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Articles can be submitted electronically to invivo@mec.cuny.edu or mailed as a printed copy (preferably with a diskette that contains the file) to the Editorial Board at Medgar Evers College. All submissions should be formatted double spaced with 1 inch margins. The title of the article, the full names of each author, their academic affiliations and addresses, and the name of the person to whom correspondence should be sent must be given. As a rule, full length articles should include a brief abstract and be divided into the following sections: introduction, materials and methods, results, discussion, acknowledgments and references. Reviews and short communications can be arranged differently. References should be identified in the text by using numerical superscripts in consecutive order. In the reference section, references should be arranged in the order that they appeared in the text using the following format: last name, initials., year of publication. title of article, journal volume number: page numbers. (eg. - ¹Hassan, M. and V. Herbert, 2000. Colon Cancer. *In Vivo* **32**: 3 - 8). For books the order should be last name, initial, year of publication, title of book in italics, publisher and city, and page number referred to. (eg. - Prosser, C.L., 1973. *Comparative Animal Physiology*, Saunders Co., Philadelphia, p 59.). Abbreviations and technical jargon should be avoided. Tables and figures should be submitted on separate pages with the desired locations in the text indicated in the margins.

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The MACUB web site is now up and running. We now call for members to use the web site for registration information. Register for the Annual Fall Conference on-line. Submit your poster presentation abstract on-line. Submit your member paper presentation on-line. If you are a MACUB member in good standing and have a web site that you would like linked to our web site, submit the URL address to: gsarinsky@kbcc.cuny.edu.

The Fall 2008 Poster Presentation Awards

Community College Division

First Place

The Effects of Chelating Agents on Manganese Accumulations in Gill of the Eastern Oyster, *Crassostrea virginica*
*Soren Murray¹, Yamel Perdomo², Margaret A. Carroll² and Edward J. Catapane²
¹Kingsborough Community College and ²Medgar Evers College

Second Place

The Alu Genotype and Ethnicity
*Yun Zhao and Regina Sullivan
Queensborough Community College

Third Place

Controlling the Expression of Mammalian PKC α with *GAL1* Promoter
*Taramattie Singh¹, Mohammed Awan¹, Corinne A. Michels² and Nidhi Gadura¹
¹Queensborough Community College, CUNY and ²Queens College, CUNY

Senior College Division

First Place

Development of Spray-dried Aerosols for the Treatment of Respiratory Biofilms
*Nearco Rodriguez¹, Jennifer Fiegel² and Emily Thomas²
¹Medgar Evers College and ²University of Iowa

Second Place

Identifying Target Genes for Hypoxia-Inducible Factor-1 in the Testis
*Anoop Shah and Rebecca Tyson, Faculty Mentor: Dr. Michael A. Palladino
Monmouth University

Third Place

Identifying Protein Partners of A Novel Brain Protein
*Yan Mei Chan¹, Peter James Baker¹, Robert Agate², Fernando Nottebohm² and Jin Kim Montclare^{1,3}
¹Polytechnic Institute of NYU, ²The Rockefeller University and ³Downstate Medical Center

Graduate School Division

First Place

Protein Engineered Biomaterials Based on COMPcc and Elastin
*Carlo Yuvienco¹, Jennifer S. Haghpanah¹, Hanna Barra¹, Min Dai¹, Susheel Gunasekar¹, Peter James Baker¹,
Wendy Hom¹, Natalya Voloshchuk¹ and Jin K. Montclare^{1,2}
¹Polytechnic Institute of NYU and ²SUNY Downstate Medical Center

Second Place

ICER Binds to Multiple Loci Throughout the Genome
*J.P. Zichella, L.C. Muniz and C.A. Molina
Montclair State University

Third Place

In Vitro Culture of *Drosophila pseudoobscura* Spermatogenic Cysts
Monicah Njogu and Angela V. Klaus
Seton Hall University

The Fall 2008 Conference Poster Abstracts

Synthesis of Activity Based Nek2 Sensors Using Solid Phase Peptide Synthesis. Nisar Afzal¹ and Sanjai Kumar², ¹Queensborough Community College and ²Biochemistry Department, Queens College.

Nek2 is a serine threonine kinase involved in early mitosis, which regulates centrosome organization. Misregulation of Nek2 activity can lead to chromosomal segregation error, resulting in aneuploidy – a known cause of cancer. While it has been shown that Nek2 is implicated in many different forms of cancer, many biological functions of Nek2 remain to be discovered. An Nek2 sensor is a compound used to detect the presence of active Nek2. Although the precise phosphorylation sites of Nek2 have not been mapped out for most substrates, it has been shown that active Nek2 prefers to phosphorylate a peptide containing a serine residue with basic residues at C terminus. This research is designed to develop an activity-based sensor of Nek2 which will allow us to trace the activity of this kinase throughout the cell cycle. We tested this hypothesis by evaluating if a synthetic peptide, NBD-Ser-Phe-Arg-Arg-Arg-Lys, which incorporates all of the important features of recognition, would serve as a reporter of Nek2 activity. Information gained from this research will give us a greater understanding of the biological function of Nek2, in both normal and cancerous cells.

Use of L-1 and Alu Markers as Indicators of Baboon Taxa Differentiation. Lauren Alvarez and Stephane Boissinot, Queens College.

Baboons (genus *Papio*) consist of five closely related taxa. Each of these baboon taxa has distinctive phenotypic features as well as unique behavior, social systems and ecology. The evolutionary mechanisms responsible for their differentiation are unclear. Examining genetic variation among baboon species can provide insight into the role of natural selection and demographic events in the speciation process. LINE-1 (L1) and Alu polymorphic markers will be used to address this issue. These mobile, repetitive elements are never completely excised and are unlikely to occur in the same location in the genome, so we can infer that two individuals sharing the same insertion share a common ancestor. We developed two strategies to isolate polymorphic L1 elements in baboons. The first was based on the use of publicly available genomic database. The second was developed using RAPD (Random Amplification of Polymorphic DNA) primers. Primers specific for recent L1 inserts were designed and tested by Polymerase Chain Reaction (PCR) on a panel of baboon DNA. Preliminary PCR results have concluded that most of the L1 elements selected for were not found in the macaque genome and are polymorphic in the genus *Papio*.

The Effect of Endomorphin 1 and Endomorphin 2 on Thermal Avoidance Behavior in *Caenorhabditis elegans*. Sybil Andreux, Suhail Idrees, and Fernando E. Nieto-Fernandez, SUNY College at Old Westbury.

Thermal avoidance (Tav) behavior in *Caenorhabditis elegans* has been used as an invertebrate nociception model. The purpose of this study was to determine whether the μ agonists EM1 and EM2 effect an antinociceptive response in *C. elegans*. The worms were grown on Nematode Growth Medium with *E. coli* OP50 lawns as their source of food. Upon exposure to a noxious stimulus, the nematode *C. elegans*

reacts by exhibiting a rapid reflexive withdrawal away from the point of stimulation. The worms were exposed to EM1 and EM2 (10^{-4} to 10^{-6} Molar) for twenty minutes prior to the behavioral test. Exposure to the antagonists, Naloxone and CTOP, was done twenty minutes prior to agonist exposure. 76.46% of the control unexposed worms showed a class I response. Exposure of the worms to increasing concentrations of the agonists decreased the percentage of animals exhibiting a class I response (for EM1 33.61% at 10^{-4} M, 35.99% at 10^{-5} M and 44.44% at 10^{-6} M concentration, for EM2 35.31% at 10^{-4} M, 39.16% at 10^{-5} M and 42.24% at 10^{-6} M). Exposure to the antagonists 10^{-3} M naloxone, and 10^{-3} M CTOP reversed the antinociceptive effect caused by the agonists EM1 and EM2 (Naloxone-EM1: 71.74%, CTOP-EM1: 67.21%, Naloxone-EM2: 83.78%, CTOP-EM2: 75.61%). This work was supported in part by NIMH-COR Grant # MH017138-25 and a NCMHD-MHIRT grant # T37.

The Effect of Phosphate on the Growth of the Cyanobacterium *Synechococcus sp.* IU 625. Sahar M Arekat¹, Rita Sheth¹, Jennifer Samy Garas¹, Lee H. Lee¹ and Tin-Chun Chu², ¹Montclair State University and ²Seton Hall University.

Synechococcus sp. IU 625 is a unicellular, prokaryotic photoautotroph cyanobacterium. Overgrowth of *Syn. sp.* IU 625 often causes algal bloom which makes it a good environmental indicator. Phosphate is one of the required nutrients for the cyanobacterial growth. Many studies have been done but the results were inconclusive regarding whether phosphate is an essential nutrient for the growth of *Synechococcus sp.* IU 625. Different concentrations of phosphate (0X, 0.5X, 1X, 5X, 7.5X and 10X) have been used to study its effect on the growth of cells. Two repeatings of each concentration have been carried out. Growth was monitored by direct count with a hemocytometer and by turbidity studies with a spectrophotometer. The results suggest this microorganism is sensitive to different concentrations of phosphate. At concentration of 0X of phosphate, the growth of the cells is severely inhibited. At concentration of 0.5X, the growth was less than the control (1X). With the concentration of 5X, the growth was similar to that of the control. When the concentrations of phosphate reach to 7.5X and 10X, the growth are severely inhibited. The results suggested that phosphate is important but may not be the limiting factor for the growth of the cells.

Genomic Research Experience in Classroom Setting. Jillian Aruch and Chunguang Du, Montclair State University.

Having first hand experience as a student doing Genomic research puts into perspective the amount of work that goes into the sequencing and annotation of Genomes. The Genomic Education Partnership, sponsored by Howard Hughes Medical Institute, allows undergraduate institutions, such as Montclair State University, to experience this type of work. Students in the Genomics courses get experience in basic research, DNA sequencing, alignment and comparison analysis of the *Drosophila melanogaster* Genome. Students also experience annotation of the *Zea mays* Genome. The Genome Sequencing Center of Washington University in St. Louis generates the raw sequences. The goal of the sequencing

project is to decipher sequence domains, repeating sequences, as well as other characteristics that may aid in analyzing the given chromosome. The goal of the annotation project is to analyze several sequences using BLAST and other various programs to determine gene types, functions and other characteristics.

Self-Assembled Alpha-Helical Scaffolds for Cartilage Tissue Engineering. Mukta Asnani¹, Chandni B. Limbad¹, Susheel K. Gunasekar¹ and Jin K. Montclare^{1,2}, ¹Polytechnic Institute of New York University and SUNY Downstate Medical Center.

The repair of damaged cartilage is a challenge due to limited blood supply to the tissue. As a result, the design of artificial scaffolds capable of supporting chondrocyte growth, proliferation and differentiation is important. Cartilage oligomeric matrix protein (COMP) is the natural non-collagenous glycoprotein expressed in the articular cartilage, tendon and ligament. COMP is comprised of five arms and the central assembly domain where the arms meet in a cylindrical structure. This is assembled with an N-terminal pentameric coiled-coil domain (COMPcc) that can bind vitamin D₃, all-*trans* retinol in its hydrophobic pore (diameter 2-6Å). We are working towards generating fusions of COMPcc and leucine zipper peptides (ZE and ZR) to create bioinspired protein scaffolds for cartilage tissue engineering. We describe our progress towards the synthesis and characterization of our designed alpha-helical templates.

Seek and Destroy: Display of Phosphotriesterase on Cell Surface to Seek Out and Destroy Organophosphates. Javi Balroop, Fong Bell, Peter J. Baker and Jin K. Montclare, Polytechnic Institute of NYU.

Phosphotriesterase (PTE) is an intracellular class of metalloenzyme which efficiently hydrolyzes a variety of organophosphates (OPs) including nerve agents and agricultural insecticides. OPs are a class of synthetic compounds that inhibit acetylcholinesterase, causing toxic levels of acetylcholine to form in the post-synaptic vessel. We are developing a PTE fusion protein to the outer membrane protein A that will facilitate the expression of PTE on the surface of *E. coli*. The ultimate goal of this project is to develop an engineered bacteria capable of seeking out and destroying organophosphates.

Enrichments of Acidotolerant Sulfate Reducing Bacteria From an Acid Mine Drainage Site. Lotfi Bassa¹, Albert Wong², Caryl Ann Becerra² and Klaus Nüsslein², ¹Montclair State University, Montclair and ²University of Massachusetts Amherst.

Davis mine is an abandoned pyrite mine that is affected by acid mine drainage (AMD), which is an increase in water acidity and heavy metal deposition due to the oxidation of Iron sulfide. The high acidity can be detrimental to life and affects the aquatic ecosystems down stream. Over the past 25 years of field excursions, it has been observed that the attenuation of AMD has been occurring in this site. Field and molecular evidence suggest that sulfate-reducing bacteria (SRB) are present and active. In this study we investigated the role of SRB in the attenuation of AMD at Davis mine. Enrichments

were constructed to isolate and characterize the SRB. Fluorescence in-situ hybridization was used to confirm their presence and several biochemical methods were used to determine their activity level. The isolation and characterization of SRB indigenous to Davis mine, an acid mine drainage site, holds applications to the remediation of AMD at Davis mine and other acidic and metal-contaminated sites.

