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<p><b>Theophilus O. Abah</b></p> <p>Molecular Genetics &amp; Proteomics</p> <p>Univ. of MD - Baltimore County</p> <p>Dr. Margaret A. Titus - Genetics, Cell Biology &amp; Development</p> <p>Evan Smith and Nicholas Sanders</p>	<p><b>The Expression and Solubilization of Bacterial Transformants Expressing Myosin 7 MyTH/FERM Domains</b></p> <p>Usher's Syndrome I is a genetic disorder that causes deafness at birth and progressive blindness due to mutations in the motor protein <i>myo7A</i>. The tail of Myo7A contains two MyTH/FERM domains, MF1 and MF2, which are involved in protein binding and cytoskeleton interaction, and mutations in these domains can cause Usher's Syndrome. <i>Dictyostelium Myo7A</i> was used as a model to study MyTH/FERM domains. Our goal was to obtain large quantities of soluble MF1 and MF2 protein expressed in bacteria. The expression of His-tagged MF1 and MF2 was induced in <i>E. coli</i> either by IPTG or auto-induction. Next, cells were detergent lysed and spun. Initially, MF1 and MF2 were insoluble so different induction conditions were tested to obtain soluble protein. His affinity beads were added to the soluble fractions to isolate His- MF1 and MF2 and the eluates concentrated via TCA precipitation. A small fraction of MF1 and MF2 was present in the soluble fraction from cells grown in auto-induction media, indicating a way to obtain large amounts of MF1 and MF2 protein domains. Future experimentation on extracting protein from inclusion bodies (insoluble fraction) may be attempted.</p>
<p><b>Sarah Anderson</b></p> <p>Molecular Genetics &amp; Proteomics</p> <p>Loras College (IA)</p> <p>Dr. George Weiblen &amp; Dr. David Marks - Plant Biology</p> <p>Erin Treiber</p>	<p><b>Gene Expression of THC Synthase and CBD Synthase in <i>Cannabis sativa</i></b></p> <p>This research investigated the genetics of drug content in a controversial and economically important plant, <i>Cannabis sativa</i>, the source of psychoactive tetrahydrocannabinol (THC) and cannabidiol (CBD). Previous genetic mapping of <i>Cannabis</i> drug content supported a single-locus model of cannabinoid inheritance with three major phenotypes. The study objective was to determine whether the variation in levels of cannabinoid synthase gene expression match patterns of cannabinoid variation observed previously. RNA was isolated from female flowers of 19 plants. cDNA libraries were produced and qPCR was performed for THCA synthase and CBDA synthase to measure gene expression in 10 plants. Five plants showed comparable levels of THCA and CBDA synthase expression, three plants showed higher CBDA than THCA expression, whereas two plants showed elevated THCA expression relative to CBDA synthase. Patterns of gene expression that were consistent with previously observed cannabinoid variation suggest a role for gene regulation in affecting <i>Cannabis</i> drug content.</p>
<p><b>Alice Arroyo-Juliá</b></p> <p>Global Change Ecology</p> <p>Univ. of PR – Cayey</p> <p>Dr. James Cotner - Ecology, Evolution &amp; Behavior</p> <p>Seth Thompson</p>	<p><b>Exploring the Production of Organic Carbon in Minnesota's Northern Lakes</b></p> <p>Dissolved Organic Carbon (DOC) is one of the most important reservoirs of organic matter and provides UV-B protection to the flora and microorganisms in the lakes. Lakes are important for the carbon cycle because they rapidly exchange CO<sub>2</sub> with the atmosphere and bury organic carbon for thousands of years. However, it is still unclear where organic carbon in lakes comes from. There are two possibilities: internal sources (autochthonous) or external sources (allochthonous). In this study, we examined chlorophyll (Chl) and DOC levels, from a survey of 15 lakes in northern Minnesota that varied greatly in allochthonous and autochthonous production. Results illustrated no correlation between DOC and Chl with an R<sup>2</sup>=0.04 suggesting allochthonous rather than autochthonous DOC as the major source of carbon in lakes. Overall, highly productive terrestrial landscapes can generate significant amounts of organic matter that are subsequently either consumed or deposited into the lake sediments.</p>
<p><b>Holly Belgium</b></p> <p>IR – AHSSRP</p> <p>St. Olaf College</p> <p>Dr. Robert Kratzke – Hematology, Oncology &amp; Transplantation</p>	<p><b>Measles Virotherapy for Non-Small Cell Lung Cancer</b></p> <p>Live attenuated measles virus (MV-Edm) has been shown to have oncolytic activity against many cancers. In this investigation non-small cell lung cancer (NSCLC) was treated <i>in vitro</i> with MV expressing green fluorescent protein (MV-gfp) and effects on cell survival were measured. MV-gfp replication was monitored by fluorescence microscopy and proteins involved in signaling pathways were investigated using immunoblot analysis. MV infection significantly reduced proliferation of lung cancer cells in a dose-dependent fashion. We demonstrated <i>in vivo</i> efficacy of MV against human lung cancer implanted in immunodeficient mice. MV-treated tumors displayed reduced growth compared to untreated tumors. Finally, human blood outgrowth endothelial cells (hBOECs) were explored as carrier cells to protect MV from the immune system</p>

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<b>Holly Belgum</b> IR – AHSSRP St. Olaf College Dr. Robert Kratzke – Hematology, Oncology & Transplantation	<b>Measles Virotherapy for Non-Small Cell Lung Cancer</b> Live attenuated measles virus (MV-Edm) has been shown to have oncolytic activity against many cancers. In this investigation non-small cell lung cancer (NSCLC) was treated <i>in vitro</i> with MV expressing green fluorescent protein (MV-gfp) and effects on cell survival were measured. MV-gfp replication was monitored by fluorescence microscopy and proteins involved in signaling pathways were investigated using immunoblot analysis. MV infection significantly reduced proliferation of lung cancer cells in a dose-dependent fashion. We demonstrated <i>in vivo</i> efficacy of MV against human lung cancer implanted in immunodeficient mice. MV-treated tumors displayed reduced growth compared to untreated tumors. Finally, human blood outgrowth endothelial cells (hBOECs) were explored as carrier cells to protect MV from the immune system and enhance targeting of MV to tumors. Treatment of NSCLC with MV-infected hBOECs resulted in reduced cancer cell proliferation in a dose-dependent fashion. These results suggest that MV shows promise for clinical treatment of NSCLC.
<b>Graham Brown</b> IR – AHSSRP Macalester College Dr. Gregory Vercellotti – Medicine Paul Marker	<b>Binding Activity of Hemopexin and Albumin with Heme</b> Sickle cell disease (SCD) is characterized by a point mutation in the sixth position of $\beta$ -globin chain of hemoglobin, replacing glutamic acid with valine. Valine substitution promotes polymerization of hemoglobin at low oxygen levels, causing red blood cell sickling and release of hemoglobin and heme into plasma. Heme is highly lipophilic and readily intercalates into membranes of endothelial cells, promoting oxidative damage and inflammation. Hemopexin is a plasma protein with a high heme-binding affinity which inhibits free heme-induced oxidative damage. A UV-Vis spectroscopic scan assessed the heme-binding activity of purified rabbit hemopexin, an <i>in vitro</i> translated rat hemopexin cDNA construct and purified human serum albumin. Absorbance shifts illustrated rabbit hemopexin binds heme with much higher affinity than albumin, but our translated hemopexin cDNA construct has proven inconclusive.
<b>Jhoset Burgos-Rodriguez</b> Global Change Ecology Univ. of PR - Rio Piedres Dr. Dana Davis - Microbiology	<b>Determining <i>Candida albicans</i> Niche Occupant on Non-human Mammals Using Scat Samples from Upper Midwest Wild Mammals</b> <i>Candida albicans</i> is a commensal fungus of the gastrointestinal tract that causes high levels of morbidity and mortality on post-surgery and immunocompromised patients as well as individuals on prolonged antibiotic regimens. Since <i>C. albicans</i> has a symbiosis exclusive to humans, we hypothesize that it is likely that similar fungi occupy the same niche in other mammalian species. Scat samples have been previously used for species identification and food habits on non-human mammals but to our knowledge no one has ever identified the diversity of yeasts in these species. Twenty-eight scat samples were collected from Upper-Midwest wild mammals and twenty-two soil samples were used as environmental control. Eighty yeast were isolated from samples and compared growth at different media indicating 72 species. PCR was conducted to identify species. Finding an organism similar to <i>C. albicans</i> on its natural host will provide a novel organism that will serve in the study of such species.
<b>Kathleen Burnell</b> IR – BTI Univ. of MN – TC Dr. Romas Kazlauskas - Biochemistry, Molecular Biology & Biophysics	<b>A Single Grain of Rice: A Synthetic Biological Approach to a Global Health Challenge</b> People suffering from water related illnesses occupy half of the world's hospital beds, according to the 2006 United Nations Human Development report. An accessible water disinfection system, such as the one this study proposes, could lower this number significantly. The proposed scheme begins with a grain of rice and amylase to create glucose, oxidizes this product using glucose oxidase to produce H <sub>2</sub> O <sub>2</sub> and glucono-1,5-lactone, and creates a peracid by employing a perhydrolase. This peracid has the capability to oxidize microbes and disinfect water. This study focuses on the final step to screen potential perhydrolases. Glucono-1,5-lactone did not react with any of the screened enzymes including <i>Pseudomonas fluorescens</i> esteras (PFE), a known perhydrolase. We hypothesized that either the ring size was incorrect or the substituents hindered the binding step. One five membered ester, $\gamma$ -caprolactone, and one six membered cyclic ester, $\delta$ -

