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Undergraduate Research and Scholarship Symposium

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2011-03-30

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**Duquesne University**

The Third Annual  
**UNDERGRADUATE  
RESEARCH AND  
SCHOLARSHIP  
SYMPOSIUM**

**Power Center Ballroom  
March 30, 2011**

Sponsored by: Academic Affairs, Office of the Provost, Office of Research

The Third Annual  
**UNDERGRADUATE  
RESEARCH AND  
SCHOLARSHIP  
SYMPOSIUM**

**WEDNESDAY MARCH 30 2011**

Sponsored by:  
Academic Affairs  
Office of the Provost  
Office of Research

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### Acknowledgements

**The organizers would like to thank all of the Faculty Mentors and Advisors for their unselfish service to and support of our undergraduate scholars.**

This symposium would not have been possible without the hard work and diligence of the Undergraduate Organizing Committee members.

**Kristen Friedrich – Chair  
 Josh Koslosky  
 Kait Wolf  
 Devin Bowen  
 Jonathon Scott  
 Justin Stadelmyer  
 Matthew Taylor  
 Eddie Strauser  
 Ashley Biernesser**

The organizing committee would like to thank the following organizations and individuals for their generous support of this important event:

**Academic Affairs  
 The Provost and Academic Vice President Dr. Ralph Pearson  
 The Office of Research and Ms. Julie Christy  
 University Events  
 The Honors College  
 Phi Kappa Phi**

## Schedule of Events

Undergraduate Research and Scholarship Symposium

March 30th, 2011 – Power Center Ballroom

<b>8:00 am – 9:00 am</b>	<b>Student set up</b> Continental breakfast for participants
<b>9:00 am</b>	<b>Doors open to the public</b>
<b>9:00 - 10:00 am</b>	<b>Formal Presentations Session 1</b>
<b>10:00 am - 11:00 am</b>	<b>Informal Poster Session</b> Guests are invited to walk around, peruse student projects, and engage with the students
<b>11:00am – 12:00 pm</b>	<b>Formal Presentation Session 2</b>
<b>12:00 pm – 1:00pm</b>	<b>Break for Lunch</b> Boxed lunch provided for participants
<b>1:00 pm – 2:00 pm</b>	<b>Keynote Speaker</b> Dean Christopher Duncan McAnulty College & Graduate School of Liberal Arts
<b>2:00 pm</b>	<b>Awards</b> <b>Closing Remarks</b>

Presentation Session 1  
9:00-10:00

Time	Presenter(s)
9:00	<b>Cara Mellits, Chelsey Tressler, &amp; Daniel Morgan</b> Bayer School of Natural and Environmental Sciences <i>Atypical Streptococcal Infections of Cats from an Institutionalized Hoarding Family</i>
9:15	<b>Eileen Johnson &amp; Kelli Clark</b> Rangos School of Health Sciences <i>Wounded Warriors: Challenges, Barriers, and Supports</i>
9:30	<b>Katelin Lambert &amp; Tim O'Brien</b> McAnulty College and Graduate School of Liberal Arts <i>Taking Back the American Vote: A Case for Drawing</i>
9:45	<b>Allison Laux &amp; Valerie Wowk</b> School of Nursing <i>A Literature Review of Research Evidence on Pediatric Influenza Vaccinations</i>

Presentation Session 2  
11:00 – 12:00

Time	Presenter(s)
11:00	<b>Michael Mehok</b> McAnulty College and Graduate School of Liberal Arts <i>Microtext: Geographically Locating Twitter Tweets</i>
11:15	<b>Jennifer Hornyak</b> Bayer School of Natural and Environmental Sciences <i>Analysis of Nuclear DNA from Burnt Tissue</i>
11:30	<b>Brittany Long &amp; Kimberly Gnora</b> School of Nursing <i>Decreasing Ventilator-Associated Pneumonia</i>
11:45	<b>Rachael Ross</b> Mylan School of Pharmacy <i>Mutagenesis of the Serotonin Transporter</i>

## Special Awards

\$500 - Outstanding Research Award

\$250 - Two Honorable Mentions

**Sponsored by Phi Kappa Phi, National Honor Society**

\$250 - Outstanding Poster

**Sponsored by the Honors College**

\$250 - Scholarship Award

\$125 - Two Honorable Mentions

**Sponsored by the Office of the Provost**



Dr. Christopher M. Duncan

Dean of the McAnulty College and Graduate School of Liberal Arts

Dean Duncan's research includes work on the relationship between the religious belief and political activism in American politics, and he has done work on welfare reform and American political culture. He has taught numerous courses, including Catholic Social Teaching and American Public Policy, Seminar in Theories of Justice, and Catholicism and American Civic Engagement. Dean Duncan is the author of numerous scholarly publications, including the book *The Anti-Federalists and Early American Political Thought* and the article *Catholicism, Poverty and The Pursuit of Happiness*, which appeared in the *Journal of Poverty*. His works have also appeared in *American Political Science Review*, the *Journal of the Art of Teaching and Commonwealth*.

Dr. Duncan holds a B.A. in philosophy and political science from the University of Michigan, and an M.A. and Ph.D. in political science from Wayne State University.

Number: 1  
Authors: Chelsey Tressler, Cara Mellits, Daniel Morgan  
Year: Junior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Becky Morrow  
Title: Atypical Streptococcal Infections of Cats from an Institutionalized Hoarding Facility

Abstract:

Hundreds of cats were rescued from a disease-ridden pseudo-sanctuary located north of Pittsburgh, Pennsylvania. Over 50 cats in the population had clinical signs highly similar to those in horses infected with *Streptococcus equi* (*S. equi*), including cervical lymphadenitis with abscessation and acute rhinitis characterized by profuse mucopurulent nasal discharge. In addition to the spontaneous neck abscesses and atypical upper respiratory infections, many cats exhibited septic arthritis with total joint destruction, paw abscessation, necrotizing fasciitis, meningitis, otitis, and septic shock, often leading to death. After gathering medical data on over 400 cats as well as culturing Group C Streptococcal bacteria from several samples taken from the various regions, it was hypothesized that a single bacterial species, *S. equi*, was responsible for all of these clinical signs. After DNA isolation, amplification of bacterial DNA using universal bacterial primers (ITSF and ITSReub), cloning, and sequencing, *Streptococcus canis* (Group G) was consistently identified. Due to the lack of correlation between culture results and sequence results, horizontal gene transfer between *Streptococcus* species is suspected. These clinical syndromes may be explained by different Streptococcal virulence factors; therefore primers specific to those virulence factors in multiple species of *Streptococcus* will be tested in future experiments.