Induction of Temperate Cyanophage AS-1 by Heavy Metal Mercury. Jean-Edson Belcourt¹, Arfa Nayyer¹, Lee H. Lee¹ and Tin-Chun Chu², ¹Montclair State University and ²Seton Hall University.

Recently, studies on freshwater cyanophage AS-1 and cyanobacteria *Synechococcus sp.* IU 625 (*Anacystis nidulans*) provide evidence that AS-1 may have a lysogenic life cycle in addition to the previously characterized lytic cycle. In this study, heavy metal Mercury has been used as an agent to study induction of the temperate cyanophage AS-1. The culture of *Synechococcus sp.* IU 625 was exposed to 0.1 mg/L, 0.5 mg/L, 1.0 mg/L, and 2.5 mg/L of mercuric chloride, respectively. The PFU (plaque forming unit) assay of different mercury concentrations was carried out at 0 hour, 6 hours and 24 hours after the addition of heavy metal. The induction efficiency was determined by comparison PFU of the treated to the control. The PFU of the 0 mg/L served as control. Induction of AS-1 was observed in all the concentrations of mercuric chloride. The efficiency of induction was higher with lower mercury content, i.e. 0.1 mg/L > 0.5 mg/L > 1 mg/L > 2.5 mg/L. The induction of 6 hours and 24 hours in the respective concentrations were similar. These results indicate that prophage induction may be triggered by mercury at certain exposures.

Developmental Effects of Dibutyl Phthalate on Zebra fish, *Danio rerio*. Matthew J. Berkhout, St. Joseph's College, Faculty Mentor: Moira E. Royston.

Dibutyl phthalate (Di-n-butyl phthalate) is a compound used globally and produced in excess of one million pounds annually in the United States alone. Dibutyl phthalate is incredibly useful in a wide range of products, including, but not limited to, food storage containers and wraps, building materials such as vinyl tiles, cosmetics, nail polishes, colognes, floor polishes, interior and exterior paints, resins, sealants, and pesticides. Thus, there are innumerable sources of exposure for both humans and the environment. Human exposure occurs through oral consumption, inhalation, and dermal absorption. Dibutyl phthalate appears on seven federal regulatory lists, and is suspected to be a toxicant to nearly every system of the body, largely as an endocrine disruptor. Due to the extreme importance of the endocrine system during early development, it is suspected that dibutyl phthalate will have the most detrimental effects on organisms exposed at this stage of life. This research project is aimed at determining the developmental effects of dibutyl phthalate on zebra fish. The zebra fish is an organism widely used in studies in developmental biology due to its high rate of reproduction and transparency during development, allowing extensive observation of developing structures.

FWLY Region of Latent Membrane Protein-1 in Epstein-Barr virus (EBV) Infected B Cells May Not Be Necessary For Cell Signaling Via NFkB. Gerialisa Caesar¹, Jennifer Martin² and Ryan Takeshita², ¹Medgar Evers College and ²University of Colorado.

Epstein-Barr virus (EBV) is associated with mononucleosis and in immune suppressed individuals leads to cancers. Previous studies suggest FWLY regions in LMP-1's transmembrane domain is necessary for LMP-1's functions. LMP-1 AALA cloned constructed as well as wild type LMP-1 and LMP-1 LLLL were used to determine whether LMP-1 variants would go to lipid rafts. Cells expressing LMP-1 were lysed, treated with 0.1% Triton X-100 and lysates were centrifuged, fractions resolved on SDS-PAGE gels and analyzed for LMP-1. LMP-1 variants in lipid raft fractions were compared. To investigate if FWLY regions of LMP-1 were necessary for cell signaling via NFkB activation, human cells were transfected with LMP-1, LMP-1 LLLL, cloned LMP-1 AALA expression plasmids and luciferase reporter. Transfected cells were harvested and luciferase protein measured. Luciferase activity gave correlations of amounts of NFkB activity. A direct role for the FWLY region of LMP-1 was not found in association with NFkB activation. LMP-1 AALA showed NF-B activity, sometimes in higher levels as compared to wild type LMP-1FWLY. LMP-1 LLLL variant increased RLU values as compared to wild type LMP-1 with the FWLY region.

Evidence for Low Levels of Genetic Variation Among *Zostera marina* Populations From the Atlantic West Coast. James J. Campanella¹, Paul A.X. Bologna¹, Eric B. Rosenzweig¹, Stephanie M. Smith¹, and John V. Smalley², ¹Montclair State University and ²Bergen Community College.

Zostera marina (eelgrass) can be found in the North Atlantic on the coast of Europe and on the east and west coasts of North America. Over the last 30 years, the once robust species has been reduced to sparse patchy populations due to disease and anthropogenic effects. In order to better understand the consequences of this devastation on the population genetics of the species, we have analyzed the population structure of western Atlantic *Zostera*, employing microsatellite DNA polymorphisms. Although high Fixation Index values suggest moderate genetic differentiation among most of the *Zostera* populations, they were not genetically diverse internally. This lack of diversity was supported by a general dearth of observable heterozygotes in these populations; mean Hobs values (0.14-0.46) were lower than the mean Hexp values (0.57 -0.81). Additionally, the mean FIS values in these populations were positive, again indicating a surfeit of homozygotes. Allelic Richness suggests Chesapeake Bay has the greatest genetic diversity of the populations studied, while the other populations are generally similar. Genetic diversity appears lower in these American populations than in comparable populations, suggesting reproductive fitness problems in the future. There is evidence of demographic bottlenecks and particularly low genetic diversity in Long Island. Northern Maine had the highest effective population size, suggesting a possible use in future restoration projects.

Gender Differences Caused by Urinary Creatinine Adjustments Made to Heavy Metal Measurements. C. Cappelli¹, M. Gamble², X. Liu², P. Factor-Litvak², V. Slavkovic² and J. Graziano², ¹Wagner College and ²Columbia University Mailman School of Public Health.

In large studies, spot urine collection is used to measure environmental exposure to heavy metals. While twenty-four hour urine analysis is more accurate, it is not the preferable method because it is more time consuming, labor intensive and costly. Creatinine levels in urine are used to normalize heavy metal measurements because it is excreted in urine at a constant rate per day. This study analyzes differences in heavy metal concentrations between males and females after adjustment for creatinine. Significant differences in creatinine-adjusted heavy metal levels were found to exist between the sexes. Moreover, age may also have an effect on heavy metal levels when adjusted for creatinine regardless of gender because creatinine levels vary with age. As males develop more muscle mass during adolescence than females, gender has a large impact on the final adjusted heavy metal measurements. This finding is important for hospitals and other health care facilities where the heavy metal data for men and women are grouped together yielding a single range of normal values, which is used to assay an individual's health and exposure to heavy metals. According to our findings, different normal ranges of metals adjusted for creatinine should be used when examining adult men and women.

Variation Within a Species: Evidence of Evolution. Sherifah Carter and Kristin Polizzotto, Kingsborough Community College.

We were interested in studying the evolutionary changes within a species. We examined six populations of late Cretaceous ammonites from the Western Interior Seaway, including two populations of *Scaphites patulus* and four populations of *Scaphites whitfieldi*. We hypothesized that significant differences would occur between species and among populations within a species. We measured 7 characteristics and conducted ANOVAs in order to determine if there were any significant morphological differences between the two species and within each species. *S. patulus* and *S. whitfieldi* are different in all the variables except for whorl width. Within the *S. whitfieldi* there were also differences among populations. The *S. whitfieldi* collected from Utah appeared to be the most different amongst the four populations. The *S. whitfieldi* that were collected from a concretion in South Dakota also showed some significant differences compared to the other three populations. These results support the idea that evolution occurred within the species among geographically separated groups.

Identifying Protein Partners of A Novel Brain Protein. Yan Mei Chan¹, Peter James Baker¹, Robert Agate², Fernando Nottebohm² and Jin Kim Montclare^{1,3}, ¹Polytechnic Institute of NYU, ²The Rockefeller University and ³Downstate Medical Center.

Fibronectin Transmembrane (FnTm) is a novel transmembrane protein found to be up-regulated in the learning system in birds and other mammals. Identifying FnTm protein partners will allow us to clarify the FnTm signaling pathway in the brain. However, identifying protein pairs is

often limited because the weak forces by which proteins interact are not sufficient to preserve the protein-macromolecule complex. To circumvent this limitation we are working towards introducing a photocross-linkable non-natural analog of *para*-azidophenylalanine and photoleucine in a residue-specific manner into FnTm. Based on preliminary pull-down data, we identify myelin basic protein (MBP) as one of the strong interacting partners to FN3 and perform biophysical characterization of this interaction. Here we demonstrate the progress of our efforts to discover the protein-protein interactions involved in learning.

Comparative Toxicity of Branched and Straight Chain Alkyl Functionality in Ionic Liquids. Siobhan Charles¹, Jinhee Gwon², Xing Li², James Wishart³, Sharon I. Lall-Ramnarine² and Catherine McEntee¹, ¹Kingsborough Community College, ²Queensborough Community College and ³Brookhaven National Laboratory.

Due to some attractive properties, ionic liquids (ILs) are becoming attractive candidates as green solvents. ILs are salts whose melting points are relatively low (below 100°C), have high solubility and low vapor pressure (which makes it non-flammable) and are adaptable solvents which can be designed to fit a particular application and used in chemical synthesis. Although ILs will not produce volatile organic compounds (VOCs), it is becoming increasingly clear that ILs can have a negative impact on organisms of soil and water. In order to more fully understand the impact these compounds will have if released into the environment, we have begun to characterize the effects of N-methyl imidazolium bromides (or phosphates) and N-methyl pyrrolidinium bromides (or phosphates) on microorganisms. Experiments presented here are related to the activity of the ILs as a function of purity, branched versus straight alkyl chains and the anion of the IL. We report that for halide ILs the chain length affects toxicity as expected from reports in the literature. Purity (as determined by color) does not seem to have an effect on toxicity while the type of anion can alter IL toxicity.

Construction of a Yeast Plasmid Containing a Triple-HA Tagged Copy of the Mammalian Protein Kinase α ORF. Shih Wei Chiang¹, Corinne A. Michels² and Nidhi Gadura¹, ¹Queensborough Community College, CUNY, and ²Queens College, CUNY.

Hsp90 is a molecular chaperone essential to the folding, activation and maturation of small number of distinct client proteins. We hypothesize that PKC α is a possible client protein of Hsp90. Results from Rotenberg laboratory show that Hsp90 and PKC α co-immunoprecipitate from cell lysates. As part of this project, we subcloned mammalian PKC α -3HA gene into a yeast vector as follows. Plasmid pCMV4 PKC α containing the ORF of the mammalian PKC α was digested with *EcoRI* and *XhoI* restriction enzymes. The amplified fragment was gel purified and inserted into the yeast vector p413-GPD using standard procedures. The presence of the mammalian PKC α -3HA gene in the new vector was confirmed by a) *EcoRI* and *XhoI* digestion and gel analysis, b) PCR analysis using appropriate primers, and c) sequencing the insert. This plasmid will be introduced into various yeast strains carrying alterations in components of the Hsp90 chaperone and the protein expression and activity monitored.

Assessing the Toxic Effects of Ionic Liquids on Mosquito Larva. Ashrain Corbie, Gary Sarinsky and Catherine McEntee, Kingsborough Community College.

Ionic liquids (ILs) are liquid salts at room temperatures. They show high conductivity and are non-volatile. Additionally, they are good solvents for many organic and inorganic materials. Because ILs are non-volatile and are friendly alternatives to organic solvents they are considered as having a low impact on the environment and human health. Evidence suggests that ILs have varying levels of toxicity towards organisms. In order to assess the environmental impact of ILs, two questions were addressed. First, what effect does varying alkyl chain length have on mosquito larval development. Second, are there differences in toxicity between ILs with straight alkyl chains versus those with branched chains. A series of alkyl halide imidazolium and pyrrolidinium bromides were serially diluted 10-fold and first instar mosquito larvae added. The concentration ranged from 50mM to 0.5 μ M. Larval viability was determined. Results of these studies confirm reports by others that alkyl chain length has a significant impact on viability. These studies also show that mosquito larvae are more sensitive to ILs than bacteria; loss of larval viability is observed with ILs in which bacteria are resistant. Therefore we have identified a sensitive assay for the continued assessment of IL activity. This work was supported by grants 1R25GM62003 of the Bridges to the Baccalaureate Program of NIGMS and the 0516-08-1091 of the CSTEP Program of the New York State Education Dept. We thank Sharon Lall-Ramnarine (Queensborough Community College) and James Wishart (Brookhaven National Labs) for synthesizing and supplying the ionic liquids.

Does Estrogen Effect Contractility of Isolated Myocytes of ER α (-/-) Mice? Kiyva Davis¹, Scott M. Belcher² and Hong S. Wang², ¹Medgar Evers College and ²University of Cincinnati College of Medicine.