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<p><b>Joshua Campbell</b></p> <p>Heart, Lung &amp; Blood</p> <p>Carleton College</p> <p>Dr. David A. Bernlohr - Biochemistry, Molecular Biology &amp; Biophysics</p> <p>Eric K. Long</p>	<p><b>Protein Carbonylation in Various Lean and Obese Tissues</b></p> <p>Protein carbonylation occurs when lipid peroxidation products form covalent complexes with lysine, histidine, or cysteine amino acids. Low levels of lipid peroxidation products are naturally produced in animals and contribute to normal cellular function. High levels, however, lead to oxidative stress, which has been linked to a variety of diseases such as muscular dystrophy and insulin resistance. This study was conducted to determine if obese subjects have higher levels of carbonylated protein than lean subjects. A variety of mouse tissues were examined, including muscle, liver, subcutaneous and visceral fat. Carbonylation was detected by derivatizing protein carbonyls with a molecule containing biotin and using Streptavidin to visualize the biotinylated protein. Contrary to our hypothesis, obese subjects did not have higher levels of carbonylated protein than lean subjects in any tissue studied. These results indicate that protein carbonylation was independent of obesity in this experiment.</p>
<p><b>Melissa Campion</b></p> <p>Heart, Lung &amp; Blood – MGP</p> <p>Washington and Lee University</p> <p>Dr. Colin Campbell – Pharmacology</p> <p>Kate Castle</p>	<p><b>Determining the Mechanism of Cell Death Induced by a Novel Protein Monoepoxide Drug</b></p> <p>A novel protein monoepoxide drug was synthesized by incubating the bifunctional alkylating agent 1,2,3,4-diepoxybutane with recombinant human O6-alkylguanineDNA alkyltransferase (AGT) protein. This drug was shown to form DNA-protein crosslinks when incubated in vitro with a synthetic DNA duplex substrate. When this protein monoepoxide drug was introduced into cells via electroporation, it was cytotoxic. We hypothesized this was due to the drug's ability to form chromosomal DNA-protein crosslinks. To test this hypothesis we synthesized another novel protein monoepoxide drug using a modified AGT protein that does not bind to DNA and is excluded from the nuclei of cells. I will electroporate this AGT monoepoxide into cells and determine the drug's cytotoxicity. I hypothesize that this modified AGT monoepoxide drug will be substantially less toxic than the parent molecule. Contrary results would indicate that the mechanism of action of these cytotoxic monoepoxide drugs is not due to DNA-protein crosslink formation.</p>
<p><b>Leonardo Cartagena-Méndez</b></p> <p>Microbiology</p> <p>Interamerican University (PR)</p> <p>Dr. Daniel Bond - Biotechnology Institute</p> <p>Tanhia Gonzalez</p>	<p><b>Cytochromes Displayed in the Outer Membrane on <i>E.coli</i></b></p> <p>C type cytochromes are multi-heme proteins that transfer electrons from the inner membrane to the outer membrane of a cell. Microorganisms such as <i>Geobacter</i> and <i>Shewanella</i> are capable of expressing an ample variety of these cytochromes in comparison to <i>E. coli</i>. In this study we aimed at expressing c type cytochromes native to the species of <i>Geobacter</i> and <i>Shewanella</i> in the outer membrane of <i>E. coli</i>. Utilizing Recombinant DNA techniques we cloned the genes for Omc C, Omc E, Omc S, Omc T and Omc Z and expressed them outside of <i>E. coli</i> using the AIDA-I autotransporter protein. The presence of the cytochromes was confirmed by western blots and heme staining.</p>
<p><b>Julissa Chavez</b></p> <p>Heart, Lung &amp; Blood</p> <p>Carleton College</p> <p>Dr. Robert P. Hebbel – Medicine, Division of Hematology, Oncology, and Transplantation and Vascular Biology Center</p> <p>Liming Milbauer</p>	<p><b>Tissue Engineering: The Potential Use of Endothelial Cells for Wound Healing</b></p> <p>Impaired wound healing often affects individuals with diseases such as sickle cell and diabetes. Endothelial cells, which form the inner lining of blood vessels and line the entire vascular system, can be used to monitor the wound healing progress. This wound healing varies according to the type of endothelial cell and its respective environment. In this study, the wound healing efficiencies of Human Umbilical Vein Endothelial Cells (HUVEC) and Blood Outgrowth Endothelial Cells (BOEC) were compared in seven different culture matrices. This comparison involved monitoring the migration and proliferation of the cells through an <i>in vitro</i> scratch assay to mimic an <i>in vivo</i> wound. The results show that BOEC were more efficient than HUVEC in wound healing. BOEC performed the best in the matrix with the combination of collagen, fibronectin, and gelatin. This suggests that BOEC could allow for autologous cell therapy in wound healing. To further assess these results, a co-culture was produced with endothelial cells and fibroblast.</p>
<p><b>Anna Cibils</b></p> <p>Molecular Genetics &amp;</p>	<p><b>Maintaining Self Renewal in Skeletal Muscle Satellite Cells</b></p> <p>Skeletal muscle stem cells—also known as satellite cells—can repair muscle in mouse models of muscular dystrophy. However in order to extract stem cells from</p>

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Proteomics Oberlin College Dr. Michael Kyba – Pediatrics- Division of Hematology, Oncology, and Blood and Marrow Transplantation Megan Multhaup	donor tissue skeletal muscle must be destroyed, making only small biopsies feasible. Ex vivo culture of satellite cells leads to their rapid differentiation, causing their expansion ex vivo to be currently impossible. Several pathways regulating the proliferation and differentiation of satellite cells have been characterized, but many remain unidentified. We have generated a mouse model in which a ZsGreen reporter is regulated by the Pax7 promoter—a satellite cell-specific transcription factor. Using this model we isolated ZsGreen+ satellite cells from the mouse skeletal muscle tissue. We employed various pathway inhibitors and culture conditions in an attempt to maintain self-renewal of the ZsGreen+ cells. These studies will identify an optimal environment in which to replenish the satellite cell pool ex vivo, leading to opportunities to establish gene therapies for patients of various muscular dystrophies.
<b>Flavia Costa</b> IR - BTI Univ. of MN – TC Dr. Jeffrey Gralnick - Biotechnology Institute Evan Brutinel	<b>Identifying Novel Genes Involved in the Anaerobic Respiration of <i>Shewanella oneidensis</i></b> Dissimilatory metal reducing bacteria (DMRB) are able to couple the oxidation of an organic or inorganic substrate to the reduction of an extracellular metal. <i>Shewanella oneidensis</i> is a model DMRB used extensively to study the pathways involved in extracellular metal reduction. A better understanding of the physiology of <i>S. oneidensis</i> will be useful for future bioremediation and bioenergy applications. We used transposon mutagenesis and next-generation sequencing to identify genes whose products are involved in the anaerobic respiratory pathway. Several of the genes identified were known genes whose products are important for growth under anaerobic conditions, validating the screen. In addition there were seven genes with unknown function that were also indicated as important for anaerobic growth. Deletion mutants were created and tested for their ability to grow anaerobically compared to the wild type. Growth curves and plate dilution assays were used to observe growth.
<b>Madeleine Daupp</b> IR – IGERT Washington University (St. Louis) Dr. Terrance M. Hurley - Applied Economics Theresa Bauer	<b>Can Economic Games Measure the Salience of Group Identity in Undergraduates?</b> A strong sense of group identity can foster social welfare preferences that lead individuals to act in ways not predicted by standard economic theory. We identified the potential of such departures from self-interest to serve as quantitative measures of the salience of group identity among individual test subjects. We chose three types of games that would be affected by altered preferences for altruism, trust, and cooperation. University of Minnesota undergraduates were asked to play the games both before and after an identity manipulation that encouraged the students to see one another as members of a common group. We hypothesized that this salient group identity would have a significant effect on subject choices. The ability to measure group identity through economic games could aid social scientists in conducting future studies related to group identity and behavioral choices.
<b>Jolani Daney</b> Heart, Lung & Blood Macalester College Dr. Molly McCue - Veterinary Population Medicine Jessica Petersen and Michelle Lucio	<b>The Effect of a Myostatin SINE insertion on Equine Skeletal Muscle Characteristics of Quarter Horses</b> The purpose of this study was to determine whether or not a SINE insertion within the Myostatin (MSTN) gene of Quarter horses contributes to an overall change in the horses' muscle fiber composition. The MSTN protein is an inhibitor of muscle growth, and if it is not being generated then there should be an increase in Type 2B intermediate muscle fiber types. Muscle samples from 79 different horses were genotyped and analyzed by counting and measuring the diameter of the muscle fibers (type 1, type 2A, and type 2B). Analysis of variance and Tukey Post-Hoc Tests showed statistical significance for the samples that were genetically heterozygous and homozygous for the SINE insertion in reference to fiber type composition. The SINE insertion is relevant to the phenotypic expression of the MSTN gene within Quarter Horses.
<b>Matthew Dargis</b> IR – BTI	<b>Identification of Genes Responsible for Cell-to-Cell Attachment in <i>Geobacter sulfurreducens</i></b> The ability to attach to surfaces and other cells is necessary for reduction of

