Paradise Lost"

This essay presents an economics-based reading of Paradise Lost, specifically arguing that Satan makes use of cost-benefit analysis in his critical decision to initially rebel against God, his determination to ruin humanity in Book 2, and his steely refusal to repent in Book 4. Satan's decision-making issues arise due to his fixation on a subjective and worldly understanding of costs and benefits. To Milton, some costs and benefits are objective and constitute "Right Reason": God's

Erika Rettler, "Leading Indicator Analysis"

Leading Indicators can help companies forecast where they expect to be in the future. This project looked at revenue streams and many indicators that seek to explain the growth of those revenues. Based on correlation analysis indicators can be chosen if they are strongly correlated. The top 6 indicators have been graphed to show where the revenue can be expected to be in the next year.

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1:00-2:00
MULVA STUDIO

Increasing Laser Efficiency Through Exploration Of Optical Pumping and Cell size

Grace Schwantes, Physics

Quinn Van Oudenhoven, Physics

Joseph Zielinski, Physics

Erik Brekke, Assistant Professor of Physics

The hyper-fine structures of rubidium can be used to emit 420nm blue light using a parametric four-wave mixing method. This was done using a 778nm laser propagating through a tapered amplifier and the rubidium $5s_{1/2} \rightarrow 5d_{5/2}$ transition. We explored several possible methods for increasing the efficiency of this process. These involve manipulating the atomic level populations so more atoms can undergo the four-wave mixing process and changing the size of the cell containing rubidium to prevent re-absorption of light. Efficiency of these processes can be evaluated through the comparison of light intensities before and after the utilization of these methods.

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POSTER
2:00-3:00
MULVA STUDIO

Economic Impact Studies

Nicole Kozlovsky, Accounting and Economics

Marc Schaffer, Assistant Professor of Economics

Economic Impact Studies for the Green Bay Botanical Garden and Cerebral Palsy Center and they have a \$5.97 million impact on Northeast Wisconsin and a \$8.53 million impact on Brown County, respectively.

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3:00-4:00
MULVA STUDIO

Unintended Consequences Of Dredging Activity In The Lower Fox River On Zooplankton Density And Biomass

Tyler Butts, Biology (organismal) and Environmental Science

Carrie Kissman, Assistant Professor of Biology and Environmental Science

Water bodies adjacent to paper and other industries are often contaminated by polychlorinated biphenyl (PCBs). Remediation via dredging to remove contaminated sediments may have unintended consequences for local water clarity and zooplankton density and biomass. Zooplankton samples and water quality data was collected at dredged sites as well as upstream and downstream of dredging for two years, 2013 and

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Virulence of Flavobacterium Columnare in Zebra sh

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2:00-3:00
MULVA STUDIO

The Relationship Between Income and Depression

Nicole Vanderlin, Economics

Marc Schaffer, Assistant Professor of Economics

A common cliché is that money cannot buy an individual happiness. Taking a closer look at such a simple but powerful saying one might examine the relationship between the two. One could capture this quantity by looking at an individual's level of depression. Going by the cliché would indicate that there would not be a consistent positive or negative linear relationship between ones level of depression and income. But one also can make the argument that the more depressed an individual is the less motivated one is, which could result in a lower income. This would indicate a negative relationship between depression and income. So the question then becomes how does depression affect one's income?

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MULVA STUDIO

Moth Diversity

Kaitlin Rhode, Biology

Carrie Kissman, Assistant Professor of Biology
and Environmental Science

There are a multitude of characteristics that constitute species diversity and diversity that is observable at any given time. In particular, this study focuses on the effects of the lunar phases on species diversity, richness and abundance observed in the order Lepidoptera. Within the order, only moths were of interest in this study. Diversity was analyzed by determining species richness and abundance within the different moon phases in two different years. We expect to see that there will be greater richness and diversity of Lepidoptera during the new moon phase when moon illumination is almost non-existent, and less richness observed in phases, such as waxing gibbous, when the moon is bright.

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MULVA STUDIO

Petrology Of Intrusive Granites From The Mellen Complex in Northwest Wisconsin

Molly Gallahue, Geology

Angelina Pankow, Geology

Tim Flood, Professor of Geology

The Mellen Complex (MC) in northwest Wisconsin formed 1.1 Ga during the Keweenawan rifting event. Granites are the youngest part of the MC making them the youngest igneous rocks in the state of Wisconsin. The purpose of this project was to determine the origin and crystallization history of the granites. Research methodology included outcrop and hand sample examination, microscope point count and textural analysis, and scanning electron microscope analysis to establish mineral chemistry. The samples for this study were found to be different types of granites. The crystallization sequence for most samples was also determined.