17 β -estradiol (E2) is a hormone influencing development, maturation and function of female reproductive systems and most other organs, and influences the cardiovascular system. Little is known about actions of E2 on myocardium. It is hypothesized effects of E2 on heart are mediated by ER β . Effects of E2 on contraction in isolated myocytes from female ER α (-/-) mice were examined, and compared to wild type. Mice were anesthetized, hearts were excised and aorta cannulated with cold Ca²⁺-free tyrode solution. Hearts were perfused in a Langendorff apparatus with Ca²⁺-free Tyrode solution at 37°C for 3min. Perfusion was switched to the same solution containing 1mg/mL type II collagenase (276U/mg, Worthington) and perfusion continued until hearts became flaccid. Atria and aorta were removed, ventricular tissue excised, minced, dissociated, and filtered. Cells were pelleted and washed in 25, 100, 200 mM and 1mM Ca²⁺- Tyrode solution, then resuspended in 1.8 mM Ca²⁺-Tyrodes. Myocytes were field stimulated at 0.5 Hz. Contractions were recorded. The results show Myocytes from WT females E2 increased contractility by 274%. The contractile effects of ER β (-/-) myocytes were reduced. E2 increased contractility by 135%. The study support the hypothesis ER β is the major mediator of E2-induced contractility in heart.

Preparation of Thin Sections of *Drosophila* Ovaries for Examination by Transmission Electron Microscopy. Georgia Dellas¹, Tanya Modica¹, Nidhi Khanna¹, Aimee Marin¹, Christopher Corbo^{1,2} and Heather Cook¹, ¹Wagner College and ²CSI/IBR Center for Developmental Neuroscience, City University of New York.

The goal of this study was to identify a fixation and embedding procedure for the analysis of *Drosophila* oocyte development by transmission electron microscopy. *Drosophila* oocytes develop within tubular ovarioles within the ovary. One to two germ line stem cells reside at the tip of each ovariole. Oogenesis is initiated when a stem cell divides to produce a daughter stem cell and a cystoblast cell. The cystoblast further divides to produce a cyst of cells one of which develops into an oocyte. The remaining cells support oocyte development. Genetic and immunocytological studies indicate that mutations in the small repeat-associated siRNA (rasiRNA) pathway genes may affect stem cell maintenance in the female germ line. Future studies will use electron microscopy to analyze stem cell maintenance and oocyte development in rasiRNA pathway mutants, *armitage (armi)*, *aubergine (aub)* and *spindle-E (spnE)*.

Epiphytic Relationships in Eelgrass and Implications for Restoration of a Healthy Coastal Environment in Jamaica Bay, NY. Rachelle Desroches and Mary T. Ortiz, Kingsborough Community College.

Eelgrass (*Zostera marina*) is a marine angiosperm that grew in Jamaica Bay, NY. In the 1930's it disappeared from US coastal areas, then reappeared in places such as Shinnecock Bay and South Hampton, NY, but not in Jamaica Bay. In this project we compared epiphytes on algae from Jamaica Bay and on eelgrass from Shinnecock Bay to determine similarities and/or differences. We collected algae and eelgrass from the two locations, scraped equal areas of the surfaces, added methylene blue, and scanned the resulting slides using a compound microscope. The hypothesis was the epiphytes on algae in Jamaica Bay will be similar to those on eelgrass from Shinnecock Bay. Results indicate similar epiphytes exist on algae from Jamaica Bay and on eelgrass from Shinnecock Bay. Epiphytes identified included members of the *Dimerogramma*, *Ulothrix*, *Rhoicosphenia*, *Rhizosoleniaceae*, *Coscinodiscus* and *Nitzschiaceae* species. With respect to epiphytic relationships, potential for eelgrass survival in Jamaica Bay is positive. Eelgrass remediation to Jamaica Bay may help restore a healthy environment to this area. This work was supported by Grants 1R25GM62003 of the Bridges to the Baccalaureate Program (NIGMS) and 0516051091 of the CSTEP Program (NYS Department of Education).

Effects of Anti-Androgens on Spinal Cord Motor Nuclei. Christina Dewan and Regina Sullivan, Queensborough Community College.

The effect of flutamide on two spinal motor neurons innervating the penis was measured and compared to the effect of flutamide on the retrodorsal lateral nucleus, which contain motor neurons that innervate the flexor digitorum brevis muscle. The computer software Image J will allow measurement of control and experimental motor neurons. The results indicate that blocking of androgen has a direct on the normal development of male spinal motor neurons.

Sex Ratios of Two Species of *Gambusia* (fishes). Dorfman, D., Monmouth University.

Unequal division of the sexes in adult *Gambusia* (mosquito fishes) from different waters (fresh and brackish) has been reported by researchers. For this study *G. holbrooki* and *G. affinis* were examined. These species can be differentiated externally, in the laboratory. Adult sex ratios of one male to 4.4 females (1:4.4) have been reported, with some indications of a 1:1 ratio of fishes smaller than 20 mm, and other reports of ratios of 1:3 to as much as 1:10 during different months. Despite the highly skewed adult ratios in *Gambusia*, several studies found initial sex ratios of 1:1. In the present study *G. Holbrooki* were collected from Ding Darling National Wildlife Refuge (by permit), Sanibel Island, Florida, November, 2007 (March, June, September, October). *G. affinis* was obtained once yearly from the New Jersey State Fish Hatchery, Hackettstown, from 2004 to 2007. Sex of fishes was determined externally. Ten percent of 1,625 *G. holbrooki* were males (1:10) and 26 percent of 3, 079 *G. affinis* were males (1:3). If there is late gonopodial maturation, it is not obvious in transitional stages (i.e. to 20 mm+).

Correlation of Macroinvertebrate and Fish Species Diversity with Sediment Grain Size and Total Organic Matter in an Anthropogenically Impacted Estuary. Jamie Eldridge, Patricia Dasilva, Alina Ventriglia, Meghan Shaw and Ursula Howson, Monmouth University.

Shark River estuary is located in Monmouth County, NJ. The ecosystem serves as a nursery ground for many estuarine-dependent fishes, and is used heavily by recreational boaters and fishermen. The estuary has become increasingly silted due to soil erosion from the watershed. Depth is shallow in many areas, preventing access to some locations at low tide. Although dredging is generally considered detrimental to an ecosystem, in this case anthropogenic siltation may cause the estuary to convert to terrestrial wetland, leading to a change in ecological function, and ultimately loss of function for indigenous fauna and humans. Before dredging is conducted, it is important to establish a baseline assessment of fish and macroinvertebrate community structure in the ecosystem. Surveys were conducted periodically July 2006 - June 2007. Sampling sites were selected based on proposed dredge sites. Macroinvertebrates were collected by Ponar grab at each site, sieved, sorted, and identified. Fishes were collected with otter trawl, identified, and measured. Sediment grain size was determined through sieve analysis and total organic matter was analyzed by loss on ignition using a muffle furnace. Species diversity of macroinvertebrates and fishes was then correlated with sediment grain size and total organic matter.

Phylogenetic Analysis Of Internal Transcribed Spacer 2 Sequences Among The Rare Frog *Rana Cascadae*; Implications For Cryptic Speciation And Conservation. Vanessa Espinosa and Kirsten Monsen, Montclair State University.

Rana cascadae is a member of a species complex of frogs endemic to the Pacific Northwest of the United States. Over the last 25 years *R. cascadae* has experienced population declines throughout its range. We have recently shown this species is composed of three unique genetic groups whose mitochondrial DNA is as divergent as well-

described species suggesting they may represent unique cryptic species. In order to assess nuclear DNA divergence among these *R. cascadae* groups relative to other well-described species we designed PCR primers to amplify the Internal Transcribed Spacer 2 from individuals in each *R. cascadae* genetic group as well as five closely related ranid frog species from the same species complex (*Rana aurora aurora*, *R. aurora draytoni*, *R. pretiosa*, *R. luteiventris*, *R. muscosa*) and one out group species (*R. catesbeiana*). We sequenced the PCR product of the ITS 2 region and assessed genetic divergence to determine if the *R. cascadae* groups are as divergent as well-described species for these nuclear markers. We discuss *R. cascadae*'s status as a group of genetically distinct cryptic species and discuss the implications for conservation of this unique group of frogs.

Molecular Characterization of Antibiotic-Producing Bacteria from Brooklyn Soils. Rudgie Fadael and Carolle Bolnet, Medgar Evers College.

In our previous studies, physiological and morphological methods were used in an attempt to screen out new potent antibiotic producers from different locations in Brooklyn, NY: Manhattan Beach (MB), Coney Island Beach (CIB), Prospect Park (PP) and Downstate (DS). Cultures from CIB soil not only displayed the most bacterial diversity but also revealed colonies showing signs of antibiosis. Among these cultures, we were able to identify bacteria of the genus *Streptomyces* whereas the others could not be identified accurately by those two methods. In this study, we used molecular tools to characterize unidentified bacteria from CIB. DNA was extracted from pure cultures and amplified using a nested PCR designed for the 16S rRNA gene that significantly reduces the amount of non specific amplification. The cleaned PCR products were sequenced by using Big-Dye chemistry and the ABI3730 automated sequencer. Using BLAST, the obtained sequences were compared to bacterial 16S rDNA sequences in GenBank. Analyses of the results revealed a 99% nucleotide similarity to the 16S rDNA sequence of *Streptomyces hygroscopicus* very well known as a producer of antimicrobial agents such as rapamycin, ascomycin as well as the immunosuppressant FK506. Rudgie Fadael is a Science-CSTEP participant.

The Effect of Hedgehog Signaling in the Zebrafish Tectum and Midbrain and Hindbrain Boundary. Oluwafemi Fakayode¹, Rolf Karlstrom² and Tuba Ozacar², ¹Medgar Evers College and ²University of Massachusetts, Amherst.

Proliferating cells are fast cycling, cell-cycle progenitors getting ready to differentiate, producing genes such as Cyclin-B, D, E, and H, which are markers of proliferating stages. Her5 and Sox2 are markers for stem cells. Ascl1 is a marker for progenitor cells. What initiate differentiation, cell proliferation and increases in cell cycle is unknown. Cells express genes because they received signals to. Hedgehog regulates cell proliferation and differentiation in stem cells. Misregulation of hedgehog cause cancerous conditions. Blocking hedgehog might have negative effects changing from abnormal cell growth to cell death. We examined how loss of hedgehog signaling affects cell proliferation and maintenance of neural stem cells by adding 60 μ m of cyclopamine to zebra fish embryo at an early developmental stage and 100 μ m of

cyclopamine at a later stage. Cyclopamine is a small molecule inhibitor, binding to smoothed inhibiting hedgehog signaling. Loss of hedgehog signaling causes 50% increase in cyclin D1 expression in dorsal tectum and midbrain hindbrain boundary. Blocking of hedgehog causes 25% increase in expression of ASCL-1. The increase in cyclin D1 and ASCL expression supports the hypothesis blocking hedgehog signaling is involved in increased proliferating cells and decreased neural stem cells and pro-neural cells.

Effect of Store-purchased and Pure Cranberry and Grape Juice Drinks on the Reduction of Reoviridae Infectivity Titers in Cell Culture and Cell-free Suspension. Christopher Ferrari¹, Luis Monge¹, Anthony Zeccheo¹, Peter Tran¹, Ronald Gordon², Gunther Stotzky³ and Steven M. Lipson¹, ¹St. Francis College, ²Mt. Sinai Medical Center and ³NYU.

The health benefits of potable fruit juices prepared from grape (*Vitis labrusca*) and cranberry (*Vaccinium macrocarpon*) species have been the focus of numerous anecdotal and prospective studies. Few if any investigators have addressed the effects of these fruit juices as potential antiviral agents through viral inactivation and cell culture infectivity titration studies. The simian rotavirus SA-11 and the bovine reovirus type 3, etiologic agents associated with gastrointestinal disease in primates and bovine species, were used as model enteric viral agents. Pretreatment of Rhesus monkey kidney (MA-104) cell culture monolayers with either store-purchased or pure cranberry and grape juice drinks at concentrations \geq 16% reduced virus infectivity titers by greater than one order of magnitude. Vitamin C at concentrations present in a store-purchased grape juice drink had no adverse effect on viral titers. A synergistic effect between cranberry juice and grape juice was not observed. Pretreatment of MA-104 monolayers with grape or cranberry proanthocyanidins (PAC) or a PAC-enriched cranberry concentrate (PACranTM) reduced reovirus infectivity titers by ca. 95% at concentrations <1%. Reovirus dsRNA was absent in monolayers pretreated with either juice or in virus-juice [cell-free] suspensions, indicating a juice-associated blockage of host-cell receptor sites and a direct inactivation of the virus, respectively. Viability/cytotoxicity testing was performed by trypan blue exclusion, cell passage, and quantitation of adenylate kinase release from pretreated cells. Electron microscopy failed to reveal rotavirus particles within CJ cocktail-pretreated cell cultures. Viral maturation failed to materialize in infected cell cultures post-treated with pure cranberry or grape juices. Pre- and posttreatment of host cells with cranberry and/or grape juices adversely effected enteric virus (viz., reovirus, rotavirus) adsorption, maturation, and/or viral infectivity in cell-free suspensions.