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Univ. of MN - TC Dr. Daniel Bond - Biotechnology Institute Caleb Levar	external electron acceptors in <i>Geobacter sulfurreducens</i> . The goal was to identify genes responsible for cell-to-cell attachment in <i>G. sulfurreducens</i> . Transposon mutagenesis was used to create random insertion mutants with antibiotic resistance for selection. Colonies were picked using a Genetix Qbot or by hand. The cultures were screened using a iron oxide media screen and an agglutination screen. Phenotypes were observed and the location of the insertions will be determined by DNA sequencing after putative mutants are assayed quantitatively for agglutination and iron oxide reduction deficiencies.
<b>Michelle Dimza</b> Microbiology Missouri Southern State Univ. Dr. Francisco Diez-Gonzalez - Food Science & Nutrition	<b>Analysis of Foodborne Pathogenic Enterobacteria Survival in Extreme Conditions</b> The ability of pathogenic enterobacteria such as <i>Escherichia coli</i> O157 (EHEC O157) and <i>Salmonella</i> to survive in severe conditions is a major threat to food safety. In this study we observed the ability of EHEC O157 to persist in a wide range of conditions. In addition, the chemical composition was analyzed of heat resistant <i>Salmonella</i> at low water activity levels. Temperature, pH, and salinity ranges were recorded for samples of EHEC O157 collected from Minnesota feedlots. As for <i>Salmonella</i> , cultures were harvested on cereal and placed at three different water activities. The chemical composition of <i>Salmonella</i> cells was analyzed using RAMAN spectroscopy. Our results confirm that EHEC O157 can survive in a wide range of conditions. Secondly, our data from the RAMAN suggests there are significant compositional differences in heat resistant <i>Salmonella</i> samples. Our conclusions can be beneficial in developing definitive pasteurization criteria and understanding genetic mechanisms of resistant enterobacteria.
<b>Reginald Doku</b> IR- AHSSRP Macalester College Dr. Mark Schleiss – Center for Infectious Diseases and Microbiology Translational Research Jeff Schreifels	<b>Development of GP 131/ UL130 as a Novel Vaccine Target for Congenital Cytomegalovirus Infections</b> Although congenital cytomegalovirus (CMV) infection causes permanent developmental sequelae such as hearing disabilities in children, there are no specific therapies or licensed vaccines available. A recent discovery that th CMV gH/gH/UL 128/130/131 protein complex is essential for entry into host cells provides a new basis for CMV neutralization <sup>1</sup> . To asses this complex for vaccine studies, a guinea pig CMV GP131 gene, a homolog of the human CMV UL 130 gene, was analyzed for its antigenicity using MacVector software. Three antigenic regions were identified and amplified using a polymerase chain reaction (PCR). These regions were cloned into the vector pQE30 with a 6-His tag. Once successful pQE30-GP131 construct is obtained, expressed and purified, its ability to elicit neutralizing antibody responses will be assessed in guinea pigs, a proven model for congenital CMV infections.
<b>Elizabeth Duncan</b> Global Change Ecology Humboldt State University Dr. Brian Wisenden – Biosciences, MN State Univ. - Moorhead Seth Thompson	<b>Worms on the Brain: Understanding the Effects of a Parasite on Fathead Minnows</b> Parasites that rely on trophic transmission to reach their final host can facilitate transmission by manipulating the antipredator adaptations of the intermediate host. Here, we examined the effects of metacercariae of a digenetic trematode parasite, <i>Ornithodiplostomum ptychocheilus</i> ( <i>Op</i> ) on its intermediate host, the fathead minnow, <i>Pimephales promelas</i> . The final hosts for this parasite are piscivorous birds. We found that dispersal distance was inversely proportional to <i>Op</i> abundance but that fish activity correlated positively with <i>Op</i> abundance. <i>Op</i> abundance was not correlated with exploratory risk-taking behavior. Taken together, these data suggest either that <i>Op</i> increases fish activity level but constrains them to a small area or that fish that are active locally but do not move great distances around the lake acquire relatively high parasite loads.
<b>Arian Frost</b> Heart, Lung & Blood Colorado College Dr. Timothy Walseth -	<b>Identification of the Receptor Protein for Calcium Signaling Molecule NAADP</b> Calcium is an essential intracellular messenger in all cell types. Calcium signaling regulates a vast array of cellular functions including fertilization, T-cell activation, muscle contraction, enzyme function, and gene expression. NAADP (Nicotinic Acid Adenine Dinucleotide Phosphate) is a molecule that activates calcium release from lysosomal stores. Calcium release mediated by NAADP can result in

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Pharmacology	both local and global signaling cascades within a cell, triggering other calcium signaling pathways. Currently, the receptor protein for NAADP has not been identified. Two-Pore channels, a family of ion channels in the 100kD range, have been implicated in the NAADP pathway but have not been convincingly shown to bind specifically to NAADP. Experiments in our lab using photoaffinity labeling have lead to the discovery of a potential receptor protein in the 45kD range. Multiple strategies (preparative electrophoresis, affinity chromatography, and bifunctional probes) have been used to isolate the candidate protein for sequencing and identification.
<b>Dionna Gamble</b>	<b>Assessment of Human Cardiac Venous Anatomies within Fixed Hearts using Computed Tomography and Digital Reconstructions</b>
Heart, Lung & Blood – MGP	It is important to understand the anatomy of the cardiac venous system in order to effectively develop cardiac devices and procedures. There are numerous clinical applications including cardiac resynchronization therapy (CRT), an innovative type of pacing that treats patients with heart failure. This “biventricular pacing” helps to synchronize the beating rhythms of the right and left ventricles by placing leads in the venous system of the heart. In this research project we focused on the anatomical parameters of the cardiac venous system, specifically in the left ventricle. Contrast was injected into the veins of perfusion fixed human hearts and CT images were taken. These 2D CT slices were uploaded into the MIMICS software, which was used to create 3D images. The diameters, length, tortuosity, and branching angles were all recorded into a database for each heart. Data is still being collected and this modeling will allow engineers to construct leads to fit the veins in the left ventricle.
Univ. of MD - Baltimore County	
Dr. Paul Iaizzo – Anesthesiology, Surgery	
Julianne Eggum	
<b>Sam Gonzalez</b>	<b>Analysis of <i>O</i><sup>6</sup>-alkylguanine-DNA-alkyltransferase (AGT) Activity in A/J Mouse Lung Tissue</b>
Heart, Lung & Blood	<i>O</i> <sup>6</sup> -Alkylguanine-DNA-alkyltransferase (AGT) is known to repair <i>O</i> <sup>6</sup> -[4-(3-pyridyl)-4-oxobut-1-yl]deoxyguanosine ( <i>O</i> <sup>6</sup> -pobdG), a mutagenic DNA adduct which results from the metabolic activation of the nitrosamine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). A study in A/J mice determined that co-administration of an AGT inhibitor with a model nitrosamine did not affect tumor yield or <i>O</i> <sup>6</sup> -pobdG persistence in mouse lungs. To assess whether inhibition of AGT occurred this study, an assay was developed to determine AGT activity. Mouse lungs were homogenized and AGT activity was assessed by measuring the repair of [ <sup>33</sup> P]-end-labeled oligonucleotide containing <i>O</i> <sup>6</sup> -methylguanine via HPLC analysis. Data were normalized using protein content determined by the Bradford method. The results show that AGT activity was significantly lower in those mice treated with an AGT inhibitor, as compared to the vehicle control mice. These results suggest another possible repair pathway for <i>O</i> <sup>6</sup> -pobdG.
Macalester College	
Dr. Lisa A. Peterson - Environmental Health Sciences	
Ania Urban	
<b>Olivia Guayasamin</b>	<b>Reduced Escalation of IV Cocaine Self-administration During Concurrent Access to Wheel-running in Adolescent vs. Adult rats</b>
Neuroscience	Concurrent access to an exercise wheel reduces iv cocaine self-administration under maintenance conditions and suppresses cocaine-primed reinstatement in adult rats. In this study, the effect of wheel running on escalation of cocaine intake during long access (LgA) conditions was assessed. A wheel-running baseline was established over 3 days, and adolescent and adult rats were then catheterized and allowed to self-administer cocaine during 6-hr daily sessions for 16 days. They had concurrent access to either an unlocked or locked (stationary) wheel. Subsequently, for 10 additional sessions, the wheel access condition was reversed. Results indicated that concurrent wheel access attenuated cocaine intake to a greater extent in adolescent than adult rats. These effects were seen in adolescents and adults but were more pronounced in adolescents. Rat models suggest exercise can be a useful intervention to reduce cocaine-seeking behavior, and it may be more effective in adolescents than adults.
Princeton University	
Dr. Marilyn Carroll – Psychiatry	
Natalie E. Zlebnik	
<b>Daimon Hardy</b>	<b>Analysis of Hypothetical Protein-Coding Genes in <i>Tetrahymena thermophila</i></b>
Heart, Lung & Blood – MGP	The ciliated protozoan <i>Tetrahymena thermophila</i> is capable of both asexual and sexual reproduction (fission and conjugation, respectively). The expression patterns for a number of <i>Tetrahymena</i> genes vary, depending on whether they are