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Number: 2  
Authors: Katie Ratay, Chris Fonner  
Year: Junior  
School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Sarah Woodley

Title: The effects of gender and exposure to stressors on

Abstract:

Vertebrates typically respond to challenges to homeostasis (stressors) by mounting stress responses. Exposure to acute stressors initiates fight-or-flight responses and inhibits processes unnecessary for immediate survival such as digestion and reproduction. Acute responses are beneficial by helping an animal survive, but chronic exposure to stressors can become damaging. Our goal was to study the immune response to predator stressors in *Desmognathus ochrophaeus* salamanders. These salamanders respond to odors from predators by decreasing their locomotory activity, to avoid detection by predators. We hypothesized that both acute and chronic exposure to predator stressors would affect white blood cell differentials, a marker of immune function. We predicted that both acute and chronic exposure to predator stressors would cause a change in the proportions of neutrophils and lymphocytes. The results of the experiment did not support the hypothesis. Compared to animals exposed to non-predator odors, there was no difference in white blood cell differentials in animals exposed to predator odors. Surprisingly, animals chronically exposed to predator odors exhibited decreased neutrophils and increased lymphocytes. To conclude, chronic exposure to stressors affects immune function, although it is not clear whether immune function is increased or decreased. Also, we found gender differences in white blood cell differentials.

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Number: 3

Authors: Katie Heaps, Stacey Levine

Year: Junior

School: McAnulty College and Graduate School of Liberal Arts

Faculty Advisor: Dr. Stacey Levine

Title: Denoising Images Using Total Variation

Abstract:

Total variation has been used in the image processing community for decades as a way to denoise images while preserving important information such as edges and smooth regions. In this talk, we will examine the total variation method first introduced in an influential paper by Rudin, et al. and look at several



extensions of their original scheme, including a dual formulation that yields a differentiable problem (unlike the original) and an upwind scheme that better preserves isotropic features. We will observe the effects of these algorithms on a variety of images.

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Number: 4

Authors: Christine Gray

Year: Junior

School: McAnulty College and Graduate School of Liberal Arts

Faculty Advisor: Dr. Patrick Juola

Title: Personality Analysis through Text

Abstract:

This experiment deals with the ability to detect personality using the Java Graphical Authorship Attribution Program and the Myers-Briggs personality types. This is first experiment of its kind to be done in English; a prior experiment has only been conducted in Dutch. By analyzing text and finding the average distance between results, JGAAP is able to conclude whether the author of a particular text is an introvert or extrovert based on a sample document of which the personality type of the author is known. The text is analyzed by using character n-grams in which repeated patterns of characters of size n are used to determine how close the document with an unknown author is to a document with a known author, the most common experiments being character bigrams and character tetragrams. This method of text analysis has proved to be the most accurate for determining the personality of an author. This experiment also proves that personality can be detected using micro documents because each document is less than 2,000 words. An experiment on personality analysis on documents of this size has also never been performed before. Also the experiment uses documents that were passively collected from reddit.com. This is significant because these documents are not of the best quality since they were collected from a source that is not naturally academic. So far this experiment has only been run on the first level of the Myers-Briggs scale, introvert versus extrovert, but it can be expanded to the other levels of the scale in the future.

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Number: 5  
Authors: Rachael Ross and Dr. Tammy Nolan  
Year: Junior  
School: Mylan School of Pharmacy  
Faculty Advisor: Dr. Chris Surratt  
Title: Mutagenesis of the Serotonin Transporter

Abstract:

Despite our extensive knowledge about neurons and the chemical messengers they use to communicate, called neurotransmitters, many of the finer details still remain a mystery. One area of interest on this subject involves transmembrane proteins, which transport neurotransmitters back into the presynaptic neuron after an action potential has been fired. There are three transporters for the monoamine neurotransmitters, the Dopamine Transporter (DAT), the Norepinephrine Transporter (NET), and the Serotonin Transporter (SERT). These transporters are significant because they are potential targets for the treatment of depression, cocaine addiction, methamphetamine addiction, and various other diseases. By utilizing tools such as molecular modeling, virtual screening, and mutagenesis, this experiment attempts to gain a better understanding of which amino acids may be important for the binding of inhibitors to SERT. A more complete understanding of the S2 binding pocket in SERT would allow for the development of new SERT specific drugs, which may have fewer side effects than currently available treatments.

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Number: 6  
Authors: Jennifer Berkebile, Jonathan Ragheb, Richard Elinson  
Year: Junior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Richard Elinson  
Title: Thyroid Hormone Receptor in the Avian Yolk Sac

Abstract:

Thyroid hormone (TH) plays a major role in the development of various tissues. TH functions by binding to thyroid hormone receptors (TR), which includes the three isoforms, TR $\pm$ , TR<sup>20</sup>, and TR<sup>22</sup> in the chicken *Gallus gallus*. In the developing avian embryo, TH is required for muscle growth. While TH may act directly on muscle, it may be required alternatively for metabolism of yolk, needed for muscle growth. To test this, we extracted RNA from the tissues of 15 day old *G. gallus* embryos, synthesized cDNA, and assayed the cDNA by RT-PCR using primers specific for TR $\pm$ . We successfully detected the presence of TR $\pm$  RNA in five *G. gallus* tissues: yolk sac membrane, brain, eye, heart, and liver. We confirmed the PCR result by cloning and sequencing the TR $\pm$  amplicon. The presence of TR $\pm$  in yolk sac membrane links TH with metabolism of yolk or yolk sac regression. Using the same protocol with primers for TR<sup>20</sup> and TR<sup>22</sup>, we will investigate the presence of TR<sup>2</sup> in yolk sac membrane. We will then perform in situ hybridizations to determine the specific location of TR expression in yolk sac membrane.