Contact Inhibition Alters the JNK-1 Stress Response. Marian Gaballah, Julia Arpino, Mary Grace Baker and Dorothy Hutter Lobo, Monmouth University.

Cells in different stages of proliferation demonstrate changing levels of mitogen-activated protein (MAP) kinase pathway proteins, which may affect the response of cells in culture to oxidative stress. Previous results indicate increased MAP kinase phosphatase (MKP) levels upon contact inhibition in healthy fibroblasts, corresponding with decreased levels of phosphorylated extracellular signal-regulated kinase (ERK)

and p38. Cancerous fibrosarcoma cells do not exhibit contact inhibition, and no change in active kinase or MKP levels was seen. Western blot analysis and chemiluminescence were used to obtain relative MKP-1, JNK, p-JNK, and cleaved PARP levels in subconfluent and confluent fibroblast and fibrosarcoma cell cultures. A relationship between proliferation and MAP kinase and phosphatase activity was seen. JNK-1, a MAP kinase, remained inactive in cells during all stages of proliferation. However, following induced oxidative stress by H₂O₂, cleaved PARP as well as higher phosphorylated JNK (p-JNK) levels were detected in subconfluent cells in relation to confluent cells, indicating the early stages of apoptosis. Based on these results, a correlation can be established between confluency of the cell culture and the response to oxidative stress, as determined by varying levels of protein expression and activity within the cells.

Microbial Contamination in Smoked and Salt Cured Sea Food. Alejandro Gonzalez¹, Wilchisia Boyd² and Lalitha Jayant², ¹Hunter College, CUNY and ²Borough of Manhattan Community College, CUNY.

Many of the coastal communities living outside the United States of America preserve their seafood using a very basic salting and drying or smoking method. Most of these edibles are imported into the country with little regulation from the FDA and are easily accessible to the local public. It is a common concern that due to lack of regulation in food preparation in these countries, there might be pathogenic bacterial contamination in these foods. Dried and smoked seafood from different sources were selected for this study to randomize the sample. Samples of dried fish, smoked fish and dried shrimp from four different sources were analyzed for microbial contamination by plating method. Preliminary results from the initial plating showed significant bacterial contamination. Colony counting by dilution plating method showed an excess of 3000 colonies per gram of dried seafood. Gram staining indicated the presence of *Staphylococcus* sp, *Bacillus* sp and other gram-negative bacteria. The next focus will be on confirming *Staphylococcus aureus* by RAPD, BBL chromagar Staph aureus plates, coagulase test and staphaurex latex tests.

The Effect of Ginkgolides on the Inhibition of beta-Amyloid Aggregation. Glibert Gonzalez¹, Roger Lefort², Michael L. Shelanski² and Julio P. Larios², ¹Medgar Evers College and ²Columbia University.

Over half of persons over 80 years old suffer from Alzheimer's disease. As the average life expectancy approaches 80 years, finding a treatment for this disease is becoming increasingly important. One potential treatment may come from the theory that beta-amyloid dodecamers are the cause of neuronal injury and synaptic dysfunction. So, inhibiting or degrading the toxic beta-amyloid oligomers may be a means of treating Alzheimer's disease. Using western blots, we used untreated beta-amyloid as controls and beta-amyloid treated Ginkgolides A,B,J and TTL, to determine what, if any, effectiveness, the various Ginkgolide extracts have on inhibiting the formation or degrading beta-amyloid oligomers. According to our experiments ginkgolide components J and C may partially degrade beta-amyloid dodecamers. Also, we found that ginkgolide components A,B,J and TTL inhibited

beta-amyloid aggregation. There is increasing evidence from the latest literature that Ginkgolide component J may be effective in inhibiting beta-amyloid oligomerization, but further studies are necessary to confirm the viability of using any of the ginkgolide components as actual treatments for Alzheimer's disease. An even greater challenge is the study of the mechanism of the ginkgolides when used toward beta-amyloid oligomers.

Isolation and Purification of Cyanobacterium *Synechococcus* sp. IU 625 and Cyanophage AS-1. Bobak Haghjoo¹, Alexandra Laurent¹, Lee H. Lee¹ and Tin-Chun Chu², ¹Montclair State University and ²Seton Hall University.

Synechococcus sp. IU 625 is a rod-shaped, unicellular cyanobacterium that can be used as an indicator species for environmental contamination. It is also a major cause of dense algal blooms in freshwater. Cyanophages play important roles in modulating cyanobacteria populations. In our research lab, we maintain both *Synechococcus* sp. IU 625 and its phage AS-1 to carry out experiments for the studies of the heavy metal effects on the host and the interaction between the host and its phage. In summer 2008, sudden temperature and humidity raise in the research lab caused the contamination of all the cultures. In this study, several approaches have been used to isolate pure culture of *Synechococcus* sp. IU 625 and AS-1. All the cultures (1 to 2) were swabbed separately on the 3M media to check contamination. 19 out of all the cultures were contaminated with fungi and were discarded due to fungi spores. Three were contaminated with bacteria, and further purified by using serial dilution and discontinuous streaking techniques. AS-1 lysates (1 to 4) were centrifuged at 5,000 rpm and 9,000 rpm to remove the cells and cellular debris, respectively. The supernatants were then gone through filtration with Nalgene filter units.

Apoptotic Effect of Indole - 3 - Carbinol and Diindolylmethane on Estrogen Independent MDA - 231 Breast Cancer Cells. Jacqueline Hawson, Kristine Kraham and Valarie Nappi-Giordano, Saint Joseph's College.

Indole - 3 - Carbinol (I3C) is a compound found in high concentrations in Brassica family vegetables such as broccoli, cauliflower, Brussels sprouts and cabbage. Stomach acid dimerizes I3C into diindolylmethane (DIM) which is then absorbed. Being studied as a nutritional supplement, indole-3-carbinol and its condensation products appear to be promising preventatives and treatments of a variety of cancers including breast cancer. Estrogen independent MDA - 231 breast cancer cell lines will be used to assess the effectiveness of I3C and DIM using dose curves, treatment curves and measuring apoptosis. Apoptosis will be measured by microscopic observations, TUNEL assays, and looking for activated apoptosis proteins via western blot. It is hypothesized that both indole-3-carbinol and diindolylmethane will have apoptotic effects on breast cancer cell lines with DIM holding a greater potency.

Engineering Artificial Histone Acetyltransferases: A Combined Homology and Biochemical Based Approach. Wendy Hom, Kinjal Mehta, Man Xia Lee, Susheel Kumar Gunasekar, Zhiqiang Liu, Natalya Voloshchuk, Aye Sandar Moe, Rebecca Reich, Phyllis Frankl, Lisa Hellerstein and Jin K. Montclare, Polytechnic Institute of NYU.

In vivo incorporation of non-natural amino acids can be used to improve protein stability. However, there is a trade off; improved stability of the protein may lead to loss in activity. One way to improve function is to employ machine-learning algorithms to identify the variants that improve activity. Our target protein Tetrahymena GCN5 (tGCN5), a member of the Histone Acetyltransferases (HAT) family, acetylates the lysine residues of histones, enabling transcriptional regulation. Experimental data have shown an increase in stability of the protein against protease degradation but loss in activity with the incorporation of para-fluorophenylalanine (pFF) into tGCN5 *in vivo*. Using information from biochemical and structural data, we identified fourteen residues to mutate. With the aid of computer guidance, we have designed a set of variants. Here we demonstrate our progress on the synthesis of site-directed and assembling the multi-site tGCN5 mutants and determination of their activities.

***In Vitro* study of Cell Migration.** Emily Hughes and Regina Sullivan, Queensborough Community College.

Scratch assay is a technique used to analyze breast cancer cell migration *in vitro*. A monolayer of cells is "scratched" and photographed after the scratch is initially made, and then at regular intervals until the scratch is closed. We will perform a number of scratch assays on the MDA-MB231 cell line on various chemical substrates. The differential rates of cell migration will be assessed, possibly correlating with the rate of cancer cell metastasis *in vivo*.

Sex Determination, Sex Ratio, and Hatching Order of *Sterna hirundo* Chicks. Jusuf Husic, Roy Mosher and Brian Palestis, Wagner College.

The purpose of the research was to study the relationship between hatching order and sex of chicks of the Common Tern (*Sterna hirundo*). Since these chicks are virtually indistinguishable as male or female, sex identification involved DNA sampling and analysis. After banding 44 chicks in the field at Pettit Island, New Jersey, blood and feathers were collected for analysis. The sexing of the chicks was determined by DNA extraction and PCR analysis. When looking specifically at birth order within nests, only 12 chicks from 6 nests were involved. Fully 60 % of the nests had female first-hatches followed by another female, while 40% had male-first hatches followed by another male hatchling. Of the 44 chicks that were successfully sexed from about 33 nests, 26(59%) were females and 18(41%) of them were males, but this distribution was not significantly different from 1:1. This work was supported by Wagner College Faculty Research Fund grants to R. Mosher and B. Palestis.

The Anterior Midgut of Larval Yellow Fever Mosquitoes (*Aedes aegypti*): Effects of Hemolymph-side or Luminal Nutrients on the Transepithelial Voltage and Strong Alkalinization. Sejmir Izeirovski¹, Stacia B. Moffett², David F. Moffett² and Horst Onken¹, ¹Wagner College and ²Washington State University.

Isolated anterior midguts of larval *Aedes aegypti* were bathed in aerated mosquito saline containing serotonin (0.2 μ M) and perfused with NaCl (100 mM). The lumen negative transepithelial voltage (V_{te}) was measured and luminal alkalinization was determined through the color change of luminal m-cresol purple from yellow to purple after luminal perfusion stops. Addition of 10 mM amino acids (arginine, glutamine, histidine or proline) or metabolites (malate or succinate) to the luminal perfusate resulted in more negative V_{te} values, whereas addition of glucose was without effect. In the presence of TRIS chloride as luminal perfusate, addition of nutrients did not change V_{te} . These results are consistent with Na^+ -dependent absorption of amino acids and metabolites. Effects of serotonin withdrawal indicated that nutrient absorption is stimulated by this hormone. Strong luminal alkalinization was observed with hemolymph-side mosquito saline containing serotonin and with luminal NaCl, indicating that alkalinization does not depend on luminal nutrients. Additional omission of glucose or metabolites from the hemolymph-side solution had no effect on luminal alkalinization, whereas omission of amino acids significantly decelerated it. Re-addition of amino acids recovered alkalinization, suggesting the involvement of amino acid metabolism in luminal alkalinization.

Steroid Measurements in Methanol Extracts of the Bivalves Oyster, *Crassostrea virginica*. Kendra Jackson¹, Colesha Lyttle¹, Ronald Peaster², Patrice Smith² and Ebere Nduka², ¹Kingsborough Community College and ²Medgar Evers College.

We have been devise a simple means of extracting and measuring steroid hormones in oyster tissues. We initially used acid extraction to compare hormone levels in these tissues. In this study we extracted and measured levels of steroid hormones, estradiol-17b, progesterone and testosterone by Enzyme-linked Immunosorbent Assay (ELISA) in methanol extracts of oyster tissues. Previously we used oysters during spring with prominent gonads, whereas this time we used oysters harvested late in summer; in which it was sometimes difficult to identify the gonads. The results showed testosterone ELISA measurements the most stable and steroid levels at this time of year were lower compared to levels measured in late spring. Extracts from gills, palps, gonad, mantle and adductor muscle, were measured. Testosterone (10.6 ng/g wet weight) and estradiol-17b (6.98ng/mg wet weight) were detected in gonads. Since these steroids are lipid soluble we believe methanol extraction gives a more accurate measurement of steroid in these tissues than acid extraction. Kendra Jackson and Colesha Lyttle are participants in the MEC/KBCC Bridges to Baccalaureate Program. This work was supported by the Bridge of NIH, CSTEP of NYSDOE, LSAMP of NSF and STEP of NSF.

Soil Analysis - Urban Makeshift Playgrounds. Judy James, Patrice Smith, Karl Ruddock, Kwesi Amoa and Dereck Skeete, Medgar Evers College.

The main objective is to determine the overall safety of urban playgrounds, with particular focus on unregistered, "makeshift" playgrounds which several children in urban communities often use for recreational purposes. Although playground supervision focuses on the safety of equipment, not many studies has been done on health and safety problems that may be linked to soil contamination. Samples were drawn at 18 inch depth, dried, extracted, sonicated, passed through a column of silica column, a column of alumina, and finally cleaned using Environmental Protection Agency florasil method before being analyzed by GC/MS. The study revealed 4 toxic compounds to human. After the samples had been subjected to a GCMS analysis, the following compounds were found: (1) 1,1,2,2-tetrachloroethane, (2) benzophenone, (3) naphthalene, (4) N- (4-bromophenyl)-Acetamide, (5) 1-methoxy-2,4-dinitrobenzene, (6) 1-Octen-3-yne, (7) 7-oxabicyclo heptane and (8) trichloroacetic acid. Although the concentrations of these compounds were in the range of the Environmental Protection Agency (EPA) acceptable levels, further studies will be conducted to expand the sites and list of compounds found. Judy James and Patrice Smith are participants in the Medgar Evers CSTEP and STEP programs, funded by the NYSDoE and NSF

Developing a DNA Barcode for Identification of Farm Raised White Tilapia (*Oreochromis aureus*) and Phylogeny Studies. Yewande Jegede and Z.M.G. Sarwar Jahangir, Kingsborough Community College.