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<b>Daimon Hardy</b> Heart, Lung & Blood – MGP Macalester College Dr. Daniel Romero - Pharmacology	<b>Analysis of Hypothetical Protein-Coding Genes in <i>Tetrahymena thermophila</i></b> The ciliated protozoan <i>Tetrahymena thermophila</i> is capable of both asexual and sexual reproduction (fission and conjugation, respectively). The expression patterns for a number of <i>Tetrahymena</i> genes vary, depending on whether they are undergoing cell growth and fission or conjugation. Two <i>Tetrahymena</i> genes with heightened expression during conjugation are the focus of this study. Based on bioinformatic analyses, the first of two protein-coding genes (TTHERM_01217200) may function in mRNA export, whereas the second gene (TTHERM_00591640) is homologous to karyopherins. In order to determine intracellular localization, GFP-fusions of these genes were expressed in Tt transformants. The appearance of transformants concurred with bioinformatic analyses. To further study the effects of these genes, separate gene knockouts were proposed to compare Tt missing each gene of interest with wild type Tt. Expectations are that phenotypes will differ. This may help in determining function of these genes.
<b>Austin Haynesworth</b> Molecular Genetics & Proteomics Yale University Dr. David Largaespada - Genetics, Cell Biology & Development Adrienne Watson	<b>The Role of Caveolin 1 in Malignant Peripheral Nerve Sheath Tumor (MPNST) Tumorigenesis</b> Insertional mutagenesis is a technique that can be used in the identification of cancer genes. Using an insertional mutagenesis screen with the transposon <i>Sleeping Beauty</i> , Caveolin 1 (CAV1) was identified to potentially have an effect on the tumorigenesis of human Schwann cells into malignant peripheral nerve sheath tumor (MPNST) cells. In other cell types, CAV1 has been shown to act as a tumor suppressor gene (TSG), affecting the level and localization of PTEN, $\beta$ -catenin + epidermal growth factor receptor (EGFR). Our goal was to determine if CAV1 is acting as a TS gene in human Schwann cells. This was done by monitoring mRNA and protein levels when CAV1 was knocked down in human Schwann cells and when it was over-expressed in MPNST cells. We also attempted to determine if CAV1 was affecting cell proliferation, apoptosis, and anchorage independent growth. From our research, CAV1 appeared to affect PTEN, $\beta$ -catenin and EGFR levels. It also seemed to have effects on cell proliferation. Ultimately, CAV1 appears to be acting as a TSG in human Schwann cells.
<b>Sherryl Henderson</b> Neuroscience Xavier University (LA) Dr. Robert L. Meisel – Neuroscience Valerie Hedges	<b>Estradiol and Progesterone's Regulation of ARC and pMTOR within the Nucleus Accumbens and Caudate</b> The functions of different brain regions are ultimately affected by hormones, like estrogen and progesterone, which can influence neuronal plasticity. Since plasticity plays a role in the severity of disorders like schizophrenia, Parkinson's, and addiction, it is critical to scrutinize the role ovarian hormones play in the regulation of plasticity within regions associated with these disorders. This experiment dealt with how estrogen and progesterone modulate pMTOR and ARC: two proteins that work to inhibit or promote cell growth. Separate groups of ovariectomized female hamsters were treated with an oil vehicle, estradiol, or estradiol and progesterone. Using SDS-PAGE, we predict the amounts of pMTOR and ARC will be policed by exposure to estradiol in the nucleus accumbens and estradiol with progesterone in the caudate; regions known for severe psychiatric and neurological disorders. Therefore, depending on the region, hormones may hold the ability to modulate disorders of the nervous system.
<b>Mia Howard</b> IR – IGERT Wellesley College Dr. Ruth Shaw - Ecology, Evolution & Behavior Gina Quiram	<b>Evaluating Biological Control Agent Preference For Purple Loosestrife Populations In Minnesota</b> Purple loosestrife ( <i>Lythrum salicaria</i> ) is an exotic wetland plant that has become widely invasive across North America. Over the past two decades, biological control via the species' specialist herbivores, the loosestrife beetles ( <i>Galerucella pusilla</i> and <i>G. californiensis</i> ), has shown variable success in controlling <i>L. salicaria</i> populations. Some populations experience heavy herbivore damage while others experience little or no damage by biological control agents. In this study we identified and quantified a potential preference of beetles for <i>L. salicaria</i> populations with historically high or low levels of herbivory through a series of two-plant choice experiments. Preliminary results show that adult beetles did not

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<b>April Huseby</b>	<b>PD-1/PD-L1 Interactions Play a Critical Role in Maintaining Peripheral Tolerance for Type 1 Diabetes</b>
Heart, Lung, & Blood	The complexity of T cell activation involves both positive and negative signals required for full effector functioning. The primary signal is through the T cell receptor (TCR), while secondary signals include co-stimulatory or inhibitory receptors. The TCR signaling strength plays an important role to regulate T cell activation. The antigens and the binding affinity for self-reactive proteins causing diabetes are unclear. Mistakes in self-tolerance can be peripherally counteracted through the interactions of the inhibitory pathway of PD-1 and its ligand PD-L1.
Univ. of WI - River Falls	In contrast, blocking PD-1/PD-L1 interactions can break tolerance resulting in rapid autoimmune diabetes. Restoring those interactions can reinstate the tolerant T cell state. The mechanism and strength of both the activation and inhibitory cascade determine the tolerant state of autoimmune T cells. With a better understanding of how this pathway operates during the breakdown of peripheral tolerance we will be able to alter clinical disease progression and augment autoimmunity.
Dr. Brian Fife - Medicine, Rheumatology	
Cate Heiderscheidt and Kristen Pauken	
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<b>Jessica Johnston</b>	<b>Prevalence of Environmentally Associated Genes Among Environmental and Enteric Strains of <i>Escherichia coli</i></b>
Microbiology	<i>Escherichia coli</i> is a common fecal indicator bacterium used for monitoring recreational water quality. Recent studies, however, indicate that some <i>E. coli</i> strains persist in the absence of fecal inputs by becoming naturalized to soils and water, confounding the use of <i>E. coli</i> as a fecal indicator. Genetic markers unique to strains from various animal sources and environmental habitats have been identified based on variation between host-dependent and environmental strains. Here, PCR and nucleic acid probe-based methods were used to investigate the association between proposed environmental-specific gene markers and isolates from a variety of enteric and environmental sources. Preliminary data indicated that some environmental-specific markers were present in one or more environmental isolates while absent in enteric isolates, indicating that the genes have potential in the detection of naturalized strains. Before these markers are implemented in detection methods, however, a larger number of enteric and environmental strains must be screened.
Gustavus Adolphus College	
Dr. Michael Sadowsky - Soil, Water & Climate	
Brian Badgley	
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<b>Sean Legler</b>	<b>Generation of a Bioluminescent/Fluorescent Reporter of <i>COL7A1</i> Gene Expression</b>
IR – AHSSRP	Recessive dystrophic epidermolysis bullosa (RDEB) is a lethal mucocutaneous blistering disease caused by mutations in <i>COL7A1</i> , the gene that encodes for type VII collagen. Recently, allogeneic bone marrow transplantation has been utilized as a novel therapy capable of enhancing collagen VII deposition at the dermal-epidermal junction (DEJ) and providing clinical amelioration of blistering in RDEB patients. Though it is hypothesized hematopoietic stem cells are responsible for the homing of donor cells to the DEJ, the specific cell types in the bone marrow transplant actually producing collagen VII have yet to be determined. To address this and other treatment related concerns, a dual bioluminescent-fluorescent reporter driven by the the human <i>COL7A1</i> promoter was created. Current <i>in vitro</i> studies are examining the effects of chemotherapy and hypoxia on <i>COL7A1</i> expression and future studies will explore <i>in vivo</i> the localization and identity of post-transplant <i>COL7A1</i> expressing cells in a murine RDEB model.
St. Olaf College	
Dr. Jakub Tolar – Pediatrics, Hematology- Oncology, Blood and Marrow Transplantation	
Beau Webber	
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<b>Alexander Liebman</b>	<b>Using Canada Wild Rye (<i>Elymus canadensis</i>) to Facilitate the Establishment of Perennial Biofuel Grasslands in the Upper Midwest</b>
IR – IGERT	Perennial biofuel agroecosystems provide a variety of ecological services including carbon sequestration, wildlife habitat, and erosion control. Yet conversion of intensive agricultural tracts to perennial plantings is difficult, expensive, and easily dominated by invasive species. Establishment may be improved by restoration of soil arbuscular mycorrhizal fungi (AMF) populations that have been diminished by annual agricultural practices such as high N fertilization and tillage. The use of 'nurse' species, fast growing plants that disrupt weed growth and change soil microbial populations to benefit late-succession perennials, may be a particularly viable management option. To address this, I measured AMF
Macalester College	
Dr. Nicholas Jordan - Agronomy & Plant Genetics	
Sheri Huerd	

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	diversity and plant biomass of Canada Wild Rye, an early succession, C-3 grass, in three pairs of intensive agriculture and long-term prairie soils. In a 5 week greenhouse study, I compared Canada Wild Rye to three late-successional prairie species, <i>Andropogon gerardii</i> , <i>Schizachyrium scoparium</i> , and <i>Ratibida columnifera</i> and one invasive perennial, <i>Cirsium arvense</i> . I used TRFLP analysis to characterize fungal communities and data points were matched to an existing phylotype database to distinguish specific operational taxonomic units (OTU). I compared OTU and biomass differences using ANOVA statistical analysis.
<b>Jairo Luque-Villanueva</b>	<b>Is The DOC From Streams More Labile Than That From Lakes?</b>
Global Change Ecology	Inland waters have the ability to store large amounts of carbon or release it into the atmosphere. Streams transport organic carbon from soils into lakes and it is not clear whether stream carbon is more easily consumed by aquatic organisms than that in the lake. Microbes mainly use dissolved organic carbon (DOC) to respire and metabolize which has strong effects on the carbon fluxes in lakes. I expected the concentrations of DOC and the proportion of labile DOC (LDOC) to be greater in the streams than the lakes due to high terrestrial productivity. We collected water samples from 15 lakes, two streams, and a spring in Northern Minnesota and found that there was more DOC in the streams and that LDOC levels varied among systems. Variation in stream DOC and LDOC was likely due to variation in hydrology and productivity within their drainages.
Palomar College	
Dr. James Cotner - Ecology, Evolution & Behavior	
Seth Thompson	
<b>Jessica Milligan</b>	<b>The Role of NPY on Cholesterol Ester and Lipid Metabolism in oxLDL Exposed Macrophages</b>
Independent Research	Cholesterol ester laden macrophages are the hallmark of atherosclerosis. Neuropeptide Y (NPY), a 36-amino acid peptide, has been strongly implicated in augmenting the progression of atherosclerotic plaques. Lesions in the arterial wall house "fatty" macrophages, known as foam cells due to their accumulation of lipid droplets in the cell. Macrophages exposed to oxLDL accumulate a significant amount of cholesterol ester and triglycerides. We investigated the role of NPY on cholesterol ester and triglyceride metabolism. To assess this, we utilized oxLDL to induce cholesterol and triglyceride accumulation in THP-1 derived macrophages and exposed them to NPY or NPY receptors' inhibitors. We expected to see increased sequestration of cholesterol ester and triglycerides within the lipid droplet, as well as altered expression of enzymes directly involved in cholesterol/lipid metabolism.
George Fox University	
Dr. Zofia Zukowska - Integrative Biology	
<b>Nicole Moreno</b>	<b><math>\beta</math>-adrenergic Receptors and Circadian Rhythm Entrainment in the Adrenal</b>
Neuroscience	Peripheral organs have an endogenous molecular clock with a nearly 24-hour period that is entrained to the external environment by the suprachiasmatic nucleus of the hypothalamus. Glucocorticoid secretion from the adrenal cortex is linked to this clock and displays a strong rhythm, though its mechanism of entrainment is unknown. However, chromaffin cells in the adrenal medulla are innervated by the sympathetic nervous system, and the presence of $\beta$ -adrenergic receptors in cortical cells suggests that catecholamines from the medulla could interact directly with the cortex, thus entraining the clock. We recorded clock gene activity in adrenal hemisections from mPer2::Luc transgenic male mice <i>in vitro</i> using a photomultiplier tube (PMT). Sections were treated with isoproterenol ( $\beta$ -adrenergic receptor agonist), propranolol ( $\beta$ -adrenergic receptor antagonist), or vehicle at CT10. Analysis of post-treatment period and phase show no change between experimental groups, suggesting that $\beta$ -adrenergic receptors do not entrain the adrenal clock at CT10.
Univ. of TX - Dallas	
Dr. William Engeland - Neuroscience	
Marina Yoder	
<b>Najaha Musse</b>	<b>Clonal distribution of resistant and susceptible <i>Escherichia coli</i> clinical isolates at the MVAMC</b>
IR – AHSSRP	ST131, an <i>E. coli</i> clonal group under phylogenetic group B2, is a widely disseminated cause of multi-drug resistant (MDR) extraintestinal infections. Here, we assess the prevalence of ST131 among recent clinical isolates from veterans at the Minneapolis VA Medical Center, specifically the contribution of ST131 to the Fluoroquinolone resistant and Trimethoprim-sulfa resistant (TMP-SMZ-R) population. Phylogenetic grouping on 418 clinical isolates was determined by the Clermont method and subsequent PCR assay determined ST131. Phylogenetic group B2 accounted for 50% of all isolates and ST131 constituted 47% of B2.
St. Olaf College	
Dr. James Johnson – Medicine	
Brian Johnston	

