
Spring 2008 Honors Colloquium
~ Wayne State College ~

Brandon Echtenkamp

Title: "The Effects of Body Composition on Glucose and Insulin Responses to Acute Resistance Exercise in Healthy Women"

Advisor: Dr. Barbara Engebretsen

Mark Hamilton

Title: "Land Use Modeling and the Great Plains"

Land use modeling is a tool used by many planners and local governments to determine growth rates and to plan for future growth. Tools used in current land use models will be explained and a several current land use models will be examined. In addition, I will demonstrate a land use model designed using tools that appear in many current models and then apply it to Lincoln, Omaha, and Sioux Falls in order to demonstrate the power of a multi-variable model. Data was collected from online sources, various books, and personal experience. The results of this paper suggest that land use models are very useful tools and that Lincoln, Omaha, and Sioux Falls are all experiencing significant growth in specific areas.

Advisor: Dr. Randy Bertolas

Greg Ptacek

Title: "A Policy Analysis of Alternate Fuels"

Advisor: Dr. Mark Leeper

Janae Rise

Title: "Listeria Monocytogenes Virulence Gene Regulation as Assessed Through Northern Blotting Upon Exposure to Hotdogs"

Advisor: Dr. Doug Christensen

Mary Beth Peters

Title: "An Investigation of Menstrual Synchrony and Symptom Similarity Between Roommates and Close Friends"

Advisor: Dr. Karen Walker

Wayne State
College



presents

*Natural and Social
Sciences
Undergraduate
Research*

Date: 04/30/08
2007-2008

Presentations for 2007

Midwest Model United Nations ~ St. Louis, MO February 2007

Amber Hansen, Representing the Democratic Republic of Congo
Economic and Social Council

Curtis Hanzlik, Representing the Democratic Republic of Congo
Historic Security Council

Sarah Shirley, Representing the Democratic Republic of Congo
UN Commission on Crime Prevention and Criminal Justice

Jennifer Draper, Jack LaFleur, Travis Moore and Marissa Sieler, Representing
the Democratic Republic of Congo General Assembly
Committee

Advisor: Dr. Joe Blankenau

Great Plains Student Psychology Convention ~ Wichita, KS March 2007

Jonathan R. Brandow
Title: "From Demons to Disorder: A Modern Look at the History of Schizophrenia"
Advisor: Dr. Dan Miller

Jeff Carpenter
Title: "Post-Traumatic Stress Disorder and Memory"
Advisor: Dr. Karen Walker

Jeff Carpenter, Christina Reynolds, and Jake Pinkelman
Title: "Situational Influences on Mood and Test Taking Ability"
Advisor: Dr. Karen Walker

Amber Harlan and Amanda Walker
Title: "The Effects of Different Genres of Reality TV on Self-Esteem"
Advisor: Dr. Karen Walker

Jennifer Kassing and Laura Wielechowski
Title: "The Relationship Between Physical and Facial Attractiveness and Personality"
Advisor: Dr. Karen Walker

Nicole Trompeter
Title: "The Impact to Contrast Effects on Male Attractiveness and Self-Image"
Advisor: Dr. Karen Walker

Spring 2008 Honors Colloquium ~ Wayne State College ~

Denise Kraft
Title: "Social Welfare and Welfare Recipients: A Comparison of Student and Faculty Perceptions"

Advisor: Dr. Jean Karlen

Dena Brock
Title: "Mutation and Characterization of CHCHD3 A Novel Mitochondrial Protein"

Advisor: Dr. Sharmin Sikich

Shea Welsh
Title: "Genetic Engineering of the Mitochondrial Protein CHCHD6"

Advisor: Dr. Sharmin Sikich

Michaela Dolphin
Title: "Weapons of Conquest: Swords in England From the Fall of Rome to the Norman Conquest"

Advisor: Dr. Douglass Taber

Leah Wiedenfeld
Title: Aids and Southern Africa: The Socioeconomic Impact
Abstract: AIDS has ravaged many parts of the world. However, no region has been more devastated than Southern Africa. In this region of the world, AIDS is not only a medical issue. This problem is leaving its mark on the societies and economies of Southern African countries. Social stigma is further inhibiting the treatment and possible reduction in occurrences of the AIDS virus. With the AIDS outbreaks rising and Gross Domestic Product falling, Southern Africa is fighting the battle against a virus that has affected all components of life.

Advisor: Dr. Randy Bertolas

Leann Bolte
Title: "The Effect of Prednisone on Wound Healing"

Advisor: Dr. Shawn Percy

Sociology Senior Seminar Presentations April 2008

Denise Kraft

Title: Social Welfare and Welfare Recipients: A Comparison of Students and Faculty Perceptions

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Title: How Happy are Students at Wayne State College?

Natalie Rosno

Title: Single Mothers: Making It in Rural Nebraska

Abstract: Single mothers are all across the United States, in urban and rural settings. Single mothers represented sixty-four percent of women in the workforce in 2004 (Melissa J. Doak, 2006). It can be extremely difficult in rural areas, however. Though single mothers are more at risk for poverty, stress, mental illness and lack of resources (Heather A. Turner, 2005), not much research has been done on rural mothers. The purpose of this study is to examine how rural single mothers in Nebraska are making it. The sample is ten single mothers from rural Nebraska who are twenty-three years old. The definition of rural used in this study is if they live 15 or more miles from a city of 25,000 or more (Turner). The participants were interviewed with a series of questions asked about how they make it financially; what kind of support they receive from their families and community; and what kind of support they are receiving from their children's fathers. Twenty-three percent of children lived with their single mothers, while only five percent lived with their single fathers in 2003 (Doak). Results of the survey should provide insights into making it in rural Nebraska.

Charity Bolling

Title: Exploring Sociology: People's Perceptions of Sociology

Abstract: Sociology is an abstract term to most people. A literature review revealed even professionals within the field have a difficult time agreeing on a definition. This study what students on Wayne State College, and members of the Wayne area, perceive about the discipline of sociology. It is hypothesized that many students and non-students do not have a very clear understanding of what sociology is. Results could prove helpful to WSC and the faculty who teach in this area.

Marque McCray

Title: What's on your IPOD?