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Number: 7

Authors: Lorren Kezmoh, Brady Porter, John Pollock

Year: Junior

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Brady Porter

Title: Spectral Tuning of *Inia geoffrensis* Opsin Genes

Abstract:

Cellular anatomical analysis of the retina of the Amazon river dolphin, *Inia geoffrensis*, has revealed the presence of rods and cones. This observation raised the question as to whether the cones function for monochromatic high acuity or whether the cones can provide color vision. A molecular approach was used to identify that river dolphin's short-wavelength sensitive (SWS) cone opsin pseudogene (Kezmoh & Porter, unpublished data), and characterize the amino acid substitutions at position 83, 292, and 299 of the dolphin's rhodopsin, and position 292 of the long-wavelength sensitive (LWS) cone opsin sequence through the use of polymerase-chain reaction (PCR), and sequencing. Based on the conceptual translation of the DNA sequence of the *Inia* rhodopsin, the protein's predicted absorption appears to be red shifted instead of blue shifted, which is common for oceanic cetaceans. A red shift would be consistent with prevailing photopic conditions in a shallow nutrient-rich, tannon-stained

freshwater environment. This suggests that river dolphin's rhodopsin is shifted towards the green-red end of the light spectrum, therefore, resembling the rhodopsin of terrestrial mammals and not the hypsochromic rhodopsin of oceanic cetaceans.

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Number: 8  
Authors: Vincent P. Lamperski  
Year: Senior  
School: McAnulty College and Graduate School of Liberal Arts  
Faculty Advisor: Dr. Matthew Hyland  
Title: St. Bernard's Church: A Public Historian's Perspec

Abstract:

My research is in the field of public history. My paper supports the case for St. Bernard's Church to be a building deemed historically significant and thus worthy of National Register recognition. In making this argument, I had to extensively research the building as it was designed, built, and maintained and assess that empirical data with standards set by the National Register for Historic Buildings. This research involved Plat map formation, photographing the building, surrounding buildings, and the interior, and synthesizing all this data to make a rationally cogent case for historical recognition.

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Number: 9  
Authors: Stephen Timko  
Year: Senior  
School: McAnulty College and Graduate School of Liberal Arts  
Faculty Advisor: Dr. John Kern  
Title: Investigating Inference Procedures for 2x2 Tables

Abstract:

We consider three statistical procedures for making inference on sample data that can be represented in a 2x2 table. The similarities and differences among

these procedures (or hypothesis tests) are explored via simulation techniques. These simulations suggest discrepancies among these tests behave in a predictable way; this behavior is then confirmed via computational proof.

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Number: 10  
Authors: Tim O'Brien & Katelin Lambert  
Year: Senior  
School: McAnulty College and Graduate School of Liberal Arts  
Faculty Advisor: Dr. Michael Irwin  
Title: Taking Back the American Vote: A Case for Drawing

Abstract:

Taking Back the American Vote:  
A Case for Drawing Congressional Lines

The United States government was established on the principles of a democratic republic which gives electors the power to choose their leaders and hold them accountable to responsible governance through the electoral process. The reality of the present political environment indicates the opposite. Every ten years legislators strategically manipulate maps during the redistricting process, creating politically safe districts for members of their party. The American electorate is unable to exercise true accountability through the vote due to gerrymandering practices, during redistricting, by the state legislatures. Accountability is defined as the ability to hold the House of Representatives responsible for abuse of office and bad policy. This research will assess the implications that the redistricting process has on Congressional accountability, and determine whether a bias exists within the current system. The goal is not to make districts perfectly congruent with all criteria, but to prevent the use of criteria to gerrymander districts to protect incumbents or favor a political party. Our research will demonstrate the need for Congressional redistricting reform by supplementing scholarly research with a demographic analysis of Pennsylvania's Congressional districts using GIS software.

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Number: 11  
Authors: Brittany Long and Kimberly Gnora

Year: Senior  
School: School of Nursing  
Faculty Advisor: Dr. Melanie Turk  
Title: Decreasing Ventilator-Associated Pneumonia in the

Abstract:

Background: Ventilator-associated pneumonia (VAP) increases the overall hospital length of stay for patients and is linked with an increased mortality rate. Evidence-based practice established through implementing research findings has shown that specific nursing interventions can decrease the incidence of ventilator-associated pneumonia. Purpose: This research paper aims to determine from the research literature what nursing interventions can be implemented to reduce the occurrence of VAP in the hospital. Results: After reviewing the research it was found that the use of 1) oral hygiene, 2) silver-coated endotracheal tubes, 3) instillation of normal saline before suctioning, 4) patient positioning, 5) suctioning before position change, and 6) "bundle" approaches all have shown a reduction in the occurrence of VAP. Conclusion: The best practices that are established through research and incorporated into nursing practice result in a significant decrease in the morbidity and mortality from VAP. Overall, research evidence helps to guide and develop the most beneficial interventions that nurses can use in the continuum of care they provide to their patients.

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Number: 12  
Authors: Holly Bennett, Carl Brunetta, Stephanie J. Wetzel  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Stephanie J. Wetzel  
Title: GSR Analysis Using ICP-MS and SEM

Abstract:

Gunshot residue (GSR) evidence is of utmost importance in the investigation of violent crimes involving firearms as it may directly link an otherwise unknown subject to an environment of weapon discharge. A unique GSR particulate of interest is composed of heavy metals in varying proportions that include lead,

barium and antimony. Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) is an analytical technique that will yield the overall concentration of lead, barium and antimony present in a sample suggested to contain GSR. Some environmental sources, including vehicle brakes and fireworks, have been shown to resemble GSR, which could yield false positive confirmations of the presence of GSR on the particular sample of interest. Therefore a need exists for an analytical technique that will thoroughly and quickly analyze a piece of fabric or carbon-coated adhesive stub suspected to contain GSR. Manual Variable Pressure Scanning Electron Microscopy (VP-SEM) allows the specific identification of a unique GSR particulate that contains lead, barium and antimony embedded within a charging piece of fabric or on the surface of the carbon-coated adhesive stub. It was hypothesized that the advantage of SEM over ICP-MS is the ability to distinguish Pb, Ba, Sb, Pb-Ba, Pb-Sb and Ba-Sb particles from a Pb-Ba-Sb particulate, thus yielding a more accurate representation of whether or not GSR is present in the sample or not. A quick backscatter method for the detection of GSR on fabrics using SEM was also developed during analysis of the different types of fabrics, and easily applied to the analysis of the carbon-coated adhesive stubs. This method could be a valuable tool to the forensic science field as it can quickly detect the presence of GSR on fabrics and stubs to directly link someone to a firearms crime scene.