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	<p>Furthermore, ST131 accounted for 24% of isolates overall, but for 65.5% of FQ-R isolates (vs. 6.7% of FQ-S: <math>P &lt; .001</math>), 36.3% of TMP-SMZ-R isolates (vs. 18.4% of TMP-SMZ-S: <math>P = &lt; .001</math>), and 52% of dually FQ-R, TMP-SMZ-R isolates (vs. 17.9% of others: <math>P = &lt; .001</math>). Certainly, ST131 accounts for most FQ-R isolates, and for a substantial minority of TMP-SMZ-R or dually-R isolates, likely making management of UTI more difficult.</p>
<p><b>Megan Nathan</b> IR – IGERT Univ. of Southern CA Dr. David Andow – Entomology Kristina Prescott</p>	<p><b>Steps toward Developing Ladybug Species Specific Primers and Improving Gut-Content Analysis</b> Predation by ladybugs on other ladybugs is sometimes identified via gut-content analysis. However, this method is most informative if species-specific primers exist for all ladybug species in the habitat of interest. This study made strides in developing species-specific primers for ladybug species prevalent in North American agricultural habitats. DNA sequences from other ladybug species were used to create primers to amplify <i>Cycloneda munda</i> DNA. Regions from <i>C. munda</i>'s previously un-sequenced COI mitochondrial gene were sequenced, and may now be used in developing primers to distinguish among ladybug species. Additionally, it was found that inherent genetic variations between individuals within the same species might reduce the reliability of conventional gut content analyses. Further investigations on these variations and their meaning should be made. Similarly, future studies should work to finish sequencing ladybug genomes so that species-specific primers may be developed, and trophic relationships evaluated.</p>
<p><b>Michael Ndula</b> Heart, Lung &amp; Blood Normandale Community College Dr. Kalpna Gupta – Medicine Julia Nguyen</p>	<p><b>Pericyte-Endothelial Cell interaction in Tumor Vessel Angiogenesis through PDGF-B Expression by the Endothelium</b> Blood vessels formation requires pericytes-endothelial cells (ECs) association. As believed, angiogenesis does not solely depend on the EC proliferation but also requires the coverage of vascular sprouts by pericytes for vascular wall stabilization. Evidence has proved that detachments in the EC-pericyte signaling networks can contribute to tumor angiogenesis and metastasis but the role of pericytes is yet to be fully understood. Here we studied the expression of PDGF-B by morphine treated EC. We hypothesized that the expression of PDGF-B by ECs would stimulate pericyte growth by activating PDGFR-B signaling in the pericytes. Based on surface markers like CD31, <math>\alpha</math>-SMA, and PCNA in immunofluorescence staining, we found that morphine treated C3TAG mice tumors resulted in higher levels of pericyte differentiation and recruitment to the ECs compared to controlled PBS treated mice. These results emphasize that pericyte-EC interaction can be a useful target in both pro and anti-angiogenic therapies such as wound healing and cancer conditions respectively.</p>
<p><b>David Nedrud</b> IR – BTI Univ. of MN - TC Dr. Romas Kazlauskas - Biochemistry, Molecular Biology &amp; Biophysics Zhi-Jun Zhang</p>	<p><b>Conversion of a Hydroxynitrile Lyase to an Esterase via Mutagenesis</b> <i>Hevea brasiliensis</i> hydroxynitrile lyase (HbHNL) and the esterase salicylic acid binding protein 2 (SABP2) have 45% amino acid sequence similarity, the same catalytic triad and the same protein fold. However, they catalyze different reactions from divergent evolution. We hypothesized that only a few amino acids cause the different activity and therefore mutagenesis could reverse evolution. The goal of this project was to change the activity of HbHNL to esterase activity for molecular understanding of how the same catalytic triad catalyzes different reactions. Three amino acids were changed in HbHNL by PCR mutagenesis and the triple mutant was expressed/induced in BL21 <i>E. coli</i>. An esterase assay, using para-nitrophenyl acetate as the substrate, gave a specific activity of 41.65 U/mg as compared to 6e-5 U/mg for wild type HbHNL. We can conclude that a histidine 79 helps create specific esterase catalysis from a general catalytic triad.</p>
<p><b>Brooke Nneka Nnatubeugo</b> Molecular Genetics &amp; Proteomics Bowdoin College Dr. Timothy Griffin -</p>	<p><b>A Comparison of Digestion Efficiency: Standard Digestion and Barocycler Digestion</b> A Barocycler is a machine that digests samples at higher pressures, reaching a maximum pressure of thirty thousand pounds per square inch. The goal was to ascertain whether digesting exudate samples at a higher pressure for a shorter period of time in the Barocycler would show purer and more abundant peptides when run on a mass spectrometer than what would have been seen if the samples had been digested overnight at 37°C. The samples were fresh, collected from</p>

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Biochemistry, Molecular Biology & Biophysics	healthy tissue, and underwent trypsin digestion. After taking control samples, both for standard Barocycler conditions and for the standard digestions, the pressure and cycle conditions were altered for subsequent digestions in the Barocycler.
Joel Kooren	From the first set of digestions that were run on the mass spectrometer, there was no obviously superior digestion strategy. The results were inconclusive, leading us to collect more samples for digestion and mass spectrometry analysis at a later date.
<b>Rachel Nordberg</b>	<b>Using Amplicons as a System To Study Viral Gene Regulation By HSV-1 ICP27</b>
Microbiology	HSV-1 is a common human pathogen of the herpesvirus family. The ICP27 protein is a critical gene regulator of HSV-1. Plasmid transfection studies suggest that ICP27 regulates the LAT gene, the only gene expressed during HSV-1 latency. However, since plasmid transfection experiments are far removed from virus biology, we developed an amplicon system to study ICP27's influence on LAT. Amplicons are plasmids that can be transfected into cells and packaged into virus particles. Two amplicon plasmids were constructed, one containing a segment of LAT and the other a control non-LAT sequence. These plasmids have been used to prepare viral amplicon stocks, which will be used to infect cells. Northern blotting will determine LAT expression levels. We expect that LAT will be expressed in the presence of ICP27 but not in its absence. This study will provide a better understanding of how ICP27 regulates LAT in an actual viral infection.
Lehigh University	
Dr. Stephen Rice – Microbiology	
<b>Kenna Organ</b>	<b>Characterization of a Tamoxifen Resistant Cell Line</b>
Heart, Lung & Blood – MGP	The estrogen receptor (ER), an estrogen induced transcription factor, is an important target in breast cancer. Tamoxifen binds ER and has been a clinically important breast cancer therapy. However, tamoxifen resistance (TamR) breast cancer occurs. We hoped to gain a more thorough knowledge of the molecular mechanisms of endocrine resistance by creating TamR cells <i>in vitro</i> . TamR cells were generated by culturing T47D cells in the presence of tamoxifen for 6 months. TamR cells had diminished levels of IGF1R with unchanged levels of insulin receptor (IR). TamR cells failed to respond to IGF-I-induced Akt activation while retaining responsiveness to both insulin and IGF-II. IGF-I failed to enhance the proliferation of TamR cells; however, both insulin and IGF-II stimulated proliferation. Thus, TamR cells lost expression of IGF1R, but the homologous IR was not affected. Through further research we hope to identify new avenues of treatment for tamoxifen resistant breast cancer.
Univ. of WI - River Falls	
Dr. Douglas Yee - Hematology, Oncology & Transplantation	
Dedra Fagan	
<b>Nia Patterson</b>	<b>Cellular Evaluation of Organ Preservation Solutions During Hypoxia</b>
Molecular Genetics & Proteomics	Organ preservation solutions are common aspects of surgery that address the problems involved with organ transplantation. The goal for these solutions is to reduce the negative effects of ischemia so that the organs can be preserved for a longer period of time. The two mainstream solutions for cardiac transplantation are the University of Wisconsin's Solution (Viaspan) and Celsior. Cardiomyocytes were incubated in Viaspan, Celsior, and Somah (an experimental solution) to determine which better preserved the cells when placed in a hypoxic environment composed of 95% N <sub>2</sub> and 5% CO <sub>2</sub> ; afterwards a trypan blue cell viability assay was conducted. Somah is a newer preservation solution that is made up of several ingredients from Viaspan and Celsior, but also contains several new ingredients. Since Somah is newer and has different ingredients, we believe it may be more effective than Viaspan and Celsior and this is the claim we are attempting to confirm.
Occidental College	
Dr. Paul Iaizzo – Anesthesiology, Surgery	
Ryan Goff	
<b>Erick X. Pérez Guzmán</b>	<b>Construction of a <i>Sleeping Beauty</i> Transposon Vector System to Overexpress Hemopexin in Transgenic Sickle Cell Disease Mice</b>
Heart, Lung & Blood	In sickle cell disease, hemoglobin-S polymerization promotes intravascular hemolysis of red blood cells, releasing free-heme into plasma. Free-heme overload produces oxidative stress and inflammation of the vascular endothelium. Hemopexin (Hpxn) is a high-affinity plasma heme binding protein that inhibits heme-induced oxidative damage. <i>In vitro</i> cell-free transcription and translation were performed to validate the coding region of a rat wild-type rat-Hpxn cDNA. mRNA and protein generated in the cell-free system were examined by species-
Univ. of PR - Cayey	
Dr. Clifford Steer – Medicine: Gastroenterology, Hepatology, and Nutrition Division	