Advisor: Dr. Jean Karlen

Spring Tutorial Meeting of the Northland Chapter of the American College of Sports Medicine, St. Cloud State University, ~St. Cloud, MN March 2007

Matt Schaffer, Krystal Schwarz, Allison Steffen, Rick Volk, Andrea Warren, Colin Williams, and Jay Winter.

Co-authors: Dr. Tammy Evetovich, Dr. Barbara Engebretsen, and Kris Hinnerichs.

Title: Bioelectrical Impedance Accurately Estimates Body Composition in Collegiate but not High School Football Athletes

Previous research has reported that leg-to-leg bioelectrical impedance analysis (LL-BIA) accurately estimates percent body fat when compared to skinfolds in a diverse collegiate wrestling population (Utter, A.C. et al., *J. Strength Cond. Res.* 15:157-160, 2001) however, less is known regarding the accuracy of estimating body composition using this method in adolescent and collegiate male athletes. **PURPOSE:** To compare the accuracy of body composition measured using underwater weighing (UWW) as the criterion to body composition estimated using a Tanita model 300WA LL-BIA system in male high school and collegiate football athletes. **METHODS:** Eighteen healthy trained male high school football athletes (mean \pm SD, age=15.8 \pm 1.2 y, height=176.69 \pm 5.5 cm, mass=71.7 \pm 9.6 kg, body fat=12.4 \pm 5.7%) and 18 healthy male collegiate NCAA Division II football athletes (mean \pm SD, age=21.0 \pm 2.0 y, height=182.5 \pm 5.5 cm, mass=98.89 \pm 15.0 kg, body fat=16.8 \pm 6.7%) volunteered to participate in the study. Body composition measured using UWW with direct assessment of residual lung volume using an oxygen-dilution technique (Wilmore, J.H. et al., *MSSE*, 12:216-218, 1980) was compared to body composition estimated using a Tanita model 300WA LL-BIA system. Hydration status was evaluated prior to all tests using a Mannix protein/urine refractometer. A urine specific gravity of \leq 1.025 was required for inclusion in the study. **RESULTS:** Paired t-tests comparing body composition in collegiate football athletes measured with UWW (16.8 \pm 6.7%) to body composition estimated using a Tanita model 300WA LL-BIA system (16.4 \pm 5.4%) showed that the means were not different ($p>0.05$). In addition, the correlation ($r=0.75$) between these variables was significant ($p<0.05$) and the standard error of estimate (SEE) and total error (TE) were 4.76% and 3.1%, respectively. In contrast, body composition assessed in high school football athletes using a Tanita model 300WA LL-BIA system (8.9 \pm 4.0%) was significantly underestimated versus UWW (12.4 \pm 5.7%) and, while the correlation ($r=0.51$) was significant ($p<0.05$) it was relatively low, and the SEE (6.5%) and TE (6.1%) were relatively high. **CONCLUSION:** We conclude that the Tanita model 300WA LL-BIA system accurately estimates body composition in collegiate, but not high school football athletes. The data from this project suggests that the Tanita 300WA LL-BIA system does not accurately estimate body composition in male high school football athletes because it does not accurately account for biological differences in male adolescent athletes.

Advisor: Dr. Donovan Conley

Midwest Sociological Symposium ~ Chicago, IL April 2007

Jessica Reeves

Title: "The Role Race Plays in the Criminal Justice System"

Advisor: Dr. Monica Snowden

Laura Peitz

Title: "An Examination of Gender Roles within Teen Magazines"

Advisor: Dr. Monica Snowden

Sociology Senior Seminar Presentations ~ April 2007

Erin Oswald

Self-Esteem and Dating Relationships Among College Students

Advisor: Dr. Paul Campbell

Kari Schulze

Exposure to Media and Perception of Body Image Among College Students

Advisor: Dr. Monica Snowden

Antonia Olson

Wayne State College Students: Where They Are From? Where They're Going? Does Community Size Matter?

Advisor: Dr. Monica Snowden

Hillary Klinzing

Self-Image and the Frequency of Tattoos and Piercings Among College Students

Advisor: Dr. Gloria Lawrence

Tami Hopwood

Senior Citizens Biographies Memories; Revealed from the Oaks Retirement Community

Advisor: Dr. Jean Karlen

Amanda Nolting

Self Characteristics and Their Predictions of Ideal Mate Characteristics

Advisor: Dr. Gloria Lawrence

Shanita Mitchell

College Student Attitudes on Welfare and the Associated Myths

Advisor: Dr. Monica Snowden

Jake Pinkelman

Cell Phone Use in College Classrooms

Advisor: Dr. Monica Snowden

Jennie DePeel

Stress Factors Influencing Wayne State College Students

Advisor: Dr. Susan Ellis

Dani Lahman

What Does it Mean to be A Winnebago Today and Tomorrow? Tribal Enrollment Within the Winnebago Tribe of Nebraska

Advisor: Dr. Jean Karlen

Nebraska Academy of Science ~Lincoln, NE April 2008

Travis Reed and Megan Kehrli

THE DIELS ALDER REACTION AND THE DIFFICULTIES ASSOCIATED WITH AN ACTIVATED DIENEOPHILE

A research based organic chemistry laboratory sequence (involving primarily sophomore students) is being developed in conjunction with our undergraduate research program (primarily Jr. and Sr. students). Clove oil extract, primarily eugenol, was selected because it has an interesting history and can be studied safely in a typical organic chemistry lab. The Diels-Alder reaction was selected because the reaction can be modeled with Spartan '06, and the product gives a good drug score with the OSIRIS Property Explorer at the organic chemistry portal <http://www.organic-chemistry.org/>.

The reaction transition states and products (4/8 possible stereoisomers) were modeled using Spartan '06 semi-empirical AM1 and DFT computational method B3LYP/6-31G*. Both theories predict the endo transition state to be lower in energy, but differ on the endo/exo product energies, however in all instances the energy differences are less than 6 kJ/mol.

The Diels-Alder reaction was carried out under various conditions with two main approaches: 1. the solvent free refluxing of eugenol and cyclopentadiene and 2. the use of Lewis acid catalyst in THF solvent. The best results to date are with solvent free reflux at 150 °C for 24 hrs to give a relative yield, by GC/MS, of 30% of the Diels-Alder product, 4-(bicyclo[2.2.1]hept-5-en-2-ylmethyl)-2-methoxyphenol. To purify the product, chromatography (TLC and Column) conditions using a 30% (v/v) mixture of ethylacetate/hexane on silica gel was used to isolate the desired product which was the first substance off the column. It was characterized by ATR-IR spectroscopy (3X diamond) and GC/MS.