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Number: 13  
Authors: George Hupfer and Dr. Stephanie J. Wetzel  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Stephanie J. Wetzel  
Title: LC-MS/MS Analysis of Organic Compounds in Soil

Abstract: Soil evidence can prove to be key in forensic science cases and contains many compounds that can be analyzed, including organic compounds. Soil samples were obtained from different geographical areas around Allegheny County. An organic solvent, acetonitrile, was used to extract the organic compounds from the soil, and the resulting extract was analyzed using Liquid Chromatography-Mass Spectrometry (LC-MS). For increased sensitivity, an LC-MS/MS (LC-Tandem Mass Spectrometry) system was used. Analysis of the obtained data has shown

few differences between soil extract samples and extraction solvent blank samples. Various aspects of the analysis method, like the HPLC column and solvents are were modified in an attempt to better distinguish sample components. Theoretically, this should allow the soil extract samples chromatograms to be distinguished from the corresponding solvent blank with the main goal being differentiation between different soil samples. Despite the modifications, poor separation and differentiation was achieved and a new analysis method using the Q-TOF Mass Spectrometer is being developed with promising results.

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Number: 14

Authors: Ray Sevacko

Year: Senior

School: School of Education

Faculty Advisor: Dr. Elaine Parsons

Title: Political Strategy

Abstract:

I have written a paper constructing the effects of culture and how best to destroy a people's culture who are deemed a threat to American interests, in a world facing global population aging.

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Number: 15

Authors: Michael Mehok

Year: Junior

School: McAnulty College and Graduate School of Liberal Arts

Faculty Advisor: Dr. Patrick Juola

Title: Microtext: Geographically Locating Twitter Tweets

Abstract:

With the advancement of technology, computers have become a way of life for most individuals. The birth of social networking has occurred with the creation of Facebook, MySpace, and Twitter. More and more people daily are registering



on these social networks and communicate with one another. The communication that occurs between individuals is in the form of microtexts. Microtexts are becoming more practical in everyday life, and it is interesting to see how people talk differently within microtexts. With the use of these microtexts, it is also interesting to see if it were possible to geographically locate people based on how they talk in their microtexts. This experiment was done using the Twitter streaming API to gather Twitter tweets and Java Graphical Authorship Attribution Program (JGAAP). Within JGAAP, five different cities (Baltimore, Chicago, Denver, Houston, and New York) containing ten document sets of ten different tweets were examined using eight event sets and five analysis methods. A ten-fold experiment was constructed using nine trainer document sets and one test document set for each city. Of these eight event sets and five analysis methods, the character bi-grams event set and JW cross entropy analysis method worked best, and gathered 64.4 percent accuracy (with chance being 20 percent) in locating a tweet's geographical location. This data gathered shows that there is a significant increase over chance to be able to geographically locate the person who wrote the tweet. Future experimentation with microtext will focus on how smaller documents can be just as effective as larger documents in Authorship Attribution.

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Number: 16

Authors: Caroline Kirby, Ben Latoche, and Dr. Brady Porter

Year: Junior

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Brady Porter

Title: Quantification of plankton from Murphy's Bottom Lake and the adjacent Allegheny River, Armstrong County, PA.

Abstract:

Plankton counts are often useful indicators of the productivity trends in lakes. As part of the Murphy's Bottom Ecological Project, baseline data on the planktonic productivity and nutrient cycling of the Lake is needed in order to interpret ecological changes that may follow the connection of the lake to the Allegheny River to form a backwater wetland. Samples were collected using grab sampling techniques from two distinct areas in the lake, one area in the lake annex, and one area in the adjacent Allegheny River from May 29th 2008 to October 30th 2008 and preserved in 500ml clear plastic bottles with 4% Lugol's

Solution. 50ml samples were filtered through a .22 micron gridded filter, which were mounted onto slides, and analyzed under a compound microscope. Analysis included enumerating plankton in one quadrant of the gridded filter, and then extrapolating the total amount of plankton in the 50ml sample. For all four sampling areas, diatoms and yellow-green protists, such as Ceratium, were in their highest concentrations during the months of June and July. Cyanobacteria were in their highest concentrations for the annex and both areas of the lake during the month of July, whereas in the Allegheny River cyanobacteria did not appear until September. Our data indicates that Murphy's Bottom Lake is in its most productive stage during the months of June and July, and this is confirmed by chlorophyll A readings taken in situ with an YSI-probe.

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Number: 17  
Authors: Mark Dudash, Felisa Wolfe-Simon, John F. Stolz  
Year: Junior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. John F. Stolz

Title: TEM Investigation of the arsenic eating Microbe

Abstract:

GFAJ-1 is a strain of rod shaped bacteria belonging to the Halomonadaceae family isolated from Mono Lake, CA. Evidence that this strain is capable of substituting arsenic for phosphorous to sustain its growth was shown in a previous study. Prior to our current investigation, Scanning Electron Microscopy (SEM) was used to examine cells grown with arsenic (As+/P-) as well as with phosphorous (As-/P+), while Transmission Electron Microscopy (TEM) was used on just the As+/P- cells. TEM is able to show internal cell structure of sectioned biological tissue, while SEM is used for whole cell surface analysis. SEM showed that As+/P- cells were approximately 1.5 times greater in volume than As-/P+ cells. TEM examination of As+/P- cells showed the presence of large internal vacuole-like structures that were hypothesized to account for the greater intracellular volume of the As+/P- cells observed with SEM. It was hypothesized that these vacuoles contained hydrophobic polyhydroxybutyrate (PHB) as a possible means of arsenate ester stabilization. In addition to this, it was believed that the vacuoles found in the As+/P- cells might be responsible for the increased cell volume observed by SEM examination.

TEM examination revealed that the As+/P+ and As-/P+ cells contained many large vacuole-like regions in their intracellular structure, and reconfirmed the presence of these regions in the As+/P- cells. These regions were enlarged in the As+/P- cells, resulting in larger cells.

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Number: 18

Authors: Jeffrey Baker, John Noecker Jr.

Year: Senior

School: McAnulty College and Graduate School of Liberal Arts

Faculty Advisor: Dr. Patrick Juola

Title: Native Language Detection via English through Lexical Bigrams and Intersection Distance with the JGAAP Stylometry Tool

Abstract:

Detecting a person's native language through English speech is a specific problem in authorship profiling. Using the Java Graphical Authorship Attribution program, I have discovered a method for profiling persons native language with accuracy that is significantly greater than chance, and also outperforms current practices in this field. Analyzing the LINSEI corpus of English speaking transcripts, two novel methods for native language detection are explored.