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Carol M. Bruzzone	specific qRT-PCR-RFLP, polyacrylamide gel electrophoresis with Coomassie staining, Western blotting, and a Hpxn/heme binding assay. Once the wild-type rat-Hpxn cDNA has been validated, the coding region will be modified through site-directed mutagenesis to alter two histidines required for heme binding activity to generate a non-active, missense Hpxn coding region. <i>Sleeping Beauty</i> transposon, a non-viral vector, will then be constructed with the wild-type and missense Hpxn coding regions and used for genomic integration of Hpxn into transgenic sickle mice.
<b>Natalia Porcek</b>	<b>The Effects of Subinhibitory Concentrations of Antibiotics on the Nutrient Utilization of Pathogens</b>
Microbiology Lawrence Technological University Dr. Christine Salomon - Center for Drug Design Chris Gelbmann	Bacteria produce many compounds with antibiotic activity, which is believed to allow them to inhibit growth of competitors. However, little is known about the effects of subinhibitory concentrations of antibiotics on competing microbes. In this study, pathogenic strains including Methicillin-Sensitive-and-resistant <i>Staphylococcus aureus</i> and <i>Escherichia coli</i> were used to test our hypothesis that antibiotics have a potential role as signaling molecules that alter nutrient usage through interspecies communication. We have discovered that in the presence of subinhibitory concentrations of bacterial antibiotic, the pathogen's ability to utilize nutrients was altered. In most cases, the presence of antibiotics blocked the pathogens from utilizing certain nutrients; in others, the addition of subinhibitory concentration of antibiotic allows the use of nutrients that did not support growth in its absence.
<b>Lindor Qunaj</b>	<b>Examination of a Unique Virus-Specific Memory T Cell Population in the Liver</b>
Microbiology Brown University Dr. David Masopust – Microbiology, Center for Immunology Kristin Anderson	Following a primary infection, many distinct populations of memory T cells can be found in the body, with some circulating through blood and lymph nodes and others concentrating in non-lymphoid peripheral tissues. Here, we demonstrate that after immune clearance of an acute viral infection, a phenotypically unique subset of antigen-specific memory T cells can be isolated from the liver tissue. These localized T cells can be distinguished from those that are circulating by the use of both an in vivo and ex vivo CD8 stain. Furthermore, the size and exact nature of this population appears to be dependent on exposure route (intraperitoneal or intratracheal), with varying levels of CD69, CD27, Granzyme B and Ly6c (four commonly examined markers on immune cell surfaces) being observed. Since many pathogens target particular tissues, an understanding of these localized T cells may allow us to develop more effective vaccines that induce tissue-specific responses.
<b>Christie Radtke</b>	<b>What Washing Can't Remove: Detecting Internalized Microorganisms in Lettuce samples from Local Produce Markets</b>
IR – BTI Univ. of MN - TC Dr. Michael Sadowsky - Soil, Water & Climate; Dr. Francisco Diez-Gonzalez, Food Science and Nutrition Zhe Hou	In recent years, lettuce has been a major vehicle for foodborne pathogens and outbreaks in the United States. The contamination routes are still uncertain. Some researchers have proposed that microorganisms could become internalized into the plant and escape from the post-washing. This study used microbiological techniques to isolate the natural internalized bacteria—especially the ones from the <i>Enterobacteriaceae</i> family—from lettuce. A total of 160 heads for red leaf and romaine lettuce were fully surface sterilized, blended in a stomacher and enriched with GN broth for 24 hours in 37° C. API-20E strips were used as the identification method for the positive leaf samples. <i>Pseudomonas</i> and <i>Pantoea</i> were the major isolates identified by the API strips both from red leaf and romaine lettuce. Although <i>Enterobacteriaceae</i> were present ( <i>Pantoea</i> ), none of them were the typical human pathogens ( <i>Salmonella</i> and <i>Escherichia</i> ).
<b>Danielle Reenstra</b>	<b>The Interferon Response to Epstein-Barr Virus</b>
Microbiology York College (PA) Dr. Kristin Hogquist - Lab Medicine and Pathology	Epstein-Barr Virus (EBV) of the Herpesviridae family, causes chronic infection in approximately 90% of the world population and is associated with cancer and autoimmunity. The purpose of this study was to determine the cell types producing a type I interferon (IFN- $\alpha$ and IFN- $\beta$ ) response to EBV. Type I IFN is highly important for inducing antiviral immune responses. Peripheral blood mononuclear cell (PBMC) samples from latently infected individuals were depleted of plasmacytoid dendritic cells (pDC) and/or monocytes. Samples were

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Samantha Dunmire  
then stimulated with EBV or control stimuli and left to incubate. The interferon regulated genes (IRG) of each sample were measured via quantitative real-time PCR. Preliminary data showed pDC and monocyte depletions had minimal effect on IRG expression. These results suggest that while pDCs and monocytes may lead to an IFN response, there are likely other cells involved.

**Samantha Ridley**  
**Estradiol and Progesterone's Effects on CaMKII and GluR2 within the Hippocampus and Cerebellum**

Neuroscience  
Dartmouth College (NH)  
Dr. Robert Meisel & Paul Mermelstein – Neuroscience  
Valerie Hedges  
Steroids such as estradiol and progesterone are known to have an effect on disorders such as Alzheimer's and ataxias. Therefore, analyzing how these hormones affect the plasticity and functionality of brain areas related to these disorders is vital. The hippocampus is the center for memory consolidation and spatial memory, while the cerebellum controls balance and coordination. These hormones also affect different aspects of neuroplasticity, such as neuronal structure and secretion. The objective of my study was to answer this question: "How do these hormones affect the levels of proteins related to neuroplasticity within my targeted brain areas?" To examine this hypothesis, I used SDS-PAGE Western blotting. My predicted results are that the hippocampus and the cerebellum would have increased the amount of CaM Kinase II and GluR2 as a result of estradiol and a further increase with progesterone treatment. These effects of hormones may increase neural activity, which will help develop therapies to alleviate or even reverse the effects of damage from many disorders of the nervous system.

**Valeria Rivera-Torres**  
**Epilepsy in Australian Shepherd Dogs**

Heart, Lung & Blood  
Univ. of PR - Cayey  
Dr. Ned Patterson - Veterinary Clinical Sciences  
Katie Minor, RN  
Idiopathic epilepsy implies having recurrent seizures in which no anomaly is known. It is a common disorder that affects about 4% of dogs and 1% of people. This research focused on single nucleotide polymorphism (SNP) associations between epileptic and non-epileptic Australian shepherd dogs (Aussies). The major objective was to find the genetic basis of epilepsy by the conduction of PCR RFLP tests and to sequence one candidate gene, DOK6. The chromosomes of interest were CFA1 and CFA19 since previous work (Whole Genome Association) showed statistical association of SNPs with Epilepsy in a study with 40 Aussies. In the current study, PCR and two RFLP SNP tests were performed on 80 additional Aussies to compare their genotype frequencies by chi-square statistical analysis. By studying the SNPs in Aussies, we confirmed different genotype frequencies between normal and affected dogs on canine chromosomes 1 and 19 indicating possible causative genes in each location.

**Erick G. Rodríguez-Cruz**  
**CD38 Expression in Human Airway Smooth Muscle Cells: Regulation of Expression through microRNAs**

Heart, Lung & Blood – MGP  
Univ. of PR - Cayey  
Dr. Mathur Kannan - Veterinary Biomedical Sciences  
Joseph A. Jude  
CD38 is a transmembrane protein expressed in mammalian cells including human airway smooth muscle (HASM) cells. In HASM, CD38 plays a role in cellular Ca<sup>2+</sup> mobilization and airway hyperresponsiveness. Expression of CD38 is regulated by inflammatory cytokine TNF- $\alpha$  through transcriptional and post transcriptional mechanisms.  
Hypothesis: microRNAs post-transcriptionally regulate CD38 expression in HASM cells.  
Methods: 3'UTR of CD38 gene was screened for potential microRNA targets. Expression of miR-140-3p was determined in HASM cells. HASM cells were transfected with miR-140-3p mimics and CD38 expression was determined by qRT-PCR. Results: >20 miRNA were predicted to target CD38 3'UTR. Expression of miR-140-3p was downregulated in the presence of TNF- $\alpha$ . In miR-140-3p mimic-transfected cells, CD38 mRNA expression was attenuated.  
Conclusions: miRNAs play a role in CD38 expression in HASM cells. MiR-140-3p negatively regulates CD38 expression in HASM cells. The findings suggest that miRNAs can be used as novel therapeutic targets in airway hyperresponsiveness.