Advisor: Dr. David Peitz

Brittany Van Beek

ISOLATION OF NATURAL PRODUCTS FROM HERBAL SUPPLEMENTS

A resurgence of interest in natural remedies has lead to increase demand and use of herbal nutritional supplements. Unlike conventional therapeutic agents (e.g. antibiotics, painkillers, etc.), herbal supplements are currently classified as dietary supplements. As such they have minimal regulation concerning their manufacture and the efficacy of their product. Conventional methods for identification and quantification of nutraceutical components in the native herb often employ time consuming and resource intensive soxhlet extractions. Sporadic reports in the literature have suggested that ultrasonic extraction may be a viable alternative to conventional methods of extraction for nutraceutical compounds in herbal species. To date a majority of these studies have used the extraction method on native, minimally processed plant material with little to no information on commercial products. Results of an ultrasonic extraction procedure of commercial Echinacea supplements will be presented.

Advisor: Dr. Mary Ettl

Tracy Lammers

INHIBITION OF LACTOSE UTILIZATION, VIA PLANT EXTRACTS, IN MICROORGANISMS OF MILK AS ANALYZED BY ONITRO-PHENYL - β -D GALACTOPYRANOSIDE (ONPG) ASSAYS.

Common bacteria that can contaminate drinking milk include *Pseudomonas*, *Lactococcus*, *Lactobacillus*, *Campylobacter jejuni*, *Escherichia coli*, *Listeria monocytogenes*, *Salmonella*, and *Yersinia enterocolitica*. Certain micro-organisms cause the spoilage of milk through the fermentation of milk sugar (lactose) by the enzymes associated with the lac operon. The purpose of this project was to study test conditions that may increase the shelf life of milk via inhibition of enzymes that metabolize lactose to an acid end product. Using the natural micro-flora found in milk, O-nitrophenyl- β -D galactopyranoside (ONPG) assays were carried out in the presence of low levels of plant extracts. Tarragon, Rosemary, Cilantro, and Oregano plant extracts were assessed through ONPG assays. Initial results indicate that Cilantro significantly slowed lactose utilization by *Escherichia coli*. Tarragon, Rosemary and Oregano showed no significant results at this time. This work was funded by the Nebraska IN-BRE grant NIH grant # P20RR16469.

Advisors: Dr. Doug Christensen and Dr. David Peitz

Brian Jundt

A METHOD FOR THE DETERMINATION OF GAUSSIAN 03 SCRF-PCM SOLVENT PARAMETERS FOR ANY SOLVENT FOR ANY MODEL CHEMISTRY.

Modeling molecules in the solvent environment is very important for the proper investigation of several molecular properties such as solvatochromatic effects, UV/VIS spectra, REDOX potentials, and condensed phase molecular geometries. The Gaussian 03 RevC.02 software suite has parameters for twenty-four solvents available for use with the Self Consistent Reaction Field – Polarizable Continuum Model (SCRF-PCM). One of the principal solvents used in our laboratories is *Ortho*-Dichlorobenze, which is not one of the 24 solvents parameterized in Gaussian 03 RevC.02. The importance of condensed phase computations utilizing any model chemistry necessitated the development, in our laboratories, of a method for determining the SCRF-PCM solvent parameters (dielectric constant, molar volume, molecular radius, and density). Herein, we present the results of solvent parameterization for the B3LYP/3-21G(*) and B3LYP/6-31G(d,p) model chemistries and a methodology for extending solvent parameterization to any model chemistry.

Advisor: Dr. Paul A. Karr

Rachel Faust and Mary Venteicher

TITLE: DFT STUDIES OF PERIOD-3 TRANSITION METAL PORPHYRINS – COBALT (III)

Synthetic tetrapyrrole macrocycles have become one of the most extensively studied classes of compounds, not just because of their importance as model compounds for biological processes, but also as catalytic, electronic, and optical materials.¹ Recent studies show that various Zinc-porphyrin-C₆₀ dyads show extensive charge transfer between the porphyrin macrocycle and the associated C₆₀ structure. In the present study, we model (with the Gaussian software suite) the charge transfer characteristics of the cobalt (III) porphyrin-C₆₀ dyads with the B3LYP method coupled with the 3-21G basis for hydrogen, carbon, and non-porphyrin nitrogen, 6-31G(d) for the pyrrole nitrogen atoms (contained in the porphyrin macrocycle) and any oxygen atoms, and 6-31G(df) for the cobalt (III) ion centered in the porphyrin structure.

References

The Porphyrin Handbook, K. M. Kadish, K. M. Smith and R. Guilard, Eds.; Academic Press: Burlington, MA, **2000**; Vol. 1-20.

Tanna Walford

TITLE: DFT STUDIES OF THE ANION BINDING BEHAVIOR OF DI-BENZYL TETRAOXOCYCLOHEXADIENYLIDENE PORPHYRINOGEN

Synthetic tetrapyrrole macrocycles have become one of the most extensively studied classes of compounds not just because of their importance as model compounds for biological processes but also as catalytic, electronic, and optical materials.¹ Recently, we synthesized and studied a new class of porphyrinogen, viz., tetra-oxocyclohexadienylidene porphyrinogen, di-benzyl tetra-oxocyclohexadienylidene porphyrinogen,² and N-naphthylmethyl analogs.³ These porphyrinogens were found to be electron deficient as compared to parent porphyrin while the redox processes for the N-benzylated derivatives were found to be better defined than the parent porphyrinogen. Both X-ray structural and DFT molecular modeling studies revealed severe distortion of the porphyrinogen macrocycle.^{2,3} These properties of porphyrinogens suggested that they could act as anion receptors. In the present study, we model the anion binding characteristics of di-benzyl tetra-oxocyclohexadienylidene porphyrinogen with the B3LYP/3-21G* model chemistry coupled with SCRF/PCM solvation methods as implemented in the Gaussian software suite.

References

The Porphyrin Handbook, K. M. Kadish, K. M. Smith and R. Guilard, Eds.; Academic Press: Burlington, MA, **2000**; Vol. 1-20.