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Number: 19

Authors: David Vaccarello, Igor Pimkov, Partha Basu

Year: Junior

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Partha Basu

Title: New Synthetic Strategy for the Molybdenum Cofactor

Abstract:

Pterin-containing molybdenum-containing enzymes constitute an important class of molecules that are essential in life and environmental processes such as sulfur detoxification and purine catabolism in mammals. The molybdenum cofactor (Moco) is an important compound that lies at the catalytic heart of more than 50 enzymes. In humans, defects in the synthesis of Moco lead to a condition known as Molybdenum Cofactor Deficiency (MCD). Patients suffering from MCD typically have progressive neurological damage that results in early childhood death. Currently there exists no fully developed method for obtaining Moco, however recently, we have discovered a promising new synthetic approach for creating this molecule. Our approach creates a model compound that, with future work, could eventually be constructed into Moco and then be used to treat all types of Moco deficiencies.

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Number: 20

Authors: Drew W. Richards

Year: Senior

School: McAnulty College and Graduate School of Liberal Arts

Faculty Advisor: William Klewien, M.A.

Title: Secularists vs. Islamists:...

Abstract:

The political discourse surrounding the Muslim world can be deceiving on the surface, specifically to readers outside of it. Tackling such an issue requires us to examine the ideas and insights of both Muslims and non-Muslims who have seen the paradigms from various standpoints. This essay will deliver an analysis of the current struggle between Islamists and Secularists; their history, and what lies ahead for Muslim government's futures will also be outlined. The essay will identify key problematic areas that have caused dialogue among the two sides to move further apart on the political spectrum. Muslims around the world are struggling to adapt wherever they may be, their struggling due to the lack of knowledge on legitimate political institutions and structures from their home nations. To enhance Muslim education on these areas, government and non-government organizations in the Muslim world should start critically reviewing their attitudes towards the citizens of their nations.

Number: 21  
Authors: Shana Kilgore, Stephanie Wetzel  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Stephanie Wetzel  
Title: Analysis of Synthetic Polymers using MALDI-TOF

Abstract:

Current methods of forensic fiber analysis include: visual comparison and microscopy, which are subjective, and FTIR, which identifies the polymer composition. The goal of this research is to provide an objective analysis that can distinguish fibers based on manufacturers additives. Synthetic fibers, or polymers are created through addition or condensation reactions that combine monomers to form a polymer. Each manufacturer may introduce various additives, which affect the chemical and physical properties of the material. Synthetic fiber database based by polymer type and manufacturer additives could potentially objectify forensic fiber analysis by narrowing and confirming the fiber source. Matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF) was used to determine the polymer additive composition for comparison. After optimization of the MALDI parameters for several fibers, mass spectra were obtained for four nylon fibers. The MALDI spectra were then analyzed for differences in the additive composition.

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Number: 22  
Authors: Jennifer Hornyak, Lisa Ludvico, Ph.D. Phd  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Lisa Ludvico  
Title: Recovery and Analysis of Nuclear DNA from Charred Muscle and Tendon Tissue using White-tailed Deer (*Odocoileus virginianus*) as an Animal Model  
Abstract:

Historically, teeth have been used for identification of badly burned remains largely due to the composition of enamel withstanding the burning process. However, dental records are needed for positive identification and are not always available. This study examined the ability to recover nuclear DNA from both tendon and muscle tissue of white-tailed deer (*Odocoileus virginianus*) legs after they have been subjected to gasoline, kerosene, and lighter fluid treatment burns and a non-accelerant wood burn control. These accelerants were chosen because they have been most frequently used to cover up a homicide in order to make victim identification more difficult. To date, DNA has been extracted, quantified, and amplified from the burned samples. A previously designed STR-marker panel was used to genotype the remains. A genetic profile has been obtained from the majority of samples, and the DNA recovery was much greater in the tendon samples than in the muscle tissue.

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Number: 23

Authors: Emilee Renk, Gavin Buckholtz, Dr. Ellen Gawalt

Year: Sophomore

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Ellen Gawalt

Title: Surface Modification of Ti-6Al-4V

Abstract:

In order to control the interfacial properties of a biomaterial, thin films were formed on the surface of Titanium-Aluminum-Vanadium oxide. Immobilization of an alkene-terminated long chain carboxylic acid on the oxide surface of Ti-6Al-4V was sought. Solution and aerosol deposition methods were used to attach the acid to the surface of the metal. Changes in concentration, time, and temperature were varied to control deposition. Success of thin film formation was determined using Diffuse Reflectance Infrared Fourier Transform Spectroscopy (DRIFT).

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Number: 24

Authors: Amanda M. George, Ying Zheng, Yi Wen, Ira S. Buckner, Lisa M. Weiland, Ellen S. Gawalt and Wilson S. Meng

Year: Senior  
School: Mylan School of Pharmacy  
Faculty Advisor: Dr. Wilson S. Meng  
Title: Towards a Hybrid Drug Delivery System

Abstract:

The main objective of this project is to understand the interactions between polymeric particles and peptide membranes. It was hypothesized that drug-loaded particles fabricated from a polyester (PLGA) and a lipid (DOGS) containing a metal ion (nickel) can be mounted onto membranes displaying six consecutive histidine residues (H6). The particles were observed to capture a his-tagged peptide in a concentration dependent manner (measured by the changes in zeta potential), and reversible by the addition of imidazole (1 mM), the chemical moiety of the histidine side chain. When mixtures of particles and peptides were injected into saline solutions the particles remained associated with the membrane for up to one week. The association appears to occur through specific (histidine-nickel coordination) and non-specific (charge pairing and hydrogen bonds) interactions. It is envisioned that such hybrid systems can be developed into drug delivery devices by fine-tuning the physiochemical properties.

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Number: 25  
Authors: Antonette D. Cabauatan; Dr. Stephanie J. Wetzel  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Stephanie J. Wetzel  
Title: Chromatographic Analysis of Carpet Fibers

Abstract:

Synthetic polymers are used in the manufacturing of many products. Most carpets are currently made from synthetic polymer fibers. In forensic science, these fibers can be used as evidence. Current techniques, such as microscopy and spectroscopy, identify and compare fibers, but they cannot determine if a fiber came from a specific carpet. The polymers in these synthetic fibers are



long-chained molecules, which are compounded with additives which chemically modify the polymer to improve their performance. The additives in the synthetic fibers are many, varied and often proprietary. In this study, polymer additives were extracted from nine different carpets (made of nylon, polypropylene, or olefin) and subjected to analysis through GC/MS. It was found that where you choose to take a sample on a carpet does not affect the outlook of the chromatograms. Chromatographic differences were found between the nine carpets suggesting that nylon (or any other polymer) made from one manufacturer can be distinguished from nylon that is made from another manufacturer.