White tilapia, *Oreochromis aureus*, is a popular fish in the US with imports reaching 170,000 tons fillet in 2007. Semi-processed tilapia supply can face misrepresentation. Developing a consensus DNA barcode for tilapia will help law enforcement agencies to ensure consumers receive tilapia as labeled, and help phylogeny and evolution studies of cichlids. Tissue samples of tilapia were minced in 1X SSC, pH 7.0 with meat tenderizer, centrifuged at 850g at 4°C for 5 minutes, resuspended, and recentrifuged as above. The pellet was suspended in homogenizing solution containing 0.05 M Tris, 0.025 M KCl, 0.005 M Mg-acetate, 0.35 M sucrose and 0.5% Triton X-100, pH 7.6, centrifuged at 5,000g at 4°C for 10 minutes, the supernatant collected and digested with Proteinase K for 3 hrs at 37°C followed by centrifugation at 10,000g at 4°C for 10 minutes and the supernatant collected. Two volumes of 95% ethanol were added, chilled at -23°C and centrifuged at 10,000g at 4°C for 10 minutes. The precipitate (DNA) was resuspended in TE, pH 7.5. The DNA samples were amplified using the forward 5'TCTCGACTAATCACAAGACATCGG 3' and reverse 5'TCAAARAAGTTGTGTTAGTTCC 3' primers. They will be sequenced, aligned for a consensus sequence, and submitted to the GenBank database.

The Effects of Di-(2-ethylhexyl) Phthalate on Peroxiredoxin 3 Expression in *Drosophila melanogaster* Adult Males. Penel L. Joseph², Cherub A. Ruiz¹ and Thomas M. Onorato¹, ¹LaGuardia Community College and ²Kingsborough Community College.

Phthalates are infused with polymers to increase flexibility of plastics. Exposure to phthalates is ubiquitous, e.g., food containers, toys, baby bottles, IV tubing, blood storage bags,

PVC flooring, and household dust. Di-(2-ethylhexyl) phthalate (DEHP), one of the most commonly used phthalates, has adverse effects on the male reproductive system. Moreover, DEHP may shorten the lifespan of the fruit fly, *Drosophila melanogaster*, as well as increase lipid peroxidation, an indicator of oxidative stress. Peroxiredoxin 3 (Prx3) is a mitochondrial thioredoxin-dependent peroxidase that neutralizes excess peroxides, and helps protect against oxidative-stress-induced apoptosis. Mitochondrial Prx3 levels are significantly increased in an immortalized mouse spermatocyte-derived germ cell line, GC-2spd(ts), after 24 hour (h) exposure to 200 μM mono-(2-ethylhexyl) phthalate, the biologically active metabolite of DEHP. Therefore, this study determined whether DEHP affects Prx3 expression in *Drosophila* adult males. Adult male flies (day 0-5) were dry starved for 3h, and exposed to filter paper soaked in 5% sucrose containing 0 mM (control), 0.5 mM, and 1 mM DEHP. After 48h, total RNA and protein were extracted from whole flies and used for reverse transcriptase-polymerase chain reaction (RT-PCR) and Western blot analyses, respectively. Exposure to DEHP (0.5mM and 1mM; 48h) did not alter Prx3 mRNA expression. However, 48h treatment with 0.5 mM and 1mM DEHP resulted in a 1.5-fold increase in Prx3 protein levels. In summary, these preliminary findings show that 48h exposure to 0.5 mM and 1 mM DEHP has no affect on Prx3 mRNA levels, but causes an increase in Prx3 protein levels.

Effect of Cadmium on Glutathione S-Transferase Activity in Gill Tissue of the Eastern Oyster, *Crassostrea virginica*. Stephania Joseph¹, Cynthia Pierre², Margaret A. Carroll² and Edward J. Catapane², ¹Kingsborough Community College and ²Medgar Evers College.

Cadmium causes anemia, kidney and lung damage. A significant route of exposure is diet. Cadmium is a pollutant accumulating in aquatic organisms. Bivalves are used for metal monitoring and bioaccumulation studies. Little is known about their biochemical responses to metals. We showed *Crassostrea virginica* accumulated cadmium and other metals. Cadmium causes tissue damage by interfering with enzyme functions and increases cellular oxidative stress. GST is studied in mammals and other vertebrates but less in invertebrates. We studied short-term cadmium exposure on GST activity in oyster gill. Gills were removed, quartered and weighed. Quarters were incubated for 10 hours with cadmium. After incubation quarters was removed, rinsed, homogenized and centrifuged to obtain the post-mitochondrial supernatant fraction. 100μl of each fraction were assayed for GST activity. This short term exposure resulted in a loss of up to 25% of enzyme activity. Determining bivalve and other organisms responses to cadmium may allow more accurate predictions of cadmium-induced toxicity, and better predictions of cadmium transfer to higher trophic levels. Understanding toxicological effects and adaptations of *C. virginica* to cadmium will provide information to affect decisions of government regulators protecting ecosystems and lead to improvement of water quality in fresh and coastal waterways.

Membrane Lipid Peroxidation as a Mechanism of Copper Surface-Mediated Toxicity In *Escherichia coli*. Tae Y. Kang¹, Corinne A. Michels² and Nidhi Gadura¹, ¹Queensborough Community College, CUNY and ²Queens College, CUNY.

The mechanism(s) by which copper alloy surfaces kill microorganisms is still largely unclear. Several mechanisms have been proposed including oxidative damage by copper-induced formation of reactive oxygen species (ROS), copper binding to proteins resulting in functional inactivation, loss of cell wall or cell membrane integrity, and interference with metal ion metabolism with limited experimental support. The aim of our project is to determine the relationship between exposure to copper alloy surfaces or copper ions, lipid peroxidation, and killing of *Escherichia coli*. We will also determine the relationship between membrane lipid peroxidation and plasma membrane structural integrity in *Escherichia coli*. Our data indicate a biphasic killing curve following addition of CuSO₄ to the growth medium in which the initial rate of killing is slow but becomes extremely rapid after about 45 minutes to one hour. The rate of killing correlates with CuSO₄ concentration.

Serotonin 5-HT_{1A} Receptor Protein in the Adolescent Brain. Sunaina Kaushal and Dennis E. Rhoads, Monmouth University.

The 5-HT_{1A} autoreceptor has been implicated in neural development and psychiatric disorders, including obsessive compulsive disorder (OCD). OCD is an anxiety disorder characterized by recurrent, unwanted thoughts (obsessions) and/or repetitive behaviors (compulsions). Using an established animal model for OCD, a previous study conducted by this lab found that 5-HT-1A receptor agonists, 8-hydroxy-dipropylamino-tetraline (DPAT) and buspirone, induced repetitive behavior and/or increased decision time in juvenile Sprague-Dawley (SD) rats. In contrast to results seen with the SD line, juvenile Long-Evans rats showed no statistically significant increase in repetitive behavior after DPAT. Neither agonist had a significant effect on the time required for the rat to select one of the equally baited arms of a T-maze. Can these differences in behavioral responses to 5-HT-1A agonists be explained by brain differences in 5-HT-1A receptor levels? The present study is comparing juvenile (P25-28) SD and LE rats at the molecular level, exploring differences in expression of 5HT_{1A} receptors in the rat forebrain. Presynaptic membrane (synaptosome) fractions are prepared from forebrains and proteins are separated by SDS-PAGE and analyzed by quantitative Western blotting with chemiluminescent detection.

Phylogenetic Analysis of Flea Populations in Boulder, Colorado. Abimbola Kazeem¹, Ryan T. Jones² and Andrew P. Martin², ¹Medgar Evers College and ²University of Colorado.

Limited research exist on flea phylogeny and how it correlates with bacterial diseases in flea guts. Rocky Mountain Fever and Ehrlichiosis are transmitted by fleas. Fleas were sampled from nine black-tailed prairie dogs across Boulder County, Colorado. These fleas vector a number of blood-borne diseases, including Bubonic plague, Rickettsial diseases and Bartonella. We sequenced cytochrome oxidase II (COII) gene from fleas to determine phylogenetic relationships among fleas

of Boulder to determine their ecological and environmental aspect and improve understanding of the migrational patterns. We used PCR and electrophoresis of Agarose gels. DNA sequencing and analysis which incorporated the use of Sequencher 4.6, a software program that allowed for forward DNA strained sequences and the reverse DNA strained sequences to be assembled for complimentary DNA strained to be formed. All samples of flea DNA were aligned in Clustal X, a software program which allows for the phylogenetic branch of flea DNA to be built. Based on the phylogenetic stem of flea DNA our results showed they exists two clades of flea populations currently in the Boulder County area, and DNA samples from 2004 to those of 2007 revealed no shifts occurred over the course of those three years.

Nitration of p-Anisaldehyde at -15°C and 25°C: What's the difference? Keisha Kelly, Keith Lee and Kwesi Amoa, Medgar Evers College.

In any first year organic chemistry class, students are often faced with learning functional group transformation. Emphasis is often placed on the importance of temperature in effecting various transformations. However, in a laboratory setting students often do not receive any practical hand on experience in observing this phenomenon. With this in mind, we set out to develop a simple but effective chemical reaction that would demonstrate the importance of temperature control in chemical reaction. In this paper students nitrate p-anisaldehyde at -15°C and at 25°C using a nitric acid/sulfuric acid solution. GC/MS analysis of the reaction at -15°C revealed a single compound, while GC/MS analysis of the reaction at 25°C revealed four compounds.

Analysis Of Blood And Lymphatic Vascular Development In Mutant *VeZF1* Embryos Using Immunostaining. Candice King¹, Heidi Stuhlmann² and Pauline Ocaya², ¹Medgar Evers College ²Weill Cornell Medical College.

The vascular endothelial zinc finger 1(Vezf1) gene is involved in development of blood vascular and lymphatic systems. The absence of Vezf1 causes decreased lymphatic and blood vascular integrity in mice embryos. Embryos heterozygous for Vezf1 gene exhibit edema and lymphatic hypervascularization leading to hemorrhaging in the jugular region. Homozygous embryos present a greater degree of defects, causing localized hemorrhaging and death. Lymphatic vessel defects in head and neck regions of Vezf1^{+/-} embryos at day 12.5 and day 13.5 of gestation have been described by the Stuhlmann laboratory. A detailed analysis of lymphatic structures at other stages and regions have not been performed. We studied the lymphatic and blood vascular structures at other stages and regions of the embryo using immunohistochemistry to observe and identify the vascular structure that are homozygous or heterozygous. We found homozygous embryoid bodies lacked PECAM-1 positivity and an increased collagen expression. There were no difference in LYVE-1 staining of wild type and heterozygous mutant embryos. There were increased numbers of immature PECAM-1 positive structures in the head. The abnormal vascular pattern in heterozygous mutant embryos may be strain specific. This study shows Vezf1 is involved in vascular formation and Collagen IV expression.

Apoptotic Effect of Indole - 3 - Carbinol and Diindolylmethane on Human Papillomavirus 18 Positive Cervical Cancer Cells. Kristine Kraham, Jacqueline Hawson, Valarie Nappi-Giordano, Saint Joseph's College.

Indole - 3 - Carbinol (I3C) is a compound found in high concentrations in Brassica family vegetables such as broccoli, cauliflower, Brussels sprouts and cabbage. Stomach acid dimerizes I3C into diindolylmethane (DIM) which is then absorbed. Being studied as a nutritional supplement, indole-3-carbinol and its condensation products appear to be promising preventatives and treatments for a variety of viruses such as Human Papillomaviruses. Human Papillomavirus 18 positive cervical cancer cells cell lines will be used to assess the effectiveness of I3C and DIM using dose curves, treatment curves and measuring apoptosis. Apoptosis will be measured by microscopic observations, TUNEL assays, and looking for activated apoptosis proteins via western blot. It is hypothesized that both indole-3-carbinol and diindolylmethane will have apoptotic effects on cervical cancer cell lines with DIM holding a greater potency.

Effects of Road Deicers on Survival and Behavior of Larval and Adult Wood Frogs. Kristen Kwasek and Lisa Hazard, Montclair State University.