Hill, J. P., Hewitt, I. J., Anson, C. E., Powell, A. K., McCarthy, A. L., Karr, P. A., Zandler, M. E., D'Souza, F. J. *Org. Chem.*, **2004**, *69*, 5861–5869.

J. P. Hill, W. Schmitt, A. L. McCarty, K. Ariga, F. D'Souza, *Eur. J. Org. Chem.* **2005**, 2893-2902.

Advisor: Dr. Paul Karr

Tim Fertig, Veasna Huot, Julie Jacobsen, and Ryan Villwok.

Co authors: Dr. Tammy Evetovich and Dr. Barbara Engebretsen

Title: The Best Warm-up for Optimal Vertical Jump Performance in Collegiate Female Volleyball Athletes

Previous research has shown that the best warm-up for optimal vertical jump performance in college-aged athletic men is the weighted jump protocol (Burkett L.N. et al., *J. Strength Cond. Res.* 19:673-676, 2005) however, it is unclear whether this procedure optimizes vertical jump performance in college-aged athletic women. **PURPOSE:** To compare the effects of no warm-up (control), weighted jump, submaximal jump, and proprioceptive neuromuscular facilitation (PNF) warm-up methods on vertical jump performance in National Collegiate Athletic Association Division II female volleyball athletes. **METHODS:** Twelve healthy trained female volleyball athletes (mean \pm SD, age=19.3 \pm 1.1 y, height=173.4 \pm 3.0 cm, mass=70.41 \pm 5.54 kg, body fat=26.3 \pm 4.0%) volunteered to participate in the study. Subjects were randomly assigned to complete each of 4 warm-up protocols to include: control, weighted jump, submaximal jump, and PNF stretching methods. The weighted jump warm-up method required subjects to perform 5 consecutive countermovement jumps with 10% of their body weight onto a box set at 75% of their maximal vertical jump height. The submaximal jump protocol required 5 consecutive countermovement jumps to a Vertec bar set at 75% of the maximal vertical jump height. The PNF stretching protocol used a contract (5 sec at 75% maximum effort) - relax (10 sec) - stretch (10 sec at moderate tension) sequence that targeted the quadriceps, hamstring, and calf muscle groups using three separate exercises. All stretches were timed and closely monitored by the same investigator. A minimum of 48 hours was required between each vertical jump test and all tests were completed within 14 days. **RESULTS:** Repeated measures one-way ANOVA analysis with Tukey post-hoc tests indicated that average vertical jump height using the PNF warm-up method (50.80 \pm 5.66 cm) was significantly greater ($p < 0.05$) than no warm-up (49.53 \pm 5.74 cm) however, it was not different than the weighted jump (50.17 \pm 5.59 cm) or submaximal jump (50.17 \pm 5.38 cm) warm-up methods. **CONCLUSION:** We conclude that vertical jump height using a PNF stretching warm-up produces significantly greater vertical jump performance compared to the no warm-up method, but is not different from either the weighted jump or submaximal jump methods. The data from this project suggests that PNF stretching prior to vertical jump performance is the best method to prepare for vertical jump performance however, it is not significantly better than either the weighted jump or submaximal jump warm-up methods in collegiate female volleyball athletes.

Advisor: Dr. Donovan Conley

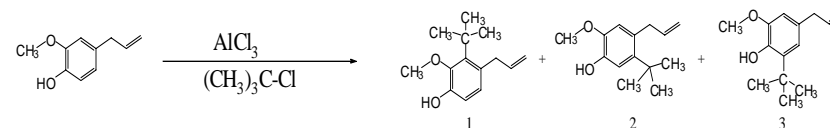
Jeremy Wilmes and Vanessa Hahn

FRIEDEL CRAFTS ALKYLATION OF EUGENOL.

Several herbs were extracted and screened for antibiotic activity and for suppression of antibiotic resistance in bacteria. Clove oil was selected for further study because of interesting results as well as being able to be studied safely in a typical organic chemistry lab sequence. Clove oil extract was reacted in a Friedel-Crafts alkylation with *tert*-butylchloride to give a possible three products, scheme 1. The mechanism for the formation of these compounds was modeled using Spartan '06 semi-empirical AM1 and DFT computational method B3LYP/6-31G* to aid in product prediction and determination. Based upon intermediate energies, product 3, 2-*tert*-butyl-6-methoxy-4-(prop-2-en-1-yl)phenol was predicted to be the major product (99%).

Results of the reaction, scheme 1, showed three products with the correct $M^+ = 220$ and the expected $M-15$ as the base peak in the GC/MS. The crude products were then compared against clove oil for antibiotic activity and suppression of antibiotic resistance to several classes of antibiotics. A relative 11% mixture of the crude products in clove oil showed no change when compared to clove extracts. Further purification and complete characterization of the products is ongoing and needs to be completed to get significant results for activity.

Scheme 1.



Advisors: Dr. David Peitz and Dr. Doug Christensen

Dena Brock

CHARACTERIZATION OF A CONSERVED GLUTAMINE IN THE COILED COIL-HELIX COILED COIL-HELIX DOMAIN OF THE NOVEL MITOCHONDRIAL PROTEIN, CHCHD3.

Advisor: Dr. Sharmin M. Sikich

Shea Welsh

LOCALIZATION AND GENETIC ENGINEERING OF A NOVEL COILED COIL-HELIX COILED COIL-HELIX DOMAIN CONTAINING PROTEIN, CHCHD6.

Advisor: Dr. Sharmin M. Sikich

Janea Rise

LISTERIA MONOCYTOGENES VIRULENCE GENE REGULATION AS ASSESSED THROUGH NORTHERN BLOTTING UPON EXPOSURE TO HOTDOGS.

Previous in house spotted arrays indicated that *Listeria monocytogenes* 4b (high pathogenicity) and 1/2a (lower pathogenicity) regulated a number of virulence genes similarly upon exposure to human cells grown in culture. This study was designed to examine the two serotypes' virulence gene regulation following exposure to ready-to-eat foods (hotdogs), via Northern Blot analysis. Genes identified as up or down regulated (through previous spotted arrays) upon exposure to human cells lines were utilized as probes along with constitutively expressed control genes. Results may be useful in understanding why there is variation in the pathogenic properties of these two strains of *L. monocytogenes*. This work was funded by the Nebraska IN-BRE grant NIH grant # P20RR16469.