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Number: 26  
Authors: Allison Laux and Valerie Wowk  
Year: Senior  
School: School of Nursing  
Faculty Advisor: Dr. Melanie Turk  
Title: A Literature Review of Research Evidence on Pediat

Abstract:

A Literature Review of Research Evidence on Pediatric Influenza Vaccinations  
Background: Research on influenza and vaccination is clinically significant because of the potential dangers and high incidence of influenza in the pediatric population. It is essential for nurses to act as patient advocates and to educate parents on current best practice based on research related to immunizations.  
Purpose: The purpose of this literature review is to determine the research to support evidence-based nursing practice in relation to influenza vaccination for the prevention of infection and disease in the pediatric population. Results: Through the research evaluation process, we found articles advocating various types of immunizations, specific methods for administration, and safety and efficacy of certain vaccinations. The influenza vaccination showed high rates of efficacy and was safe for the pediatric population. Intradermal injection of the influenza vaccine at a fifth of the standard dose was shown to be both safe and immunogenic. A less invasive, intranasal route was studied and found to effectively protect recipients against new variants of influenza A (H1N1). To increase compliance with receiving the vaccination, recall systems were studied and shown to be effective in increasing the number of immunized children during an influenza season. Lastly, the influenza vaccine was more effective in

preventing illness in fully vaccinated participants when compared to partially vaccinated children. Conclusion: The research findings of this review support the conclusion that the influenza vaccine is associated with high rates of immunogenicity in the pediatric population and has shown to be beneficial. Suggestions for further research include studies with more diverse populations such as high-risk children. Ongoing research and the development of evidence-based practice promotes high-quality patient care and supports the continued advancement of the nursing profession.

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Number: 27  
Authors: Kaitlyn Wolf  
Year: Senior  
School: A.J. Palumbo School of Business Administration  
Faculty Advisor: Dr. Kevin Shaver  
Title: Informal Institutions and GDP per Capita

Abstract:

Previous research argues that informal institutions measured by an index of social norms and customs, maintain relative primacy over formal institutions measured by constitutional constraints, in determining economic prosperity. However, research in this field has yet to separate these institutional indices to determine the underlying relationships between each informal measure and economic prosperity. To address this shortcoming, I examine the relative importance of each disaggregated measure of informal institutions in the relationship with per capita income.

The findings from the OLS estimation of this relationship suggest the primacy of obedience over trust, respect, and self-determination when controlling for other determinates of development. Additionally, obedience shows a positive impact on GDP per capita, suggesting that when measured as a means of production, rather than a method of thought, obedience promotes efficiency and in turn prosperity.

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Number: 28  
Authors: Thomas Ribelli, Matt Taylor, Will Eckenhoff  
Year: Sophomore  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Tomislav Pintauer  
Title: Diazide and Triazide Based Ligands for use in ATRA

Abstract:

Addition of a polyhalogenated compound across a double bond was discovered by Kharasch in the early 1940's. This reaction could be catalyzed by various transition metals including copper, ruthenium, nickel, and iron. The drawback to this reaction was that it required high amount of catalyst, up to 30 mol%. This is not only expensive, but is environmentally unfriendly. In 1995, Krzysztof Matyjaszewski and his group at Carnegie Mellon University, discovered that the amount of copper catalyst could be significantly reduced if the metal was complexed to a ligand and a reducing agent was added to the reaction. This reaction was coined Atom Transfer Radical Addition (ATRA). Different ligands have been shown to be more efficient by producing a higher yield. The main focus of this paper to characterize and use 8 different triazide and diazide based ligands which are complexed to both Cu(II)Br<sub>2</sub> and Cu(II)Cl<sub>2</sub>, in ATRA. Various characterization methods will be used including, <sup>1</sup>H & <sup>13</sup>C NMR, Single crystal X-ray Diffraction, UV-Vis, IR, and CV.

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Number: 29  
Authors: Carrienne Floss  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Nancy Trun  
Title: Microflora identification from salamander species

Abstract:

Salamanders are an indicator species for the environmental health of their habitat. Prior studies have shown that a wide diversity of cutaneous bacteria

can exist on the skin of terrestrial and stream-side salamanders. Some of these bacteria may produce antimicrobial metabolites that protect the salamanders from infection. Environmental stressors may diminish the cutaneous bacteria and thereby the overall health of the salamanders. The purpose of our studies is to identify the microflora that exist on two species of salamanders, *Plethodon shermani* and *Desmognathus ocoee* under normal and environmental stress conditions. Using one DNA extraction protocol, the bacterial species *Acinetobacter* was isolated from both salamanders. In order to make a more complete inventory of the cutaneous bacteria, we are extracting DNA from skin swabs of the animals using a variety of procedures. This will help us determine what other bacteria exist on these salamander species, under a variety of conditions.

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Number: 30

Authors: Carole Wolfe, Beth Surlow

Year: Sophomore

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Jana Patton-Vogt

Title: Regulation of PLB gene expression in *S. cerevisiae*

Abstract:

In *Saccharomyces cerevisiae*, B-type phospholipases (PLBs) hydrolyze the acyl chains of phospholipids to produce glycerophosphodiester. The PLBs are encoded by the genes PLB1, PLB2, and PLB3; their gene products function mainly at the cell wall, plasma membrane, and periplasmic space. The overall goal of our project is to further understand the regulation of PLB gene expression. We examined PLB expression in wildtype cells in response to temperature and chemical stressors. Additionally, we are examining which transcription factors may regulate the PLB genes. To evaluate PLB expression we used a set of plasmids containing the PLB1, PLB2, and PLB3 promoters controlling the expression of the LacZ gene. The LacZ gene encodes the enzyme  $\beta$ -galactosidase whose activity can be measured by a color changing assay. The plasmids were transformed into various yeast strains to measure PLB expression by  $\beta$ -gal plate and liquid assays. Our results have shown that there is increased PLB1, PLB2, and PLB3 gene expression at 37°C versus 30°C. We are also measuring gene expression in response to the addition of calcofluor, NaCl, and SDS, which all cause perturbation to the cell wall. Transcription factors interact

with the gene promoters to either induce or prevent transcription of certain genes. To understand the mechanism of PLB regulation, we identified several stress-induced transcription factors predicted to bind to the PLB promoters, including Crz1, Hac1, Msn2, Msn4, Sfl1, Sko1, Xbp1, and Yap1. We used strains with each of these transcription factors deleted to establish which may act on the PLB genes. We transformed these deletion strains with the PLB promoter-LacZ plasmids to measure gene expression in response to temperature (30°C vs. 37°C). These results give us a better understanding of the regulation of PLB gene expression.