Winter road deicers (primarily NaCl) may contaminate local watersheds to levels above 100 mM, potentially impacting amphibian populations. Amphibians that breed in vernal pools early in the spring, when salt levels could still be high, may be especially vulnerable. We integrated responses of larval and adult wood frogs (*Lithobates sylvaticus*) to increased salinity to determine whether adult frogs could detect and avoid salinities that were detrimental to them or their offspring. Tadpoles were raised in groups at concentrations ranging from 0-200 mM NaCl. No tadpoles at higher concentrations survived to metamorphosis. At low salinity, tadpoles had slightly lower survival, growth and development rates than control animals. Adult frogs were mildly dehydrated to induce thirst, then placed in a shallow dish containing 0-500 mM NaCl. Location (in or out of the dish) and behavior (moving, standing, sitting, or water absorption response) were recorded during a 10-minute trial. In contrast to arid-adapted anuran species, the wood frogs showed no aversion to salt, remaining in even 500 mM NaCl for 10 minutes, despite significant mass loss. Breeding wood frogs may not be capable of evaluating pond salinity, leaving tadpoles potentially vulnerable to increased mortality or subtler sublethal effects due to road salt runoff.

The Effects of Calcium Disodium EDTA on the Neurotoxicity of Manganese on Biogenic Amines in the Nervous System and Innervated Organs of *Crassostrea virginica*. Elsie Lagares, Dahniel Samuel, Edward J. Catapane and Margaret A. Carroll, Medgar Evers College.

Manganese, a neurotoxin induces Manganism, a Parkinson-like disease. Manganese injures dopamine neurons in brain involved in control of body movements. P-aminosalicylic acid (PAS) alleviate symptoms of Manganism. Its mechanism of action is unknown. *Crassostrea virginica*, possesses a dopaminergic system innervating the gill and regulating lateral ciliary activity. We showed PAS protected dopamine neurons against manganese. PAS is an anti-inflammatory drug with chelating ability. PAS's ability to

ameliorate Manganism is postulated due to its chelating actions. We treated *C. virginica* with manganese and calcium disodium EDTA (EDTAc), a chelating agent for 3 days. Biogenic amines were measured by HPLC with fluorescence detection. Cerebral ganglia, visceral ganglia and gill were dissected, weighed, homogenized, centrifuged, filtered and injected into a HPLC system with a Phenomenex Gemini 5 μ C18 column and a Jasco FP 2020 Spectrofluorometer. The mobile phase was 50 mM acetate buffer (pH 4.7) with 1 mM EDTA, 1.1 mM SOS and methanol (85%/15%, v/v). EDTAc treatments protected the ganglia and gill against effects of manganese. Manganese did not affect serotonin levels. These findings provide insights into actions of manganese and PAS in treatments of Manganism.

***In Vitro* Toxicological Analysis of World Trade Center Dust in Stressed and Unstressed Human Lung Cell Cultures. Constantino Lambroussis, David Gaipa, Sergio Perez, Caitlin Ament, Anise Elie, Barbara Soares, Research Advisor: Ann Marie DiLorenzo, Montclair State University.**

The purpose of this study is to determine a toxic level of World Trade Center Dust in mammalian cells grown in culture. In this *in vitro* study, cultures of human lung (MRC-5) were exposed to World Trade Center Dust collected from a location on Market Street, New York City, shortly after the tragedy of September 11, 2001. Dust concentrations ranging from 1.25ppm to 250ppm were used in conjunction with serum levels of 1%, 2.5% and 10% Fetal Bovine Serum (FBS) in Ham's F-12 Nutrient Medium. 96 well plates were seeded with lung cells. The resulting lung cultures were then analyzed with a colorimetric based cell viability assay to establish a viable cell count. The preliminary results indicate that lower serum level, simulating physiologically stressed *in vivo* conditions, have lower viability. Exposure to higher dust concentrations appear to indicate a negative influence on cell viability. Stressed cells were highly susceptible to dust exposure and demonstrate the lowest level of viability. These results indicate that World Trade Center Dust, with its chemical composition, has a negative influence on cell viability in both stressed and unstressed conditions. Additional testing is planned for future studies to more accurately determine potential damage to DNA.

DNA Sequence Characterization of Gowanus Canal Soil Bacteria with Potential Use in Bioremediation. Jennifer Levia and Carolle Bolnet, Medgar Evers College.

Bioremediation is a key process that uses either naturally occurring or deliberately introduced microorganisms to consume and break down environmental pollutants to return the natural environment altered by contaminants to its original condition. In this study we aimed to isolate and characterize naturally-occurring soil bacteria with bioremediation potential. Soil samples were diluted, plated on starch agar plates and then incubated at 37°C for 1-3 days. DNA was extracted from pure cultures exhibiting starch breakdown. Amplification of the 16S rRNA gene was performed and the PCR products were sequenced. The fragments were compared to GenBank bacterial sequences using BLAST. Our search results revealed 1) an isolate exhibiting 100% nucleotide similarity to *Bacillus pumilus*, a bacterium well known for alkaline protease production in environmental decontamination of Dioxin. 2) an

isolate having 99% nucleotide similarity to *Alcaligenes faecalis*, a bacterium that can detoxify arsenic to arsenate³) an isolate exhibiting 100% nucleotide similarity to *Rhodococcus equi*, a bacterium involved in hydrocarbon biodegradation. In conclusion, we have isolated and characterized three types of soil bacteria from the GC that appear to be involved in naturally occurring bioremediation. Jennifer Levia is a Science-CSTEP participant.

p-Aminosalicylic Acid Blocks Manganese from Impairing the Dopaminergic Innervation of the Gill of the Bivalve Mollusc, *Crassostrea virginica*. Roshney Licorish¹, Turksha Huggins², Edward J. Catapane² and Margaret A. Carroll², ¹Kingborough Community College and ²Medgar Evers College.

Our lab showed treating *Crassostrea virginica* with manganese impaired the cilio-inhibitory innervation of gill which is mediated by dopamine neurons originating from the cerebral and visceral ganglia, and reduced endogenous dopamine levels in the cerebral and visceral ganglia, as well as in gill. The site of action of the ciliary impairment appears to be post synaptic receptors at the ciliated cells of gill. High levels of manganese cause Manganism, a Parkinsons-like disease in people. P-aminosalicylic acid (PAS) was reported an effective treatment of Manganism. We sought to determine if effects of manganese could be decreased by cotreating animals with PAS. Animals were treated with manganese, PAS, or PAS plus manganese. Beating rates of the lateral cilia of gill epithelial cells were measured by stroboscopic microscopy of gill preparations with the ipsilateral visceral ganglia attached and tested by superfusion of visceral ganglia with dopamine and serotonin. Treatments with manganese resulted in significant impairment of the dopaminergic, cilio-inhibitory system. Cotreating animals with manganese and PAS decreased the neurotoxic effects of manganese. The study shows PAS can protect the animal against the effects of manganese and this preparation is a useful model to study manganese neurotoxicity and the pharmacology of drugs affecting it.

Investigating the Structure and Function of COMPcc via Single-Alanine Mutagenesis. Chandani B. Limbad¹, Mukta Asnani¹, Wendy Hom¹, Susheel K. Gunasekar¹ and Jin K. Montclare^{1,2}, Polytechnic Institute of NYU and ²SUNY Downstate Medical Center.

Cartilage oligomeric matrix protein (COMP) is a member of thrombospondin -3,4,5 (TSP) family commonly expressed in cartilage, ligament and tendon. It has N-terminal coiled-coil heptad repeat domain (COMPcc) that can self-assemble into a pentamer. COMPcc is comprised of 73 Å long hydrophobic pore with 2-6 Å diameter, that is stabilized by interchain disulfide bonds which can bind small hydrophobic molecules. Binding of hydrophobic molecules like vitamin D₃ and all-*trans* retinol increases the thermal stability of the COMPcc. To determine the residues in the hydrophobic pore of COMPcc that are critical to structure and stability, we have performed single-alanine mutagenesis on the protein. Here we describe the characterization of COMPcc and mutants via circular dichroism, differential scanning calorimetry and fluorescence.

Culture and Characterization of a Bacterium Previously Known only from Environmental DNA. Lovon Mahon and Carolle Bolnet, Medgar Evers College.

Our present study assesses the identity of Brooklyn soil bacteria isolates using nucleotide sequence data. Polymerase Chain Reaction (PCR) amplicons of the 16S rRNA gene were sequenced and compared to bacterial sequences in GenBank using BLAST. Our results revealed that five isolates exhibited less than 91% similarity with the closest identified match, the recently described species *Tumebacillus permanetifrigoris*, a bacterium isolated from a 9-m-deep permafrost sample from the Canadian high Arctic; however, these sequences show a better match with uncultured Firmicutes bacteria from environmental samples. We proceeded in characterizing these isolates using a polyphasic taxonomy study. Our preliminary results revealed that they are all aerobic, Gram-positive, rod-shaped bacteria growing optimally at pH7 and 28°C. Their DNA G + C content ranged from 56.7 to 57.2%. In conclusion, we have isolated from Brooklyn soils five samples likely to be conspecific with a bacterium apparently (based on GenBank representation) previously known only from environmental DNA clone libraries; further examination of the taxonomic literature is currently underway in order to confirm or refute this hypothesis and, if confirmed, we will describe this taxon as a new species. Lovon Mahon is a Science-CSTEP participant.

Migration Rates of Human Breast Cancer Cells. Joseph Mammano and Regina Sullivan, Queensborough Community College.

Cell migration is the mechanism by which cancerous cells metastasize from primary tumors to invade other organs and tissues. A scratch assay was employed as an in vitro model of this process. A "wound" was created in plated human breast cancer cells and photographs were taken at various intervals to track the rate at which the cells migrated to close the wound. The influence of different adhesion substrate on cancer cell migration was measured.

Biofilm Formation in *Candida albicans*. Kathleen Van Manen, Mentor: Elena McCoy, College of Staten Island.

Candida albicans is a significant human fungal pathogen. The ability to form biofilms has been associated with drug resistance and virulence in this microorganism. Biofilm formation is dependent on processes associated with adherence and filament formation in *C. albicans*. Since phosphate addition has been shown to affect the yeast to hypha transition in this dimorphic yeast, the effect of phosphate addition on biofilm formation in minimal medium was examined. Three strains of *C. albicans* currently maintained in the laboratory which differ with respect to nutritional requirements for filament formation were compared. When YND (Yeast nitrogen base, 2% glucose) and YNDP (Yeast nitrogen base, 2% glucose and 100 mM phosphate) minimal media were employed, adherence to a 6-welled polystyrene plate was observed at 48 hours only in YNDP medium. Germ tube formation has been reported in *C. albicans* grown in media containing 10⁻⁹M estradiol, an estrogen metabolite. The growth medium used contained serum "stripped" with activated charcoal. We have previously demonstrated serum-induced germ tube formation in our yeast strains. In the current study, effects on adherence in strains

grown in YNDP medium attributable to the addition of 10^{-9} M estradiol were not observed. We can demonstrate increased miconazole resistance in polystyrene-adherent yeast cells, however, effects of estradiol on the drug sensitivity of these cells have not been determined and experiments to examine the sensitivity to miconazole in the presence of estradiol are in progress.

Analysis of RET Signal Transduction in Transfected COS Cells. Shani Maslovski, Maryann Poku and Quinn Vega., Montclair State University.

RET, a receptor tyrosine kinase, is activated by interacting with one of four ligand-binding co-receptors, GFR-a (1-4), and their corresponding neurotrophic factors (GDNF, Persephin, Artemin or Neurturin). RET is required for enteric nervous system and kidney development. Activating mutations in RET are associated with cancer (MEN2A, MEN2B and FMTC) while loss-of-function mutations lead to developmental abnormalities like Hirschsprung's Disease. Once activated, RET undergoes an autophosphorylation event leading to the phosphorylation of multiple tyrosine amino acids in the protein's cytoplasmic domain. In order to analyze the effects of mutations on downstream transcription, COS cells were transfected with wild type and mutant forms of RET. RET activity was measured through a luciferase reporter gene assay. Specifically, a RET dependent transcription factor, ELK-1, was fused with the DNA binding domain of the GAL protein and co-transfected with a GAL dependent promoter linked to the luciferase gene. With respect to signaling, downstream luciferase promoter assays demonstrated that wild type RET increased transcription over phosphotyrosine mutants and kinase inactive RET. Preliminary data suggests that the MEN2A mutants activate transcription better than the MEN2B mutants. Future experiments will confirm these changes and study the effect of both specific tyrosines and naturally occurring mutations on RET signaling.

The Effects of the Juvenile Hormone Agonist Methoprene on the Metamorphosis of the Brine Shrimp *Artemia salina*. McGovern, S., St. Joseph's College, Faculty Mentor: M.E. Royston.

Juvenilizing factors in insects that prevent metamorphosis to the adult stage have been known about since the mid 1930s, and were later categorized as Juvenile Hormone (JH). This knowledge about JH was then utilized in the development of a category of insecticides known as Juvenile Hormone Agonists (JHA's). JHA's are used to disrupt the normal development of the juvenile insects and prevent them from undergoing metamorphosis to become sexually mature adults. In the late 1990s, studies were done correlating the use of JHA's to the disruption of metamorphosis in certain crustacean species. In this experiment, development of the brine shrimp *Artemia salina* will be monitored in the presence of varying levels of a popular JHA, methoprene.

Effects of Polyphenolic Compounds Desoxybenzoin on HO-1 Human Melanoma Cells. Pratik M. Modi¹, Carleta A. Joseph¹, Virinder S. Parmar² and Anthony L. DePass¹, ¹Long Island University and ²University of Delhi.