Advisors: Dr. Shawn Percy and Dr. Doug Christensen

Lauren Hanthorn

SCREENING FOR INHIBITION OF ANTIBIOTIC RESISTENCE MECHANISMS ATTRIBUTED TO PLANT EXTRACTS.

The concern for antibiotic-resistant bacteria has increased due to the extensive usage of antibiotics. The means by which bacteria can protect themselves from antibiotics can vary. The bacteria can modify the antibiotic molecule utilizing genetically coded enzymes; an efflux mechanism to pump out the antibiotics; or modifying the specific target area of the antibiotics to make the antibiotics ineffective. In this study, we researched steam-distilled plant extract's ability to inhibit the bacterial enzymes that lead to antibiotic resistance. The specific extracts examined include capsicum, lemon, cinnamon, thyme, oregano, and cedar. Different dilutions of these extracts were combined with antibiotic-resistant *E. coli*. Tests in triplicate were run using a 96 well tray. Different combinations of extracts, antibiotics, bacteria, and a control were set up in the trays. After one day of incubation per tray, light spectrometry readings were taken and analyzed. New triplicates were performed for any extract dilution that showed significant delay of bacterial growth. This work was funded by the Nebraska IN-BRE grant NIH grant # P20RR16469.

Advisors: Dr. Doug Christensen and Dr. David Peitz

Dani Lahman

Title: Winnebago Tribal Enrollment Survey

Advisor: Dr. Jean Karlen

Jessica Reeves

Title: The Role Race Plays in the Criminal Justice System

Advisor: Dr. Monica Snowden

Sarah Browne-Walish

Title: Preparing for Catastrophe: Mass Community Evacuation Planning for Sioux City, Iowa

Advisor: Dr. Jason Karsky

Sawyer Plageman

Title: Is it Really All in the Family? Family Structure and Educational Attainment

Advisor: Dr. Monica Snowden

American Chemical Society Midwest Regional Meeting
~ Kansas City, MO November 2007

Megan Kehrl and Travis Reed

Title: Modification of Eugenol: Using Drug Design as a Model for a Research Based Organic Laboratory

Advisor: Dr. David Peitz

Fall 2007 Honors Colloquium ~ Wayne State College

Heather Petersen

Title: Wayne State College: College Life During the Vietnam Years

Advisor: Dr. Kent Blaser

Laura Peitz

Title: Hookin' up or Savin' it? An Examination of Sexual Scripts in Seventeen Magazine

Advisor: Dr. Monica Snowden

Sawyer Plageman

Title: Is it Really All in the Family? Family Structure and Educational Attainment

Advisor: Dr. Monica Snowden

Lucus Virgil

Title: Minimum Wage and It's Impact on Small Business in Rural Nebraska

Advisor: Dr. Joe Blankenau

Experimental Psychology Symposium ~ Wayne State College Fall 2007

David Comparetto, Raelee Eike, Tanya Lough, and Kalli Nygren
Title: Effects of Viewing Victims of Hate Crimes on Attitudes Toward
Homosexuals.

Charity Bolling, Kiley Callaway, Kayleigh Miller, and Nikki Ruge
Title: Students' Use of Text Messaging and the Effect on Attention in the
College Classroom.

Amy Hayes, Torri Maloley, Cassandra McCutcheon, and Michael Umphenour
Title: Accuracy of Judging Personality in Get-Acquainted Conversations.

Jonathan Brandow, Hannah Dorcey, Joseph Dvorkin, and Julia Fritz
Title: The Aggression-Attraction Interaction Effect: How Physical Aggression
Influences Perceived Attractiveness of Women.

Jimi Dirks, Abbi Frey, Jerrica Kyger, and Raelee Van Winkle
Title: Understanding the Effects Negative Captions Have on Dateability.
Advisor: Dr. Dan Miller

Presentations for 2008

Research Projects

Eric Arreguin
Title: Transcriptional Regulation Analysis of Virulence Genes in *Staphylococcus*
Aureus
Advisor: Dr. Doug Christensen

Kris Breedlove
Title: Crisis Management in the aftermath of Virginia Tech and Northern
Illinois University
Advisor: Dr. Jason Karsky

Julia Fritz
Title: Emergency Preparedness Planning
Advisor: Dr. Jason Karsky

Lauren Hanthorn
Title: Screening for Inhibition of Antibiotic Resistance Mechanisms Attributed
to Plant Extracts
Advisors: Dr. Doug Christensen and Dr. David Peitz

Heidi Swanson
Title: Significance of Variables for Sharp-Tailed Grouse Locations at Crescent
Lake
Advisor: Dr. Barbara Hayford

Nebraska Academy of Science ~Lincoln, NE April 2008

Katie Peterson

LISTERIA MONOCYTOGENES VIRULENCE GENE REGULATION AS ASSESSED THROUGH RT-PCR UPON EXPOSURE TO HOTDOGS.

Listeria monocytogenes is a gram positive, rod shaped bacterium with the ability to cause a serious infection called listeriosis. There are approximately 2,500 cases of listeriosis each year in the United States, generally due to the consumption of *L. monocytogenes* on "ready to eat" foods. Previous, in house spotted arrays have shown that many virulence genes show little regulation difference between the virulent 4b strain and the avirulent 1/2a strain of *L. monocytogenes* when exposed to human cells. Thus, it has been questioned whether virulence genes in strain 4b and 1/2a may react differently in foods harboring *L. monocytogenes*. Transcriptional analysis of virulence genes was assessed via RT-PCR utilizing RNA of 4b and 1/2a strains of *Listeria monocytogenes*. Results and implications of RT-PCR testing will be discussed. This work was funded by the Nebraska IN-BRE grant NIH grant # P20RR16469.