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Number: 31  
Authors: Shelby Sharpnack  
Year: Sophomore  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Brady Porter  
Title: Microsatellite DNA Analysis of Local Darter Fish

Abstract:

The purpose of this experimentation is to see if loci can be expressed using *E. caeruleum* primers on two species of darters *E. camurum* and *E. tippecanoe* found in the local rivers. Seven types of microsatellite DNA were chosen to be put through the spectrophotometer. There were three samples of *E. camurum*, three samples of *E. tippecanoe*, and one sample of *E. caeruleum*. My research focused on the use of *E. caeruleum* DNA primers on the microsatellite DNA of *E. camurum*. This was achieved by first using PCR to figure out which primers worked for a given sample of DNA. From this, it was established that primers ECA11, ECA13, ECA37, ECA44, and ECA70 expressed DNA in the *E. camurum* samples CAM13, CAM14, CAM15. These samples were loaded with a fluorescent forward primer which allowed the samples to be put through a fragment analysis. The fragment analysis helped to compare the base pairs of the *E. camurum* with the *E. caeruleum* primers with the theoretical base pairs of pure *E. caeruleum* samples.

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Number: 32  
Authors: Rachel Michael, Katie Ratay, Chris Fonner

Year: Sophomore  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Sarah Woodley  
Title: Effects of Stress on Immune Function in Salamander

Abstract:

Vertebrates typically respond to challenges to homeostasis (stressors) by mounting stress responses. Exposure to acute stressors initiates fight-or-flight responses and inhibits processes unnecessary for immediate survival such as digestion and reproduction. Acute responses are beneficial by helping an animal survive, but chronic exposure to stressors can become damaging. Our goal was to study the immune response to predator stressors in *Desmognathus ochrophaeus* salamanders. These salamanders respond to odors from predators by decreasing their locomotory activity, to avoid detection by predators. We hypothesized that both acute and chronic exposure to predator stressors would affect white blood cell differentials, a marker of immune function. We predicted that both acute and chronic exposure to predator stressors would cause a change in the proportions of neutrophils and lymphocytes. The results of the experiment did not support the hypothesis. Compared to animals exposed to non-predator odors, there was no difference in white blood cell differentials in animals exposed to predator odors. Surprisingly, animals chronically exposed to predator odors exhibited decreased neutrophils and increased lymphocytes. To conclude, chronic exposure to stressors affects immune function, although it is not clear whether immune function is increased or decreased. Also, we found gender differences in white blood cell differentials.

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Number: 33  
Authors: Eileen Johnson, OTS and Kelli Clark, OTS  
Year: Senior  
School: Rangos School of Health Sciences  
Faculty Advisor: Dr. Anne Marie Witchger Hansen  
Title: Wounded Warriors: Challenges, Barriers & Supports  
Abstract:

This research study focuses on four formerly homeless returning war veterans diagnosed with PTSD who have successfully re-integrated into the community after graduating from the Shepherd's Heart Home homeless shelter. This is an exploratory qualitative research study that uses phenomenological and case study research methodologies. The primary objectives of this study are to a) explore the challenges and barriers these war veterans have experienced during community-reintegration, and b) better understand and describe occupational performance patterns and environmental factors that may impact meaningful re-integration and social participation.

Each of the four participants completed one in-depth interview, including questions around the framework of the Kawa River Model assessment that explores contextual factors, supports, barriers and personal attributes. All interviews were audio recorded and transcribed verbatim. Researchers maintained field notes for each interview. Each assessment and narrative text was catalogued. Data were analyzed to understand the challenges and barriers to successful community-reintegration with a focus on occupational performance patterns and environmental factors that may impact meaningful re-integration and social participation. The data analysis process was informed by grounded theory and began by open coding participants' interview responses. Central ideas were refined as concepts, and the properties and dimensions of these concepts were identified in such a way that categories were delineated, and the range of properties of any given category were specified and grouped together. The results of the study will inform occupational therapists and other providers of services to homeless war veterans experiencing PTSD, on effective programming, enhancement of services and advocacy that support successful reintegration into the community and social participation.

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Number:	34
Authors:	Janel Biery, Amanda Castelli, Lisa Constantine, He
Year:	Sophomore
School:	McAnulty College and Graduate School of Liberal Arts



Faculty Advisor: Dr. Michael Irwin

Title: Perspectives on Ecotourism in Belize: A Participant

Abstract:

During Spring Break of 2011 our sociology class traveled to La Milpa Eco-lodge and Research Center for Environmental Studies in Belize, Central America, in order to evaluate the implications of ecotourism and study cultural dynamics. Through our observations of this program and of local Belizean communities we gained perspective on Belizean culture and the specific impacts of ecotourism in this society. We used an approach called participant observation, a method involving intensive immersion into the indigenous experience of this area. Experiences include eating traditional foods with Mestizo families, consulting with a local healer, visiting village schools, as well as engaging in ecotourist activities in the Belizean rainforest.

Using this interactive sociological approach, we evaluated seven principles of ecotourism (Honey 2008, p. 29-31). According to this approach ecotourism should: involve travel to natural destinations, minimally impact the environment, promote environmental awareness, provide direct financial benefits for conservation, offer financial benefits and empowerment for local people, respect local culture, and support human rights and democratic involvement. After analyzing these variables we ultimately concluded that ecotourism in Belize is an effective means of educating tourists and citizens alike. It also promotes development in a recently independent nation while preserving the unique pre-existing traditions and natural resources.

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Number: 35

Authors: Kristine Deibler and Partha Basu

Year: Junior

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Partha Basu

Title: Development of a New Generation OF Fluorescent Sensors

Abstract:

A fluorescent molecule, 4,4-dimethyl-4H-5-oxa-1,3dithia-6,11-diazacyclopenta[a]anthracen-2-one, patented as Leadglow, is a highly sensitive and selective fluorescent lead sensor. When in the presence of lead the emission

band shifts with a fivefold increase in the fluorescence intensity, thus it acts as a turn on sensor. [1] When in the presence of other metals Leadglow is very specific to lead. Currently, the most common methods of lead detection involve advance equipment and often require extensive sample preparation.