**Lester Rosario-Rodríguez**  
**Construction of a DNA-Protein Cross-Link Substrate**

Heart, Lung & Blood  
Certain internal and external factors, such as oxidative stress and exposure to chemicals and ionizing radiation may lead to covalent cross-linking of nuclear proteins to genomic DNA. If not repaired, these DNA-protein cross-links (DPCs)

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<b>Lester Rosario-Rodríguez</b> Heart, Lung & Blood Univ. of PR - Cayey Dr. Colin Campbell - Pharmacology	<b>Construction of a DNA-Protein Cross-Link Substrate</b> Certain internal and external factors, such as oxidative stress and exposure to chemicals and ionizing radiation may lead to covalent cross-linking of nuclear proteins to genomic DNA. If not repaired, these DNA-protein cross-links (DPCs) are hypothesized to interfere with mRNA synthesis and DNA replication, and to activate cell death processes. Because it has proven extremely difficult to selectively induce defined DPCs, little is known about their precise biological significance or the mechanisms that cells use to repair them. As a first step towards addressing this objective, we created a semi-synthetic circular double-stranded DNA substrate to which we covalently attached recombinant human 8-oxoguanine glycosylase. The DNA-protein cross-link substrate was affinity purified using Ni-NTA agarose beads. This molecule will be electroporated into wild-type and DNA repair deficient cell lines, and polymerase chain reaction will be used to monitor the extent to which this DPC substrate is repaired.
<b>Annyoceli Santiago</b> Molecular Genetics & Proteomics Univ. of PR - Rio Piedres Dr. Deborah Samac - Plant Pathology	<b>CD38 Expression in Human Airway Smooth Muscle Cells: Regulation of Expression through microRNAs</b> Alfalfa is the fourth most widely grown crop in the United States of America. Its growth is very important to the agricultural industry. Alfalfa has a number of microorganisms that sometimes cause disease in the plant (pathogens). Nevertheless, it also interacts with organisms that do not cause any harm to the plant (endophytes). These organisms can be found inside the plant and in the rhizosphere. The focus of this study is to analyze the differences between population found inside the plant and in its rhizosphere. Four year old alfalfa plants were collected in the University of Minnesota at St. Paul. Rhizosphere bacteria and the bacteria and fungi inside the root were extracted and isolated. Bacterial 16S rDNA and fungal rDNA ITS was amplify and sequenced. Antifungal activity was found in the rhizosphere bacteria population. DNA will be extracted from soil and plants samples for non-culture based identification of microbial populations.
<b>Erin Sheffels</b> Molecular Genetics & Proteomics Reed College Dr. Ameeta Kelekar - Laboratory Medicine & Pathology Xazmin Lowman	<b>Interactions Between A Glycolytic Enzyme And A Putative Glutathione Transferase In Leukemia Cells</b> Kelekar lab recently identified an anti-apoptotic complex in leukemia cells, containing proteins with a wide variety of functions. The complex contains two proteins of interest to the lab, Bcl-2 family members Noxa and Mcl-1 <sub>L</sub> , and phosphatase and a 26S proteasome subunit. Two other proteins found in the complex, translational elongation factor 1 gamma (EF1- $\gamma$ ) and glyceraldehyde-3-phosphate dehydrogenase (GAPDH), a glycolytic enzyme, were analyzed together through binding assays with in vitro translated proteins and transient transfection assays using 293 cells to determine whether or not they interact. EF1- $\gamma$ potentially acts on GAPDH as a glutathione transferase (GST) in the complex, inactivating GAPDH. This inactivation would block glycolysis, directing cell metabolism to the pentose phosphate pathway (PPP), which manages the high energy requirements and high oxidative stress of proliferating cells. The hypothesized interaction would promote cell survival and proliferation and could be targeted in cancer treatments.
<b>Jennie Sirota</b> IR – IGERT North Dakota State Univ. Dr. Eric Seambloom - Ecology, Evolution & Behavior Aaron David	<b>Endophyte Diversity Of Invasive Purple Loosestrife (<i>Lythrum salicaria</i>) Across An Herbivory Gradient</b> Fungal endophytes are organisms that live asymptotically inside plant tissue. Research has recently been directed at studying the role of endophytes in deterring herbivory. We investigated the relationship of different degrees of bio-control effectiveness in invasive purple loosestrife ( <i>Lythrum salicaria</i> ) with endophyte colonization. We cultured endophytes from the leaves of purple loosestrife from six wetlands in southern Minnesota, and calculated their percent damage data to compare endophytes along a damage gradient. A total of 219 isolated endophytic fungi were categorized into 32 morphotypes. Results indicated that highly herbivorized sites contained more isolates and higher morphotype richness than the lower herbivorized sites. None of the isolates showed a negative relationship

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<p><b>Shannon Smith</b>  Heart, Lung &amp; Blood  Univ. of NC - Greensboro  Dr. James McCarthy - Laboratory Medicine &amp; Pathology  Jennifer Carlson</p>	<p><b>The Effect of PTEN (phosphatase and tensin homologue) Deletion on the Growth Properties of PC3M-LN4 Prostate Cancer Cells</b> Prostate cancer is a disease in which progression depends upon a series of genetic disruptions. It is not caused merely by the presence or absence of a gene but rather the level of activity the remaining gene copy has. PTEN is a tumor suppressor gene that is commonly mutated in majority of human cancers. PTEN targets proteins in signaling pathways that regulate cell growth and apoptosis in healthy tissue. This study seeks to evaluate the role of PTEN in prostate cancer progression. Our hypothesis was that if we introduce PTEN back into PTEN deleted PC3M-LN4 prostate cancer cells we will see a decrease in tumor cell growth. To address this hypothesis electroporation, liposome-based transfection and Western Blot analysis were used. The results indicated that PTEN caused immediate cell death when introduced directly into the constructs. Therefore, analyzing signal pathway activation followed.</p>
<p><b>Michael Snavely</b>  IR – AHSSRP  Macalester College  Dr. Paul Bohjanen – Microbiology, Medicine  Daniel Beisang</p>	<p><b>Inhibition of CUGBP1-Mediated Decay in Kaposi's Sarcoma Herpes Virus</b> CUG-repeat binding protein 1 (CUGBP1) mediates the rapid decay of growth-regulatory transcripts by binding to GU-rich elements (GREs) in the 3' untranslated region of messenger RNAs (mRNAs). Kaposi's sarcoma-associated herpesvirus (KSHV) is an oncogenic AIDS-defining infection that is known to alter host mRNA metabolism. Preliminary data show that transduction with a virally encoded G-protein coupled receptor (vGPCR) of KSHV inhibits CUGBP1-mediated decay in HeLa cells. An electrophoretic mobility shift assay shows that CUGBP1 still binds to GREs upon vGPCR transduction, suggesting that the mechanism of stabilization involves the interruption of CUGBP1 cofactor recruitment. An RNA affinity purification assay using biotinylated GRE probes gives preliminary evidence that CUGBP1 recruitment of the decay factor Poly(A)-specific ribonuclease (PARN) is interrupted upon vGPCR transduction. Overall, our data suggest that KSHV stabilizes short-lived transcripts through interruption of CUGBP1 cofactor recruitment. Further understanding of the stabilization of such growth-regulatory transcripts may explain the oncogenic nature of KSHV.</p>
<p><b>Kaylee Steen</b>  Molecular Genetics &amp; Proteomics  Clarke University  Dr. Claudia Schmidt-Dannert - Biotechnology Institute  Dr. David Babson and Dr. Soo Jin Yeom</p>	<p><b>Production of Biodiesel from Biomass via Microbial Consortia</b> Fossil fuels have been the primary source of energy since the beginning of the industrial revolution, but their role in global warming and ocean acidification has caused an increased need for alternative energy sources. Carbon neutral biodiesel production is one such emerging technology, and by using microbial consortia, the metabolic pathway can be divided-up among multiple microbial populations to create more efficient production processes. <i>Saccharomyces cerevisiae</i>'s metabolism can be engineered to produce acyl-CoAs that react with ethanol produced by <i>Escherichia coli</i> to generate fatty acid ethyl ester (FAEE; biodiesel) in a single reactor. The mixed populations will be controlled by engineered synthetic interspecies communication circuits. When optimized, the <i>S. cerevisiae</i> and <i>E. coli</i> consortia will minimize toxic byproduct accumulation and maximize the usable energy yield. Finally, since the starting materials will come from biological and agricultural wastes, the process will preserve food availability as well as the carbon cycle.</p>
<p><b>Kathryn Sutcliffe</b>  Microbiology  Knox College  Dr. Sing Sing Way – Pediatrics, Microbiology</p>	<p><b>Construction of a Plasmid Expressing Mycobacterium tuberculosis Antigens for Evaluating Priming of Antigen-specific CD4<sup>+</sup> T-cells</b> The intraellular pathogen Mycobacterium tuberculosis (MTb), an infection mediated through T-cell immunity, is responsible for 2 million deaths annually. However, the current bacilli Calmette-guerin (BCG) vaccine, despite widespread use, is relatively ineffective and the best method for developing T-cell immunity is poorly defined. Live attenuated Listeria monocytogenes (Lm) are a potential new class of vaccine vectors shown to induce antigen-specific CD8<sup>+</sup> T-cell response, but their ability to induce a CD4<sup>+</sup> T-cell response, most critical for regulating MTb infection, has not been quantified. In this study, a plasmid was constructed expressing three esat-6 MTb antigens and controlled by a promoter for Lm hemolysin and secretory sequence. In future studies, this plasmid can be recombined into live attenuated Lm and evaluated for its ability to expand the protective effects of antigen-specific CD4<sup>+</sup> T-cells and to determine whether</p>

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secretion of multiple antigens confers additional protective benefits.