Advisors: Dr. Shawn Percy and Dr. Doug Christensen

Heidi Swanson

"SIGNIFICANCE OF VARIABLES FOR SHARP-TAILED GROUSE LOCATIONS AT CRESCENT LAKE"

Advisor: Dr. Barbara Hayford

Brittany Cody

CLONING, OVER-EXPRESSION AND PURIFICATION OF inIB GENE/PROTEIN FROM LISTERIA MONOCYTOGENES FOR POSSIBLE USE IN DRUG DELIVERY

Listeria monocytogenes is a food-borne pathogen that has an exceptional ability to invade mammalian host cells that would normally not internalize bacteria. The bacterial surface proteins Internalin A and B (InIA and InIB) play an important role by initiating phagocytosis in the host cells. This unique ability may make these proteins good candidates for drug delivery modules. To assess this possibility, the InIB gene was cloned into a his-tagged plasmid and attempts were made at isolated the overproduced protein. Successful inIB isolation would allow for future attachment to drugs of interest and evaluation of the ability of InIB to induce the phagocytosis that drug into human cell lines. This work was funded by the Nebraska IN-BRE grant NIH grant # P20RR16469.

Advisors: Dr. Shawn Percy and Dr. Doug Christensen

Cory Nicholson, Tyler Slate, Mark Shearer, and Tim Pilakowski.
Co-authors: Dr. Tammy Evetovich, Dr. Barbara Engebretsen and
Kris Hinnerichs.

Title: Estimated Fiber Type is Unrelated to Repetitions to Fatigue in Male Sprinters and Distance Runners.

Sprinters have been shown to have a higher percentage of fast twitch muscle fibers than endurance athletes (Costill, D.L. et al., *J. Appl. Physiol.*, 40:149-154, 1976) however, the influence of fiber type on isotonic repetitions to fatigue at a given percentage of one-repetition maximum (1-RM) is unclear. **PURPOSE:** To examine the relation between estimated muscle fiber type and repetitions to fatigue during isotonic knee extension at 75% 1-RM in male NCAA Division II sprinters and distance runners. **METHODS:** Seven male sprinters and 6 distance runners (mean \pm SD, age=20.2 \pm 1.0 y, height=174.2 \pm 12.2 cm, mass=75.3 \pm 9.5 kg, body fat=7.5 \pm 2.0 %) volunteered to participate in the study. One-repetition maximum was assessed during isotonic knee extension of the dominant leg using the ACSM guidelines (2000). Subsequently, subjects were randomly assigned to complete either the Thorstensson fatigue test (Thorstensson, A. et al., *Acta Physiol Scand.*, 98:318-322, 1976) or repetitions to fatigue using isotonic knee extension at 75% 1-RM. Percent fast-twitch muscle fiber type in the quadriceps muscle group was estimated using the Thorstensson fatigue test using knee extension exercise in the dominant leg performed at 180° per sec on a Cybex II isokinetic dynamometer. A minimum of 48 h was required between each test and all tests were completed within 2 wk. **RESULTS:** Paired t-test statistical analysis showed that estimated fast-twitch muscle fiber type was not different ($p>.05$) in sprinters (65.9 \pm 12.3 %) and distance runners (62.3 \pm 14.4 %). Similarly, there was no difference in the average number of repetitions to fatigue performed at 75% 1-RM in sprinters (10.3 \pm 3.4 reps) and distance runners (11.7 \pm 1.5 reps). The correlation between repetitions to fatigue and estimated fast-twitch fiber type was nonsignificant ($p>.05$) and relatively low ($r=0.40$, $SEE=2.7$ reps). **CONCLUSIONS:** We conclude that estimated quadriceps fast-twitch fiber type is unrelated to isotonic knee extension repetitions to fatigue in male collegiate sprinters and distance runners. These data suggest that unlike elite track athletes, there is little difference in estimated muscle fiber type in NCAA Division II sprinters and distance runners and, this may explain the low correlation with repetitions to fatigue.

Advisor: Dr. Donovan Conley

Jennifer Horan

Title: "Peter Norbeck and the Needles Highway: An Early Conservationists work in Custer State Park"

Even though Peter Norbeck is one of the best-known statesmen in South Dakota history, his work for the conservation movement has been greatly overlooked. His immense devotion and passion for this cause can best be seen in Custer State Park in the Black Hills, a park he not only established, but lived in and helped to grow. During the 1910s as South Dakota's governor, Norbeck was largely responsible for creating the park and for beginning construction on one of the West's first scenic highways, the Needles Highway. This highway displays the graceful, ancient beauty found in the Hills and challenged road construction perceptions in a way that was ground-breaking for its time.

Advisor: Dr. Don Hickey

Tracy Lammers

Title: Inhibition of Lactose Utilization, via Plant Extracts, in Microorganisms of Milk as Analyzed by Onitrophenyl - β -D Galactopyranoside (ONPG) Assays.

Advisors: Dr. Doug Christensen and Dr. David Peitz

Cole Liska

Title: Ground cover and reproductive potential of *Sorghastrum nutans* and *Andropogon gerardii* in four Nebraska prairies.

The tallgrass prairies that covered much of Eastern Nebraska have all but vanished in the last few centuries. North American tallgrass prairie is dominated by perennial grasses and forbs. *Sorghastrum nutans* (Indian grass) and *Andropogon gerardii* (big bluestem) are both native warm season grasses of Nebraska. In the present study, Indian grass and big bluestem were compared in their extent of ground cover, their weight of seeds produced, and the germination of those seeds. Data was collected from four different sites: three of the sites were near the town of Wayne NE, and the other site was at the Niobrara Valley Preserve in North Central Nebraska. The three sites near Wayne were the Wayne State College Ecology Study Area, the La Porte Cemetery, and the Dog Town Creek prairie. Overall cover of the two grasses varied between locations, however this was not related to the weight of seeds produced per grass plant. The weight of seeds produced per plant did not significantly vary in either species. An ANOVA test indicated that germination rates of Indian grass did vary between sites.

Advisor: Dr. Mark Hammer

Janae Rise

Title: Fatty Alcohol Accumulation in Sjogren-Larsson Syndrome using Chemicalization Gas Chromatography-Mass Spectrometry

Advisor: Dr. Doug Christensen

Nathan Vollbrecht

Title: Prefential Sensitivity of *Hirudo Medicinalis* towards Hypercalcemic Blood

Advisor: Dr. Shawn Pearcy

Midwest Model United Nations ~ St. Louis, MO February 2008

Lucas Nelson, Nicholas MacGregor, Jennifer Draper, Ashley Ryan, Gregory Verbicky, Curtis Hanzlik, Zack Burgin, Amber Hanson and Jack LaFleur.

Representing New Zealand and authored a resolution regarding the control of nuclear proliferation that was adopted by their committee.