Fluorescent based sensors have been of interest for their sensitivity and simplicity. Developing sensors that are modified to be specific for other metals is very important not only for environmental testing but also biomedical purposes. We are working toward the development of a new generation of fluorescent sensors by modifying the fluorophore, Leadglow.

[1] Marbella, L.; Serli-Mitasev, B.; Basu, P., *Ange. Chemie.* 2009, 121 (22), 4056-8.

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Number: 36

Authors: Valera Horton

Year: Senior

School: Bayer School of Natural and Environmental Sciences

Faculty Advisor: Dr. Stephanie Wetzel

Title: Affects of Marijuana Smoke on Hair

Abstract:

Gas Chromatography - Mass Spectrometry (GC-MS) is a method utilized to combine the features of both gas-liquid chromatography and mass spectrometry in the identification of unknown substances. GC-MS analysis of hair samples can determine drug levels within the sample. When drugs and their chemical components are metabolized, they and their metabolites are deposited within growing hair. When drugs and their chemical components are combusted, they are released into the air and are deposited where the air settles. Hair samples were collected from known marijuana smokers as well as known marijuana non-smokers. Hair samples were subjected to marijuana smoke and GC-MS analysis was used to determine if exposure to marijuana smoke increased the levels of delta-9-tetrahydrocannabinol and its metabolites in the hair sample. Inconclusive results were obtained through GM-MS analysis due to complications with sample derivitization. The protocol was improved for future trials.

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Number: 37  
Authors: Eric Poliner  
Year: Senior  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr Jana Patton Vogt  
Title: Acetic acid response in *Saccharomyces cerevisiae*

Abstract:

Cellulose, a polymer of stable B-1,4 glycosidic linked glucose residues, is a potential major source of biofuel. Conversion to ethanol is a possible strategy to harness the energy in cellulose freed glucose, but many hurdles currently exist to its effective implementation. *Saccharomyces cerevisiae* is a highly efficient alcohol producer under fermentative conditions, but lacks the ability to directly use cellulose. Pre-treatment of cellulose with acetic acid is an effective and inexpensive method to hydrolyze the cellulose residues, but treatment with acetic acid slows fermentation. Acetic acid was confirmed to be inhibitory to *S. cerevisiae* growth in this study.

Acetic acid has been proposed to be growth inhibitory through a number of mechanisms, including amino acid biosynthesis and transport. It has been observed that intracellular amino acid concentrations are severely lowered in acetic acid stressed *S. cerevisiae* (Almeida et al.). In this study we monitor the transport of a particular radiolabeled amino acid, [14C]leucine, in response to acetic acid stress. We have found leucine transport to be reduced under conditions of acetic acid stress as compared to conditions of no acetic acid stress. These results suggest that inhibition of amino acid transport may be one mechanism by which acetic acid treatment inhibits the growth of *S. cerevisiae*.

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Number: 38  
Authors: Samih Nassif, Courtney Watkins, Partha Basu  
Year: Sophomore  
School: Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Dr. Partha Basu  
Title: On the Purification of NapA from *C. jejuni*

Abstract:

Optimization of Purification and 6x-His Tag effect on Enzyme Kinetics: *Campylobacter jejuni* is a pathogenic, gram-negative bacterium which relies on nitrate reduction for growth via a periplasmic nitrate reductase (Nap). The catalytic subunit, NapA, is a molybdenum-containing 4Fe-4S protein which serves as the catalytic center for reduction of nitrate to nitrite. Heterologous expression of NapA from *C. jejuni* has been carried out in *E. coli*, using a plasmid vector containing NapA with a 6x Histidine tag, and a second plasmid vector containing NapLD, proteins that help maturation of NapA. Purification of this specific protein from *C. jejuni* has been done by co-workers in the author's laboratory using a Qiagen Ni-NTA affinity column. The 6x-His tag binds to the column and allows for separation of NapA in one single step. Yet, this procedure does not fully separate NapA from *E. coli* polyhistidine proteins, as evidenced by faint protein bands present in the eluent fractions. An optimization of the purification process is presented. Ultra-centrifugation and Ammonium Sulfate Precipitation are among the methods used to clean the cell lysate before the Qiagen Ni-NTA affinity column. SDS-PAGE analysis and Methyl Viologen Activity Assays show evidence of active NapA in both the French Press Lysates and Sonication Lysates. A purification table is also included to compare recovery and total protein present as purification proceeds. Future work will concentrate on purified protein extracts and ask whether or not the presence of the 6x-His Tag affects enzyme kinetics of NapA.

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Number: 39

Authors: Brittany L. Peshoff OTS, Bryna U. Smith OTS, Patricia A. Crist, PhD, OTR, FAOTA

Year: Senior

School: Rangos School of Health Sciences

Faculty Advisor: Dr. Patricia A. Crist

Title: The Impact on Occupational Competence, Values, and Environmental Adaptation of Late Effects of Cancer Treatment

Abstract:

**Objective:**

Objective 1: Identifying extent to which late effects of cancer treatment affect self-perception of occupational performance, competence, and values, as measured by the *Occupational Self Assessment (OSA)*.

Objective 2: Discuss the emerging role of occupational therapy and recommendations for interventions with these cancer survivors.

**Background:** One half of all men and one in every third women will be diagnosed with cancer in their lifetime [1], 60% of which have a survivorship rate of five or more years [2]. This increase in survivorship identifies new health challenges for surviving cancer and its treatments [3] otherwise called late effects. Late effects, due to cancer itself, adjuvant treatments, supportive care, or by any combination [4], impact physiological, psychological, and environmental factors pertaining to an individual.

**Methods:**

Individuals aged 21-65 who are currently cancer free and experiencing late effects of cancer interventions within the past two years beginning months to years after treatment. As part of a larger study tracking occupational performance changes upon late effects of cancer, subjects completed the Occupational Self Assessment (OSA) to describe changes in occupational competence and values during late effects of cancer.

*Abstract Synopsis:*

Advances in technology have led to an increase in cancer survivors, leading to exploration in survival experiences specific to late effects experiences after cancer interventions. The purpose of this research is to investigate the self-reported occupational functioning challenges of individuals with late effects, using the *Occupational Self Assessment* (OSA) focusing on the participants' self-perception on their occupational competence and functioning.