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2:00-3:00
MULVA STUDIO

Using Chemical Disruption to Study Organ Regeneration

Halee Martin, Chemistry

Ryan King, Assistant Professor of Biology

Planarians have amazing capacity for regeneration. Current strategies of studying this system involve amputation of large sections of the body. This does not encompass replication of traumatic organ injury such as kidney failure. Planarians possess a primitive kidney-like system with cellular and molecular similarities to the human kidney. The goal of this project is to develop a strategy to destroy this system without damaging other parts of the organism in order to study regeneration.

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MULVA STUDIO

Analyzing Density of Porites and Cervicornis Coral Near Bocas del Toro, Panama

Sophie Mueller, Environmental Science

Carrie Kissman, Assistant Professor of Biology and Environmental Science

POSTER PRESENTATION

13 POSTER

2:00-3:00
MULVA STUDIO

Differences in Sensation Seeking by Age Group and Sex

Sarah Jensen, Psychology and Shelby VanRossum, Psychology
Raquel Cowell, Assistant Professor of Psychology

Sensation seeking is a trait used to assess an individual's pursuit of novel and exciting experiences, and is expressed behaviorally as risk-taking. Previous research suggests that sensation seeking may change throughout life but has focused on young adults without including older adults (Steinberg et al., 2008). Our study addresses this deficit by administering a modified version of Zuckerman's Sensation Seeking Scale to 54 younger (18-22) and older (65+) adult participants. A one-way ANOVA revealed significant between-group effects for three of the sensation seeking subscales. These findings suggest differences in sex and age regarding sensation seeking. These differences may affect the decision-making processes used in everyday life.

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MULVA STUDIO

Macroinvertebrate Response to Winterkill Event in Dream Lake

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2:00-3:00
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17
POSTER
2:00-3:00
MULVA STUDIO

Hippocampal Insulin Receptor Labeling in Zebra Finch Brain as Revealed by Confocal Microscopy

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POSTER

3:00-4:00
MULVA STUDIO

Katie Flesch, Biology

Erica Groelle, Biology

Deborah Anderson, Associate Professor of Biology

Sciuravids are a diverse group of primitive rodents from the early to middle Eocene of North America. Taxonomy of the Sciuravidae has been misleading because the genotype, *Sciuravus nitidus*, with its high level of intraspecific variation, has been used as a wastebas -

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MULVA STUDIO

Digital Commons @ St. Norbert College
Holly Hammann, English
Dani Perszyk, Mathematics and Computer Science
Sarah Titus, Project Librarian for Intellectual

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MULVA 2nd Floor

Spatial Memory Behavior and Vesicular Glutamate
Transporter 2 mRNA in the Hippocampus of Adult Male
and Female Zebra Finches Following Acute
Corticosterone Treatment

Danielle Gardner, Biology and Brittany Rupp, Biology
David Bailey, Associate Professor of Biology

Hippocampal-dependent memory is modified by the stress hormone corticosterone, which can alter glutamate neurotransmission. Glutamate is loaded into synaptic vesicles by vesicular glutamate transporter proteins (VGLUTs). In previous work, corticosterone treatment of female zebra finches increased hippocampal VGLUT mRNA by 140% relative to controls. We hypothesized that corticosterone treatment of males would significantly increase VGLUT2 mRNA compared to females. These data will provide an explanation for the sexually dimorphic nature of stress-induced, hippocampal-dependent memory performance, and a further indication that potentiation of memory during acute stress results from an increased glutamate shuttling following upregulation of VGLUT2.

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3:00-4:00
MULVA 2nd Floor

Escherichia Coli Requires OmpX for Growth in the
Presence of Bile Salts

Nicole Minton, Biology, Anna Nowaczyk, Biology
and Hannah Johnshoy, Biology

Zachary Pratt, Assistant Professor of Biology

Outer membrane proteins (Omps) in Gram-negative bacterial membranes fight against environmental stress. Omps function during extracellular stress as efflux pumps or activators of RpoE, a stress-responsive sigma factor. Our work examines ompX's effect on the growth of Escherichia coli in bile salts, which are found in the gastrointestinal tract and disrupt bacterial lipid membranes. An ompX mutant was generated in E. coli using recombinering (Datsenko and Wanner, 2001). The ompX deletion mutant showed decreased growth compared to the parental strain in the presence of bile salts. These findings indicated that the deletion of ompX renders E. coli sensitive to bile salts.