Advisor: Dr. Joe Blankenau

Nebraska Chapter of The Wildlife Society Annual Meeting ~ Kearney, NE February 2008

Allison Friedmann, Cassidy Goc, Mark Hamilton, Heidi Swanson and Daniel Thompson

Title: Environmental Awareness and Conservation Agency Trust in Northeast Nebraska

Advisors: Dr. Monica Snowden, Dr. Joe Blankenau and Dr. Mark Hammer

Great Plains Student Psychology Convention ~Emporium, KS March 2008

Susan Schenck

Title: College Bullying

To determine whether those bullied during high school experienced bullying in college, 269 college students completed a survey. Preliminary results suggest 37% of participants had experienced bullying at the secondary level. Of those participants, 22% had received insulting/degrading text messages, <10% had been called names or physically threatened.

Advisor: Dr. Gloria Lawrence

NACSM Research Paper

Heather Zach, Catie VanDiest, Kristin Jennings, and Brent Newland.
Co-authors: Dr. Tammy Evetovich, Dr. Barbara Engebretsen, and Kris Hinnerichs.

Title: Young Men's Christian Association Bench Press Test has Superior Accuracy Versus Lean Body Mass Alternative.

The Young Men's Christian Association (YMCA) bench press test and a modified cadence alternative test have been shown to have reasonably good accuracy in predicting one-repetition maximum (1-RM) bench press in untrained young men and women (Kim, P.S. et al., *J. Strength Cond. Res.* 16:440-445, 2002) however, these tests use a standard gender specific weight that does not account for individual differences in lean body mass (LBM). **PURPOSE:** To compare the accuracy of the YMCA bench press test in predicting 1-RM bench press to an alternative test to fatigue that uses resistance equivalent to individual LBM. **METHODS:** Twelve healthy resistance trained males (mean \pm SD, age=21.3 \pm 0.1 y, height=177.5 \pm 8.1 cm, mass=80.9 \pm 8.2 kg, body fat=15.1 \pm 4.4 %) volunteered to participate in the study. One-repetition maximum bench press was determined using the ACSM guidelines (2000) after which, subjects were randomly assigned to complete each of 2 treatments to include the YMCA and LBM bench press tests to fatigue. The YMCA test protocol involved subjects performing the bench press exercise to fatigue with a weight of 36.4 kg. For the LBM test protocol, subjects performed the bench press exercise to fatigue using a weight equivalent to their LBM estimated using an Omron bioelectrical impedance analyzer. Both tests were performed at a metronome rate of 60 beats per min which elicited 30 repetitions per min. Test scores were determined using the number of repetitions completed when subjects could not keep pace with the metronome. A minimum of 48 h was required between each test and all tests were completed within 2 wk. **RESULTS:** Simple correlation analysis showed that the relation between repetitions to fatigue using the YMCA bench press protocol and measured 1-RM bench press was significant ($p < 0.05$) and was better ($r = 0.88$, $SEE = 6.6$ kg) than the correlation between repetitions to fatigue using the LBM bench press protocol and measured 1-RM bench press ($r = 0.65$, $SEE = 8.1$ kg). **CONCLUSION:** We conclude that the YMCA bench press test has superior accuracy versus the LBM alternative test to fatigue. The data from this project supports previous research that has reported the YMCA bench press test has reasonably good accuracy in estimating 1-RM bench press.

Advisor: Dr. Donovan Conley

NACSM Research Paper

Keegan Coop, Natalie Hawk, Kristin Binder, and Camie Kalkowski.

Co-authors: Dr. Tammy Evetovich, Dr. Barbara Engebretsen and Kris Hinnerichs.

Title: Dynamic Warm-Up Methods Produce Optimal Vertical Jump Performance in Collegiate Track Athletes.

Previous research has shown that the best warm-up for optimal vertical jump performance in collegiate football athletes is the weighted jump protocol (Burkett, L.N. et al., *J. Strength Cond. Res.* 19:673-676, 2005) however, it is unclear whether other dynamic warm-up methods are equally effective in optimizing vertical jump performance, particularly in collegiate track athletes. **PURPOSE:** To compare the effects of no warm-up (control) and dynamic warm-up methods to include: weighted jump, submaximal jump, and barbell squat on vertical jump performance in National Collegiate Athletic Association Division II track athletes. **METHODS:** Ten (8 male, 2 female) healthy trained collegiate track athletes (mean \pm SD, age=20 \pm 8.0 y, height=182.3 \pm 11.7 cm, mass=74.35 \pm 11.49 kg, body fat=12.6 \pm 4.8 %) volunteered to participate in the study. Subjects were randomly assigned to complete each of 4 warm-up protocols to include: control, weighted jump, submaximal jump, and barbell squat. The weighted jump warm-up protocol required subjects to perform 5 consecutive countermovement jumps with 10% of individual body weight using dumbbells, onto a box set at 75% of maximal vertical jump height. The submaximal jump protocol consisted of 5 consecutive countermovement jumps to a Vertec bar set at 75% of maximal vertical jump height. The barbell squat warm-up consisted of performing 2 sets of 5 repetitions of barbell squats to 45° using 90% of one-repetition maximum. A rest interval of 2 min was required after each warm-up protocol and between each of 3 vertical jump attempts. The highest vertical jump score was used to compute maximal vertical jump performance for each protocol. A minimum of 48 h was required between each vertical jump test and all tests were completed within 2 wk. **RESULTS:** Repeated measures one-way ANOVA analysis with Tukey post-hoc tests indicated that average vertical jump height using the dynamic warm-up methods: weighted jump (65.53 \pm 10.08 cm), submaximal jump (64.61 \pm 9.10 cm) and barbell squat (65.27 \pm 9.21 cm) were significantly greater ($p < 0.05$) than no warm-up (63.47 \pm 9.23 cm). **CONCLUSION:** We conclude that dynamic warm-up methods to include: weighted jump, submaximal jump, and barbell squat, produce significantly greater vertical jump performance than no warm-up. The data from this project suggests that a variety of dynamic warm-up methods can be used to optimize vertical jump performance in collegiate track athletes.

Advisor: Dr. Donovan Conley

Great Plains Student Psychology Convention ~Emporium, KS March 2008

Jonathan Brandow and Julia Fritz

Title: The Aggression-Attraction Interaction Effect: How Physical Aggression Influences Perceive Attractiveness of Women.