<p><b>Laura Swanson</b></p> <p>Molecular Genetics &amp; Proteomics</p> <p>Luther College</p> <p>Dr. Min Ni - Plant Biology</p> <p>Xin Li</p>	<p><b>Identification and Analysis of HRB Mutants in <i>Arabidopsis thaliana</i></b></p> <p>The major photoreceptors that control seedling de-etiolation or photomorphogenesis in higher plants are the red/far-red light absorbing phytochromes and the blue/UV A light absorbing cryptochromes. The major photoreceptors that regulate the stomatal aperture are the blue/UV A light absorbing cryptochromes and phototropins. However, relatively less is known about the components that are involved in the signal transduction chain downstream of the photoreceptors. We are working with three hypersensitive to red and blue (<i>hrb</i>) <i>Arabidopsis</i> mutants which show a shorter hypocotyl phenotype under red and blue light, and a smaller stomatal aperture under blue light supplemented with red light. We cloned the HRB1 gene which codes for a protein with a ZZ-type zinc finger domain, and are creating transgenic <i>Arabidopsis</i> overexpression lines that harbor a HRB1-His-Myc construct. I am identifying single insertion and homozygous lines, phenotyping these lines, and examining the expression of the transgenic proteins in these transgenic lines. We are also sequencing the <i>hrb2</i> genome to locate the mutation on chromosome 2 by high-throughput sequencing technique. I will analyze the results using bioinformatic tools to identify the gene.</p>
<p><b>Alexandra Thomas</b></p> <p>Microbiology</p> <p>St. Olaf College</p> <p>Dr. Wade Bresnahan – Microbiology</p> <p>Stacia Phillips and Dan Cygnar</p>	<p><b>Functional Mapping of the Human Cytomegalovirus UL99 and UL94 Tegument Protein Interaction</b></p> <p>Human cytomegalovirus (HCMV) is a herpesvirus that can cause serious disease in individuals with an immature or compromised immune system. The HCMV virion contains a tegument layer derived from virally encoded proteins. We have previously shown that two of these tegument proteins, termed UL94 and UL99, interact during an HCMV infection and are required for virus replication. Therefore, we determined if the UL94/UL99 interaction is required for virus replication. Mutations within both UL94 and UL99 that retain or abolish their interaction in vitro were incorporated into the viral genome using Bacterial Artificial Chromosome technology and assayed for virus replication. We found that viruses containing mutations that blocked the UL94/UL99 interaction were unable to replicate. Conversely, viruses containing mutations that did not hinder the UL94/UL99 interaction replicated to wild type levels. These findings suggest that the interaction of the UL94 and UL99 tegument proteins plays a critical role in HCMV replication.</p>
<p><b>Caroline Vallelian</b></p> <p>Global Change Ecology</p> <p>Univ. of Arkansas</p> <p>Dr. James Cotner - Ecology, Evolution &amp; Behavior</p>	<p><b>Let There Be Light: Productivity of Wild Rice in Itasca State Park</b></p> <p>Northern wild rice, <i>Zizania palustris</i>, is an annual grass that grows primarily in shallow lake areas, rivers and streams. Wild rice grows in both Elk Lake and Lake Itasca. In Elk Lake it is restricted to the border of the lake and there are few dense areas. Lake Itasca is dominated by wild rice with dense areas throughout the lake. The maximum depth that algae and macrophytes can grow is determined by the depth of light penetration. We compared wild rice production in these two lakes using a logging water quality sonde that measured dissolved oxygen (DO) concentrations, water temperature and pH and an underwater photometer was used to measure light levels. The collected wild rice was weighed for biomass and wet and dry weight. The results indicated that Lake Itasca had more biomass, deeper light penetration, and more DO than Elk Lake.</p>
<p><b>Laura Vicente-Rodríguez</b></p> <p>Heart, Lung &amp; Blood – MGP</p> <p>Univ. of PR - Cayey</p> <p>Dr. Patrick Arndt – Medicine; Division of Pulmonary, Allergy, Critical Care &amp; Sleep Medicine</p>	<p><b>Anti-inflammatory Effects of the Chinese Herb Triptolide</b></p> <p>Triptolide is a natural, biologically active compound extracted from the Chinese herb <i>Tripterygium Wilfordii</i> hook that possesses potent immunosuppressive properties. A potential role for Triptolide in regulating acute inflammation, however, has remained unexplored. The acute inflammatory response is triggered when the innate immune system is activated by infectious agents initiating the release of inflammatory cytokines. Neutrophils are one essential component of the innate immune system. An over exuberant response of neutrophils is detrimental, resulting in excessive tissue injury. This injury can be limited by identifying pharmacological agents that regulate the neutrophil response. We examined the</p>

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Stephanie Nordstrom, Brian Strahan	anti-inflammatory effects of Triptolide pre-treating human neutrophils with Triptolide 1-50nM and then stimulate with LPS, LTA or TNF- $\alpha$ . We use ELISAs to quantitate the effects on cytokine expression and Western Blot to observe the changes in cell signaling pathways. Our results suggest that Triptolide decreases induced cytokine expression through an inhibition of p38 MAPK activation.
<b>Jonathan Wilson</b> Independent Research – BTI Univ. of MN - TC Dr. Burkhard Seelig - Biochemistry, Molecular Biology & Biophysics Dana Morrone	<b><i>In vivo</i> Activity of an Artificial RNA Ligase</b> <i>De novo</i> 'from scratch' enzymes can be developed to catalyze industrial or biological reactions not performed by known natural enzymes. We used mRNA display on a zinc-finger library of four trillion variants to select for an artificial enzyme catalyzing unnatural RNA ligation of the 5'-triphosphate and 3'-hydroxyl ends of two substrate RNA molecules in the presence of an aligning, complementary RNA splint. However, <i>in vivo</i> activity of this artificial ligase has not been demonstrated. Two duet plasmids were used to test the <i>in vivo</i> activity of the ligase in <i>E. coli</i> : one encoding the expressed <i>de novo</i> RNA ligase and untranslated splint mRNA, and a second encoding two non-overlapping fragments of $\beta$ -lactamase mRNA. Ligation of these two mRNA fragments by the expressed ligase will result in full-length $\beta$ -lactamase mRNA as a reporter gene, conferring ampicillin resistance upon translation. This <i>in vivo</i> ligation may have synthetic biology applications for RNA manipulation.
<b>Nolan Winslow</b> Heart, Lung, & Blood Luther College Dr. Jakub Tolar – Pediatrics, Blood and Marrow Transplantation	<b>An Analysis of Stem Cell Signaling Phenotype in RDEB Squamous Cell Carcinoma</b> The skin disorder recessive dystrophic epidermolysis bullosa (RDEB) is characterized by mutations in the collagen VII gene, (COL7A1) skin blistering, and impaired wound-healing ability. Stem cell transplantation can provide relief for RDEB individuals, who often have a higher risk for developing squamous cell carcinoma. Currently, the reason for this transition is unclear. Stem cell signaling factors balance maintenance of pluripotency and commitment to a cellular lineage. Previous research in our lab has shown a greater state of methylation of the stem cell maintenance gene NANOG in wild type versus RDEB individuals. NANOG has been proposed to play a role in tumor development. An examination of the gene expression profile of three RDEB/WT sibling pairs shows decreased expression of BMPRI1B (bone-morphogenetic-protein-receptor-IB) and TCF7 (transcription-factor-7), components of pluripotency pathways in a cell. Differential expression of these genes may begin to characterize an RDEB phenotype that predisposes cells for transition to malignancy.
<b>June Yan Huang</b> Heart, Lung & Blood Univ. of PR - Rio Piedres Dr. Walter Low – Neurosurgery Laura Stone	<b>Comparison Of The Neuroprotective Effects Of UDCA Formulations In A Cell Culture Model Of Stroke</b> Ischemic stroke is a leading cause of morbidity and mortality in the United States. Each year, approximately 795,000 people experience a new or recurrent stroke. In this study, we used an in vitro model of ischemic stroke to examine the neuroprotective efficacy of three different formulations of ursodeoxycholic acid (UDCA), an endogenous bile acid. UDCA and its conjugated species have antiapoptotic, antioxidant and anti-inflammatory effects in nerve cells indicating their therapeutic potential for central nervous system disorders. Glutamate excitotoxicity was used to simulate one of the methods of cell death that occurs during a stroke. After treating the excitotoxic cells with these neuroprotective compounds, cell viability was measured by MTT assay. We found that a water soluble maltodextrin UDCA conjugate (mdUDCA) had the greatest neuroprotective effect on our cell model of ischemic stroke. Thus, mdUDCA is a lead candidate for the potential treatment of brain injury cause by a stroke.
<b>Josiah Zacharias</b> Microbiology Trinity International Dr. Stephen Jameson - Laboratory Medicine & Pathology	<b>Memory CD8<sup>+</sup> T Cell Subsets Characterized by CD27 and CD43 Cell Surface Markers</b> CD8 <sup>+</sup> T cells are an important component of immune responses because they respond to specific foreign antigens present on MHC Class I molecules on the surface of antigen-presenting cells through the use of T cell receptors. In our experiment, mice were infected with LCMV and <i>Listeria m.</i> to which naïve T-cells responded and activated an immune response. We identified memory T cells specific to the infection and defined three subsets: 1) CD27 <sup>+</sup> & CD43 <sup>-</sup> , 2) CD27 <sup>+</sup> & CD43 <sup>+</sup> , and 3) CD27 <sup>-</sup> & CD43 <sup>-</sup> . We discovered that the subset lacking both

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the CD43 and CD27 markers was shown to be the most effective at eliminating infection, despite its small population size, relative to the other two subsets. We then used qPCR and flow cytometry to determine relative expression of the effector molecules granzyme B and perforin, and the transcription factors T-bet and EOMES among the three subsets.

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