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MULVA 2nd Floor

G Protein-Coupled Estrogen Receptors in the Zebra
Finch Hippocampus are Necessary for Learning and
Memory of a Spatial Task

Angel Hon, Biology and Yekaterina Makeyeva, Biology
David Bailey, Associate Professor of Biology

Inhibition of estrogen production in the zebra finch hippocampus decreases performance in a spatial memory task, but studies involving the role of estrogen receptors in this effect are necessary to more directly examine estradiol's role. Birds were given an agonist or antagonist of the G protein-coupled estrogen receptor (GPER) and were tested for acquisition and retention of a food location. Then, brain tissue was collected and the hippocampus microdissected. While GPER agonism did not significantly affect acquisition, antagonism resulted in a failure of learning. Additional work is determining the synaptic mechanisms mediated by estrogen provision and necessary for hippocampal-dependent memory.

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 MULVA 2nd Floor

The Effect of Mindset on Decision-Making

Carly Barry, Psychology

Kameko Halfmann, Visiting Assistant Professor of Psychology

We explored how abstract versus concrete processing affected decision-making. We also examined if connection to future self modified the relationship between mindset and decision-making. We expected individuals in the concrete processing condition to make safer and more immediately gratifying decisions than the abstract processing condition. Preliminary analyses show that, on average, participants in the concrete condition do indeed make safer and more immediately satisfying choices, and that connectedness to one's future self predicts future oriented choices. However, data analysis is ongoing. The results of this research will help us understand what guides our decision-making process.

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 3:00-4:00
 MULVA 2nd Floor

A Revision on the Impact of the Bubonic Plague

Kristian Clausell-Mobley, Biology

Tom Conner, Professor of French

Beginning in the mid-14th century, bubonic plague swept across the known world leaving death in its wake. This pandemic sized cataclysm which ravaged Europe was brought about by a multitude of factors including those which could be controlled and others which could not. Within this paper I make the case for a different view of the plague; one that maintains it was not all bad. Some effects of the plague, one might argue, could have led to an eventual rise of the middle class in medieval Europe, eventually leading to capitalism as we know it today. Evidence for these positive contributions of the plague will be analyzed to see just how the bubonic plague changed the Europe of the 1300's to the one more recognizable today.

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 MULVA 2nd Floor

Indole Based Structural Analogs of Moda nil Inhibit the Dopamine Transporter

Katie Flesch, Biology

Cynthia Ochsner, Assistant Professor of Chemistry

Moda nil (2-[(diphenylmethyl) sul nyl] acetamide) is a wake promoting agent that acts at presynaptic dopaminergic neurons as a partial substrate for the dopamine transporter (DAT), increasing extraneuronal dopamine. Using rotating disc electrode voltammetry in a suspension of human embryonic kidney cells expressing the human dopamine transporter, our previous results indicated that moda nil binds to DAT at the same site as DA. We also reported that an in-house synthesized indole based structural analog of moda nil inhibits DAT in an uncompetitive manner, exhibiting cocaine-like inhibition. We have synthesized four additional indole based analogs to determine whether they are inhibitors (cocaine-like) or substrates (amphetamine-like) of DAT. The mechanisms of inhibition of these analogs are determined by fitting rates of dopamine inward transport to mathematical models.

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POSTER

2:00-3:00
MULVA 2nd Floor

Centrifugation Minimizes Microbial Growth in Craft Beer

Nelson Milbach, Chemistry (Biochemistry emphasis)

David Hunnicutt, Associate Professor of Biology

Brewing involves the activity of microbes from the production of raw materials to packaging. Fermentation of sugars in grain extracts by brewing yeast, *Saccharomyces cerevisiae*, is of central importance to brewing. However, the presence of other microbes presents a threat to the quality of finished product, dictating the careful management of the brewing process. The current work assesses the microbial content of craft beers produced by Hinterland Brewery, Green Bay WI before and after the incorporation of centrifugation in the brewing process. Analysis of microbial growth on differential media suggests that centrifugation effectively eliminates excess microbial content.

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MULVA 2nd Floor

Cerebral Palsy Wage Study

Rikki Gingras, Business Administration

Jamie O'Brien, Assistant Professor of Business Administration

Marc Schaffer, Assistant Professor of Economics

The goal of this wage study was to compare the salaries offered by the Cerebral Palsy Center to Green Bay market salaries. The Cerebral Palsy Center has thirty-eight positions that needed to be evaluated and compared with the going market wage in our region.