Polyphenols are group of chemical found in plants, characterized by the presence of more than one phenyl ring structure per molecule. There are several plant polyphenols now known to show anti-cancer activity. In this study, VSP -15,

2,4-dihydroxy-3-prenyl-desoxybenzoin, was tested for its anti-cancer properties by evaluating proliferation assays, viability analysis, RT-PCR measuring gene regulation of signal transduction and cell cycle arrest, and melanin synthesis using the Fontana-Masson staining technique on HO-1 human melanoma cell populations. VSP-15 has been found to be responsible for a decrease in cell proliferation, viability % and an induction of morphological changes. VSP-15 also exhibits a dose dependent effect of HO-1 cells. The RT-PCR Cell Cycle arrays showed significant gene regulation affecting CHL1/CHLR1, BRCC5/HRAD51, RAD9 and A1S9/A1S9T. The latter two being a DNA-damage checkpoint protein in G1/ S phase of the cell cycle.

Isolation and Analysis of Cryptic Plasmids from Metal Resistant Bacteria of the Deep Terrestrial Subsurface. O. Mofunanya, B. Ziogaite, B. Smith and J. Coombs, Adelphi University.

Bioremediation is a clean-up strategy that utilizes living organisms to sequester environmental contaminants or transform them into less harmful forms. In microorganisms, the genetic determinants that make bioremediation possible can spread through communities by horizontal gene transfer (HGT); a process which allows new genetic information to be acquired from organisms other than the parent cell. Previous work has shown that select bacteria from a deep subsurface soil core possess DNA sequences with a high degree of homology to *zntA*, a gene involved in resistance to toxic metals such as cadmium (Cd) and lead (Pb). Furthermore, phylogenetic analysis has indicated that the *zntA*-like genes in these bacteria were most likely acquired through HGT. In this study, plasmid DNA was isolated from four subsurface bacterial strains used in the previous *zntA* work. Individual plasmids were then separated from each other via gel electrophoresis and electroelution. A nested PCR method and a custom DNA microarray were used to analyze the purified plasmids, and both of these methods resulted in the detection of select plasmid-borne genes. This work has implications for our understanding of the role of plasmid DNA in HGT among bacteria of the deep terrestrial subsurface.

The Effects of Chelating Agents on Manganese Accumulations in Gill of the Eastern Oyster, *Crassostrea virginica*. Soren Murray¹, Yamel Perdomo², Margaret A. Carroll² and Edward J. Catapane², ¹Kingsborough Community College and ²Medgar Evers College.

Manganese is needed in small amounts for physiological functions, but high amounts are toxic, causing Manganism. Manganism is similar to Parkinsons disease, both due to disruption in dopamine neurons in brain. Recently, p-aminosalicylic acid (PAS) is being used to alleviate Manganism in humans. PAS is an anti-inflammatory drug having chelating ability. The oyster, *Crassostrea virginica*, possesses a dopaminergic gill innervation. We showed manganese disrupts this and PAS caused a decrease in manganese accumulations in oyster gill. The ability of PAS to ameliorate symptoms of Manganism is postulated to be related to its chelating actions. We studied if other chelating agents caused similar reductions in manganese accumulations. Gills of *C. virginica* were incubated with 500 μ M manganese, followed by 3 day treatments with metal chelators, diaminocyclohexanetetraacetic acid (DACH), sodium EDTA (EDTAna) or calcium EDTA (EDTAcA). Manganese was

measured using atomic absorption spectrometry with THGA graphite furnace. The chelating agents reduced manganese accumulations. DACH was most effective (72% reduction), followed by EDTAcA (56%) and EDTAna (25%). This study shows chelating agents are effective in reducing manganese accumulations and supports the hypothesis the mechanism of action of PAS in treatment of Manganism is related to its chelating abilities.

Effects of p-Aminosalicylic Acid on the Neurotoxic Effects of Manganese on the Dopaminergic Innervation of the Gill of the Bivalve Mollusc, *Crassostrea virginica*. Michael Nelson, Edward J. Catapane and Margaret A. Carroll, Medgar Evers College.

Lateral cilia of the gill of *Crassostrea virginica* are controlled by a reciprocal serotonergic-dopaminergic innervation from their ganglia. Manganese is a neurotoxin causing Manganism in people chronically exposed to elevated levels in their environment. Clinical interventions for Manganism have not been successful. p-Aminosalicylic acid (PAS) is providing effective treatment of severe Manganism. PAS is an anti-inflammatory drug with chelating properties. The mechanism of action is unknown. We showed short-term treatments of *C. virginica* with manganese disrupts the dopaminergic innervation of the gill. We examined the acute effects of PAS, EDTA and the anti-inflammatory agent, salicylic acid (SA, aspirin) on the effects of manganese. Beating rates of lateral cilia in gill epithelial cells were measured by stroboscopic microscopy. The cerebrovisceral connective innervating the VG were electrically stimulated using suction electrodes, before and after additions of PAS, EDTA and SA to the gill. PAS and EDTA effectively blocked the neurotoxic effects of manganese, while SA did not. The study demonstrates that the mechanism of action of PAS in alleviating Manganism in humans may be more related to the chelating abilities of the chemical as opposed to its anti-inflammatory actions.

A South to North Comparison of Estuarine Shrimp (*Palaemonetes* species). Brian Neuner, Tatiana Malvoisin, Maria Leon, Allen Burdowski and Kathleen Nolan, St. Francis College.

A total of 463 estuarine shrimp were collected from four north to south locations: Apalachee Bay (Florida), Jamiaca Bay, (New York), the Hudson River (New York) and the Swan River on Cape Cod (Massachusetts). Two species, *Palaemonetes pugio* (365) and *P. vulgaris* (98) were identified. The proportion of species varied according to location. Length and mass for each species were measured, and frequency diagrams were prepared. In addition, shrimp were categorized into gravid (egg bearing) or not gravid. Egg numbers were counted with the assistance of a Motic camera and the imaging software Image J. The Hudson River shrimp contained the greatest average number of eggs and were the largest. Among all locations there was a closer correlation between mass and numbers of eggs than between length and number of eggs. It is important to know the life history characteristics of these organisms, as they may be sensitive to certain types of pollution.

Study of Plants Growing in Water (Hydroponics). Deshawn Nicholson, Jonathan Culpper and Dereck Skeete, Medgar Evers College.

This past summer at Medgar Evers College environmental science majors provided research training and motivation to 25 local high school students in the STEP Summer Academy by involving them in a project on hydroponics growing of plants. The students constructed a green house with a hydroponics unit set up inside using PVC pipes. Our aim was to demonstrate ways of growing food without using soil in a very limited space. Basil plants were placed in Styrofoam cups with a growing medium, holes were punched in cup to allow continuous flow of a nutrient solutions through the system, and the cup was placed into holes drilled in 2" PVC pipes to fit the cup. A pump was installed to supply a continuous flow of the nutrient solution to the plants. Observations were recorded daily. At the end of forth week, basils plants had an average height of 3.5 inches, which was impressive when compared with regular growing standards in soil media. The project shows it is possible for plants to grow in water in very little space and it also introduced a group of very eager high school students to the practice of scientific research.

Toxicological Study of the Metal Chelator Phenylmercaptoacetamide in *Caenorhabditis elegans*. Briana Z. Nieto-Buie¹, Yesenia Hernandez², Fernando E. Nieto-Fernandez³ and Duncan A. Quarless³, ¹Midwood High School, ²Uniondale High School and ³SUNY College at Old Westbury.

Arsenic contamination has become a serious environmental problem. Only in New York State there are forty eight superfund sites with arsenic as its major pollutant constituent mostly in the soil. Methods to remove arsenic from solid include the use of bioaccumulators. One of these organisms is *Pteris vittata* accumulates arsenic. An alternate method developed in our laboratory uses a chelator compound phenylmercaptoacetamide (PMA). The hypothesis is that PMA may enhance the ability of *P. vittata* to hyperaccumulate arsenic. The purpose of this project is to asses the toxicological effect of PMA in soil using *Caenorhabditis elegans* as an indicator model. Wild type *C. elegans* N2 were exposed to increasing arsenic concentration levels, in the presence and absence of PMA. The mortality effect of arsenic and/or PMA was evaluated at the end of twenty four hours of exposure. Worms were counted and classified according to life cycle stages. Mortality of worms increased with arsenic concentration. This effect appears to decrease in the presence of PMA. PMA alone doesn't have any effect on the worms. It is concluded PMA may be a good candidate as a potential metal chelator. Its potential as a transporter/bioaccumulator needs further testing.

In Vitro Culture of *Drosophila pseudoobscura* Spermatogenic Cysts. Monicah Njogu and Angela V. Klaus, Seton Hall University.

The complex process of spermatogenesis has previously been studied using *in vitro* cultures of spermatogenic cysts for two *Drosophila* species: *D. melanogaster* and *D. hydei*. For both these species, it has been reported that spermatogenic cells undergo differentiation *in vitro* to some extent. The aim of our study was to determine whether the same processes could be observed in spermatogenic cyst cultures of *D. pseudoobscura*. Our results show that cysts isolated from late

stage pupae were able to retain their ability to continue differentiating into fully coiled bundles of mature sperm *in vitro*. Furthermore, motile spermatids were observed in some of these bundles. To our knowledge, this is the first evidence that motile sperm in a *Drosophila* species can be cultured *in vitro*.

Study of Phycocyanin Gene and Primer Design in Cyanobacterium *Synechococcus* sp. IU 625. Aline Oliveira¹, Arti Rana¹, Lee H. Lee¹, Tin-Chun Chu² and Jack Gaynor¹, ¹Montclair State University and ²Seton Hall University.

Cyanobacterium *Synechococcus* sp. IU 625 is a unicellular photosynthetic prokaryote. It is a major causative agent of algal blooms in the environment. It possesses a light-harvesting complex containing pigments such as chlorophyll and phycocyanin to absorb light at different wavelengths. Phycocyanin is a unique blue pigment that gives cyanobacteria blue-green in color. This gene is a good candidate for PCR-based assay to detect cyanobacteria. In this study, 10 sets of primers have been designed from the phycocyanin gene using the genome information obtained from a very close related strain *Synechococcus elongatus* sp. PCC 7942. The primers have been used to prime *Syn. Sp.* IU 625 cells or DNA prepared from different methods. PCR products have been analyzed by using agarose gel electrophoresis. The fragments obtained from different priming sets have been sequenced using ABI Prism 3700 Genetic Analyzer and the sequences are assembled using CodonCode Aligner. BlastN and BlastP searches have carried out for the sequences generated. The results suggest that phycocyanin gene is highly conserved among *Synechococcus* species. The designed primers may be further used as general probes for indentifying cyanobacteria in the environment, which can serve as a useful tool for early detection and prevention of algal bloom.

The Disruption of Morphological Response: The Disruption of Larval Development of *Xenopus laevis* As a Result of Bisphenol A Exposure. Orioles Jr., T., St. Josephs College, Faculty Mentor: M.E. Royston.

Bisphenol A, commonly known as BPA, is a chemical belonging to the phthalate family. Phthalates are used to soften vinyl; BPA in particular is a chemical building block used in the production of clear, shatterproof, formable polycarbonate plastics. Later, after heating and scratching of the plastics, these phthalates can leach into our food or drink. Most are known to be endocrine disruptors, capable of interfering with the hormones that regulate masculinity and femininity. Scientist from the Centers for Disease Control and Prevention and several universities found that boys born to mothers with higher phthalate levels are more likely to show altered genital development, linked to incomplete testicular descent. Additional studies found higher phthalates levels led to lower sperm counts. In addition to these occurrences, male alligators located in Florida with sex organs on third to one half normal size. In this experiment larval development, morphological processes of the *Xenopus laevis* (African Clawed Frog) with exposure to Bisphenol A is studied.

Induction of Temperate Cyanophage AS-1 by Phosphate. Prayag Patel¹, Kathleen Thomas¹, Lee H. Lee¹ and Tin-Chun Chu², ¹Montclair State University and ²Seton Hall University.

It has been reported that many marine cyanophages and freshwater cyanophage AS-1 are temperate and can be induced by different environmental factors. In this study, different concentrations of phosphate have been used to study the role of phosphate on the induction of temperate AS-1 from *Syn. sp.* IU 625. Concentrations of 0X, 1X, 2.5X, 5X and 10X phosphate of the control have been added in standard 3M media. The cultures were studied by the growth of the host and AS-1 production at different times after the addition of the phosphate. The results indicated that the induction of the temperate AS-1 varies in different phosphate concentrations. At 6 hours of growth after inoculation, 50% of lysis was observed at 0X and 1X of phosphate; 75% of lysis was observed at 2.5X and 5X of phosphate of the control. When the phosphate concentration reached to 10X, the lysis was about 80%. At 24 hours, all the concentrations of phosphate have more than 95% of lysis, and the plates became near clear. These results suggested that phosphate is one of the factors that can induce lysogenic to lytic infection.