American media are increasingly depicting women using behaviors once thought atypical of their gender. How aggression has impacted what men find attractive in women was investigated. Male participants rated a woman on how attractive she was, after either viewing her as an aggressor or when she was behaving passively.

Advisor: Dr. Dan Miller

Charity Bolling and Kaleigh Miller

Title: Students' Use of Text Messaging and the Effects on Attention in the College Classroom.

The present study investigated effects of text messaging on attention in the college classroom. College students watched and were tested over a video either with or without a confederate texting during the video. No significant effect of texting was found and possible explanations are discussed.

Advisor: Dr. Dan Miller

Midwest Sociological Symposium ~St. Louis, MO March 2008

Laura Peitz

Title: Hookin' up or Savin' it? An Examination of Sexual Scripts in Seventeen Magazine

Advisor: Dr. Monica Snowden

Sawyer Plageman

Title: Is it Really All in the Family? Family Structure and Educational Attainment

Advisor: Dr. Monica Snowden

Midwest Sociological Symposium ~St. Louis, MO
March 2008

Natalie Rosno

Title: Single Moms - Making It in Rural Nebraska

Abstract: Single mothers are all across the United States, in urban and rural settings. Single mothers represented sixty-four percent of women in the workforce in 2004 (Melissa J. Doak, 2006). It can be extremely difficult in rural areas, however. Though single mothers are more at risk for poverty, stress, mental illness and lack of resources (Heather A. Turner, 2005), not much research has been done on rural mothers. The purpose of this study is to examine how rural single mothers in Nebraska are making it. The sample is ten single mothers from rural Nebraska who are twenty-thirty years old. The definition of rural used in this study is if they live 15 or more miles from a city of 25,000 or more (Turner). The participants were interviewed with a series of questions asked about how they make it financially; what kind of support they receive from their families and community; and what kind of support they are receiving from their children's fathers. Twenty-three percent of children lived with their single mothers, while only five percent lived with their single fathers in 2003 (Doak). Results of the survey should provide insights into making it in rural Nebraska.

Advisor: Dr. Monica Snowden

Charity Bolling

Title: Exploring Sociology: People's Perceptions of Sociology

Abstract: Sociology is an abstract term to most people. A literature review revealed even professionals within the field have a difficult time agreeing on a definition. This study what students on Wayne State College, and members of the Wayne area, perceive about the discipline of sociology. It is hypothesized that many students and non-students do not have a very clear understanding of what sociology is. Results could prove helpful to WSC and the faculty who teach in this area.

Advisor: Dr. Jean Karlen

Sarah Browne-Walish

Title: Preparing for Catastrophe: Mass Community Evacuation Planning for Sioux City Iowa.

Abstract: Emergency management is key in assuring the safety of citizens during a crisis. The intent of this project was to produce a working evacuation plan that was functional and could be carried out by any number of agencies or individuals at the time of disaster. The most difficult part of generating a plan was collecting all of the relevant information from the different agencies. The time constraints as well as lack of experience became a challenge. This challenge was overcome by touring different agencies, meeting with, and getting to know those involved in emergency response. This student experience helped me learn how to build professional relationships, and make lasting contacts. These valuable contacts made it possible for me to understand the intricacies of the plan, and helped me to better understand that being prepared is essential when it comes to saving lives.

Advisor: Dr. Jason Karsky

Midwest Sociological Symposium ~St. Louis, MO
March 2008

Lisa Nelson

Title: Service Learning— Does Gender Matter?

Advisor: Dr. Jean Karlen

NACSM Research Paper

Brandon Stava, Amanda Waltke, Johnel Reber, and Kareena Nichols.

Co-authors: Dr. Tammy Evetovich, Dr. Barbara Engebretsen and Kris Hinnerichs.

Title: Automated Wrist blood Pressure Monitor has Poor Accuracy During Rest and Steady-State cycle Exercise.

The accuracy of automated wrist blood pressure monitors has been called into question (O'Brien, E. et al., *British Medical Journal*, 322: 531-536, 2001) and has yet to be firmly established (Griffin, S. et al., *MSSE* 29: 149-159, 1997).

PURPOSE: To examine the accuracy of assessing systolic blood pressure (SBP) and diastolic blood pressure (DBP) using an American Diagnostic Corporation model 6015 automated digital wrist blood pressure monitor (AW) by directly comparing simultaneous measurements with the reference measure assessed using an American Diagnostic Corporation model 972 mercury column sphygmomanometer (MCS) during rest and steady-state cycle ergometer exercise.

METHODS: Ten healthy college students (mean \pm SD, age=21.9 \pm 1.3 y, height=170.3 \pm 11.1 cm, mass=76.54 \pm 11.25 kg, body fat=22.2 \pm 8.3 %) volunteered to participate in the study. Blood pressure was assessed simultaneously using a MCS and AW after 5 min of seated rest and during the first stage of the American College of Sports Medicine (ACSM) cycle ergometer protocol. The ACSM cycle ergometer protocol was modified to include a 3 min initial workstage and blood pressure readings were taken between the 2 and 2.5 min time interval. A calibrated Monark Ergonomic 828 E cycle ergometer was used for all cycle tests. The same experienced technician made all blood pressure measurements with a MCS which served as the reference measure for all blood pressure comparisons with the AW device. **RESULTS:** Paired t-tests showed that AW monitor SBP measurements were significantly higher ($p < 0.05$) than MCS during seated rest (124 \pm 10.7 vs. 116.0 \pm 9.9 mm Hg) and similarly, SBP (142.7 \pm 21.8 vs. 120.7 \pm 10.1 mm Hg) and DBP (100.3 \pm 20.6 vs. 80.3 \pm 5.3 mm Hg) were higher during steady-state cycle ergometer exercise however, DBP (77.0 \pm 7.2 vs. 76.4 \pm 4.0 mm Hg) assessed during seated rest was not different ($p > 0.05$). **CONCLUSION:** We conclude that the automated wrist blood pressure monitor has poor accuracy during seated rest and steady-state cycle ergometer exercise. The data from this project suggests that the automated wrist blood pressure monitor examined in this study has unacceptable accuracy for assessing blood pressure both at rest and during steady-state cycle ergometer exercise.

Advisor: Dr. Donovan Conley