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3:00-4:00
MULVA 2nd Floor

Stability of Older Adult Reaction Time in an Impulse Control Task

Elizabeth Paitel, Psychology and Spanish

Raquel Cowell, Assistant Professor of Psychology

Both younger and older adults spend an increasing amount of time with their peers. While research suggests that younger adults significantly change their behaviors in the context of peers and take greater risks as a result (Steinberg & Gardner, 2008), it is not clear if older adults are similarly influenced. In the current study, reaction time on a decision-making task varied by age group and social context. Results from a one-way ANOVA showed that overall, a community sample of older adults exhibited slower reaction times on a decision-making task compared to the younger adults, regardless of social context. Additionally, younger adults appeared more sensitive to peers compared to their older adult counterparts and performed more quickly when they were being observed by two similarly aged, same sex peers ($M = 6.09$). This may suggest that young adults do not contemplate decisions as thoroughly in the presence of peers as older adults. These results have the potential to inform the general public of the realities of cognitive aging, and to combat ageism within our communities by illustrating how a steady reaction time is more robust in older adults, regardless of changes in the environment.

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POSTER

3:00-4:00
MULVA 2nd Floor

Characterization of the Cytotoxic Effects of
Pteridium (fern) Extracts on Human Cell Lines

Emma Meetz, Biology

John Grady, Biology

Davey Holzer, Biology

Mitch Ledwith, Biology

Austin Livingston, Biology

Kaci Keleher, Biology

Russ Feirer, Associate Professor of Biology

Bracken fern (*Pteridium aquilinum*) frond extracts induce apoptosis and cell cycle arrest in certain cancer cell lines. This work extended the findings of Roudsari et al. and determined the cytotoxicity of *P. aquilinum* extracts on additional cancer cell lines. *P. aquilinum* extracts affected the cancerous MDA-231 cells (IC₅₀ ~75 g/mL) more than the non-cancerous MCF-10a cells (IC₅₀ ~ 500 g/mL). To isolate the cytotoxic compound(s) that induced cell death, the extract was separated using a silica column to yield several distinct bioactive fractions. Work continues to characterize the bioactive compounds in *P. aquilinum* extracts, which have been found to be labile.

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1:00-2:00
MULVA 2nd Floor

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POSTER

2:00-3:00
MULVA 2nd Floor

Increasing Circulating Laser Intensity by Designing and Utilizing a Ring Optical Cavity

Sam Potier, Physics and Mathematics
Erik Brekke, Assistant Professor of Physics

Within the field of optical research, build-up cavities are utilized in order to increase the intensity of light.

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POSTER

3:00-4:00
MULVA 2nd Floor

A Comparison of Varying Electrolyte Replacement on Fluid Balance in College Football Players

Angel Hon, Biology
Emily Steffanus, Biology
Lauren Roethlisberger, Biology
Kelly Brofka, Biology

David Bailey, Associate Professor of Biology
Electrolyte replacements contain ingredients to maintain hydration and enhance performance. We determined the effectiveness of Pedialyte, Gatorade, and Medi-lyte electrolyte tablets in college football players, hypothesizing that Pedialyte would be most effective. Treatments were provided prior to practice over 4 weeks, and participants' vitals were measured and urinalysis was conducted before and after each practice. Among treatment conditions, there were no significant differences in variables like urine specific gravity, pH, and body temperature. However, of the cardiovascular variables, the tablets were more effective, limiting fluctuation of systolic blood pressure. Additional studies could examine these effects across sport and season.

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POSTER

1:00-2:00
MULVA 2nd Floor

Virulence of Flavobacterium Columnare Mutants in Zebrafish

Jack Roets, Biology
David Hunnicutt, Associate Professor of Biology
Flavobacterium columnare is a gram-negative rod that is the cause of Columnaris disease in a variety of fish, including ecologically and economically important species in Wisconsin. Infection assays using a zebrafish (Danio rerio) model system have been used to evaluate F. columnare virulence factors in knockout mutants. Wild type F. columnare strain C#2 resulted in fatal infection, while mutations in gldN, a gene required for gliding motility and secretion, showed reduced virulence. The gldN- mutant strain is being evaluated as a potential vaccine to provide resistance to Columnaris disease.

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Breakthrough Fuel is proud to support undergraduate research at St. Norbert College and congratulates all students for participating in such research