Nuclear Envelope Fission in *Saccharomyces cerevisiae*. Priyal Patel¹, Patricia Melloy¹ and Mark Rose², ¹Fairleigh Dickinson University and ²Princeton University.

Recent studies have show that abnormalities in the nuclear envelope are related to human disease. To understand these illnesses, we must first understand what roles the nuclear envelope plays and what genes control its functions. To investigate these questions, we are working with *Saccharomyces cerevisiae*, or budding yeast. Unlike mammalian cells, yeast undergoes closed mitosis, which means that during mitosis the nuclear envelope never actually breaks down. Instead, the nuclear envelope undergoes fission during cell division. Though there are differences between yeast and mammalian cells, many of the proteins that are involved in nuclear envelope regulation in both organisms share similar functions. In yeast, we are interested in what proteins control nuclear envelope fission. Some of the candidate proteins involved include the septins. Septins are scaffold proteins that recruit other proteins to form complexes at the bud neck. These complexes serve as a platform for cytokinesis and as diffusion barriers. In addition to working with septin mutants, we are also looking at *dhc1*, *kar9*, and *cdc24swe1*. Preliminary data suggests that septins are not required to control fission, although passage through the bud neck is important for fission. Future studies will address what proteins control fission from the bud neck.

Identification of Plasmids, Mercury Resistance Genes and Primer Design for PCR Based Assay in Cyanobacterium *Synechococcus* sp. IU 625. Winder Perez¹, Constantino Lambroussis¹, Lee H. Lee¹, Quinn Vega¹ and Tin-Chun Chu², ¹Montclair State University and ²Seton Hall University.

Synechococcus sp. IU 625 (*Anacystis nidulans*) is a freshwater unicellular cyanobacterium and an obligate photoautotroph that readily harbors plasmids. Dense harmful algal blooms (HAB) of cyanobacteria in freshwater can affect

human and animal health either due to acute intoxication or allergic reactions. High liver and colon cancer cases have been found in communities near algal polluted lakes and rivers in previous studies. Therefore, the early detection and prevention using molecular approach of HAB are important issues in water quality management. In this study, primers were designed for PCR-based assay for priming *Synechococcus* sp. IU 625. Two approaches have been taken; one was to identify plasmids in *Syn.* IU 625 and the other is to identify the mercury resistant genes. Primers were designed based on plasmid genomes from *Syn. elongatus* PCC 7942. The designed primers have shown positive results on priming against *Syn.* IU 625 cells, *Syn.* IU 625 DNA and plasmid mini-prep samples. Positive priming of conserved *merA* and *merR* genes regions from the genome of *Syn. elongatus* PCC 7942 indicated that these genes exist in *Syn.* IU 625. Future studies will be carried out to determine if *mer* resistance in *Syn.* IU 625 is or is not plasmid-mediated.

Acid Sensing Ion Channels Regulate Neuronal Excitability by Inhibiting Potassium Channels. Elena Petroff¹, Margaret P. Price², Francois M. Abboud² and Michael J. Welsh², ¹Montclair State University and ²University of Iowa.

We previously showed that ASIC channels inhibit large conductance Ca^{2+} and voltage-activated K^+ (BK) channels when they are co-expressed in heterologous cells, and that acidic extracellular pH, the stimulus that activates ASICs, relieved BK channel inhibition. Both channels are widely expressed throughout the central nervous system. We therefore hypothesized that ASIC and BK channels might interact in neurons and alter BK function. We found that ASIC1a and BK co-immunoprecipitated from mouse brain, indicating that they are positioned for potential interaction. Moreover, ASICs inhibited BK currents in cultured cortical neurons, and this inhibition was relieved by a drop in extracellular pH. To test the consequences for neuronal function, we measured action potential firing and found that action potentials in cortical neurons from mice with disrupted ASIC1a, -2, and -3 genes were narrow and exhibited increased after hyperpolarization. These data are consistent with increased K^+ channel activity. Previous studies indicated that increased BK activity enhances action potential firing and predisposes to seizures (Brenner *et al.*, Nature Neurosci. 2005). Consistent with these observations, we found increased excitability in neurons from *ASIC1a/2/3* null mice compared to wild-type mice. These data suggest that ASIC and BK channels associate in vivo and their interaction regulates neuronal excitability.

Caffeine Alters the Symptoms of Alcohol Dependency in Adolescence. Darsi Pitchon and Dennis E. Rhoads, Monmouth University.

Binge-drinking during adolescence is correlated with alcohol dependency later in life. Alcohol abuse may be associated in various ways with caffeine consumption. Caffeine blocks adenosine activity in the brain while alcohol promotes it, and so the goal of this study was to determine if caffeine use alters adolescent alcohol dependency. Rats respond behaviorally to both alcohol and caffeine and previous

work from our lab established that adolescent Long-Evans rats develop a severe alcohol withdrawal syndrome (i.e., symptoms of alcohol dependency) when fed alcohol as part of a liquid diet. In the present study, we co-administered caffeine and alcohol to adolescent rats by including caffeine in the liquid diet, with or without pre-exposure to caffeine alone. Conditions were established so that the level of alcohol consumption was not different among test groups. Initial trials indicated that pre-exposure to caffeine decreased subsequent alcohol withdrawal seizure frequencies from 67% to 12%, implying the caffeine-dependent brain may be 'protected' to some extent from certain effects of chronic alcohol. Conversely, co-administration of caffeine without pre-exposure increased seizure frequency up to 83%. We conclude that caffeine can alter the chronic effects of alcohol and that the pattern of caffeine consumption may dictate whether these effects are greater or smaller.

Localizing the Cytohesin Binding Site in Interaction Protein for Cytohesin Factors (IPCEF). Clarice L. N. Richardson¹ and Lorraine Santy², ¹Medgar Evers College and ²Pennsylvania State University, State College.

The study and application of locating the Cytohesin 2/ARNO binding site in Interaction Protein for Cytohesin Factors (IPCEF) is a vital skill. Previous studies discovered Cytohesin 2/ARNO binds to the IPCEF Protein in the last 121 amino acids of the protein. The focus of our research is to localize the binding site of Cytohesin 2/ARNO in the IPCEF Protein because we need to know whether any other proteins have the same function (binding ability) within a specific region of the IPCEF Protein. We used IPCEF protein and performed transformation; culture transformed IPCEF protein; Maxi and Mini prep using QIAGEN kits; created a 0.8 % agarose gel; performed agarose gel electrophoresis; performed mutagenesis; performed digestion; measured DNA concentration; performed co-immunoprecipitation; split cell culture; performed transfection; and lastly performed Western Blots. We created two mutants (Mutant 389 and Mutant 405) and tested their ability to bind to Cytohesin 2/ARNO. Mutant 389 did not; however, Mutant 405 did. These results (binding ability) are significant because it demonstrates at least some of the amino acids between 389 and 405 are required for Cytohesin 2/ARNO binding. Future work will focus on locating Cytohesin 2/ARNO binding site in the IPCEF Protein.

The Secrets Out: the Neurotoxicity Effects of Pesticides on Neuro2a Cells During Inhibition. Jenny Rodriguez, Adelphi University.

One out of every 150 babies is born with Autism. About 2% have ADHD and 1 out of every 5 American children has a mental disorder. (Roberts, Eric M., 2007) The causes of Autism remains unknown but many current theories have allured us to believe that there's a problem with the function or structure of the central nervous system in child with Autism. These mental malfunctions have the retraction of neurites similar to those in a previous experiment. Previous research with Pc12 cells tested on the neurites of the cells with pesticides. Pesticides were used because pesticides are designed to damage the Nervous system of its target and they are used worldwide. The effects of these chemicals are harmful and are causing environmental damage and a new belief is mental problems.

The pesticides used were pyrethroid pesticides, which are supposedly the safest pesticide in the market so far. An addition of Nerve Growth Factor (N.G.F) was used to help the neurites grow in the Pc 12 cells. With the pesticide Bifethrin they came to a conclusion that the neurites retracted when they added the pesticide. This raised concern about the effects of these pyrethroids on the neural networking systems. The use of a new cell called Neuro2a was used for this experiment and 5 different pyrethroid pesticides were used instead of one. The use of a non pyrethroid pesticide was also tested on the Neuro2a cells. In addition a chemical called H7 was used instead of N.G.F because the Neuro2a cells do not retract to N.G.F. The results were that the pesticides had no effect on the neurites leading to a belief that the damage is actually occurring else where in the cell and not on the neurites.

Development of Spray-dried Aerosols for the Treatment of Respiratory Biofilms. Nearco Rodriguez¹, Jennifer Fiegel² and Emily Thomas², ¹Medgar Evers College and ²University of Iowa.

The purpose of this research was to evaluate the different factors in novel drug delivery systems to treat *P. aeruginosa* respiratory infections. During infection, *P. aeruginosa* colonies can mutate and form biofilms, becoming resistant to harsh environments by enveloping themselves in a polysaccharide matrix. The research involved creating an inhalable dry powder aerosol. Inhaled aerosols are efficient since they travel through the respiratory tract, specifically targeting lung infections. The dry powder was created by spray-drying Ciprofloxacin hydrochloride, a drug that is commonly delivered orally and intravenously to treat respiratory infections, along with Leucine to improve the aerodynamics properties of the powder. The aerodynamic diameter of the powder was measured using an Andersen Cascade Impactor and found to be within the ideal range of 1-8 microns for delivery to the lungs. The results demonstrated that dry-powder aerosols could be a very effective method for treating respiratory biofilms. Nearco Rodriguez is a participant in the Medgar Evers CSTEP and STEP programs, funded by the NYSDoE and NSF.

The Study of Chromosomal Aberrations in *Vicia faba* as a Result of Exposure to UVA and UVA Radiation. Ryan Rogers and Ammini Moorthy, Wagner College.

The aim of this research project is to study the mutagenic effects of exposure to Ultraviolet A (UVA), and Ultraviolet B (UVB) radiations on plant chromosomes. The plant of choice is the Fava Bean (*Vicia faba*) with its diploid chromosome number of 12. *V. faba* has become a favorite with cytogeneticists because of its low chromosome number as well as its large and easily identifiable chromosomes. Three different groups have been prepared and each of the three groups (Control, UVA-exposed and UVB-exposed) has two subgroups one with colchicine treatment and one without. Untreated cells provide all stages of mitosis and treated cells yield chromosome spreads. Chromosomes were examined under 1000X magnification from both categories. Preliminary results indicate that UVA and UVB exposure cause various types of aberrations in mitotic chromosomes. Special fluorescent staining procedures will be used to identify the chromosomes with aberrations, and a tally of mitotic indices from all three groups will be collected and analyzed statistically. This Research was supported by the Benjamin Cummings/MACUB Research Grant.

The Effects of Two Chelating Agents, Calcium Disodium EDTA and Diaminocyclohexanetetraacetic Acid, on Manganese Disruption of Mitochondrial Respiration in the Bivalve *Crassostrea virginica*. Claudette Saddler¹, Sherine Crawford², Margaret A. Carroll² and Edward J. Catapane², ¹Kingsborough Community College and ²Medgar Evers College.

Excessive levels of manganese in brain produces Manganism which is similar to Parkinsons. The mechanism of action is not understood and thought due to decreasing dopamine levels in brain, effecting dopamine receptors and producing oxidative stress to mitochondria. We showed manganese caused dose dependent decreases in mitochondrial O₂ consumption and p-aminosalicylic acid (PAS), a drug alleviating Manganism, protected mitochondria against manganese. PAS is an anti-inflammatory drug with chelating ability. Its ability to ameliorate Manganism is thought due to its chelating actions. We studied two chelating agents, calcium disodium EDTA (EDTAca) and diaminocyclohexanetetraacetic acid (DACH) on mitochondrial respiration in *Crassostrea virginica* gill, using Micro-Biological Oxygen Monitors with micro-batch chambers. Manganese (5µM - 5 mM) caused dose dependent decreases in respiration. Pretreating mitochondria with 1 mM EDTAca blocked the effects of manganese. Adding EDTAca to manganese treated mitochondria reversed effects of manganese. DACH was not effective in blocking or reversing actions of manganese, and had its own inhibitory effects on respiration. The study demonstrates the chelator EDTAca was an effective blocker against the manganese and may be beneficial in reversing negative effects of manganese accumulations. It also provides evidence the ameliorating effects of PAS on Manganism is related to its chelating actions.

Isolation and Identification of Antibiotic Resistant Bacteria from Manhattan Beach, NY. Salome Mikaelle JeanLouis and Carolle Bolnet, Medgar Evers College.

Our group is interested in exploring the diversity of soil bacteria in different locations in Brooklyn: Manhattan Beach, Coney Island Beach, Down State, and Prospect Park. These locations represent a variety of natural and anthropogenic factors. We showed that the highest concentration of bacteria exhibiting antibiotic resistance was found in Manhattan Beach and that one third showed resistance to vancomycin, an antibiotic typically used as the last resort in the treatment of methicilin resistant *Staphylococcus aureus* (MRSA) infections. In this present study, our main purpose is to identify these antibiotic resistant bacteria for a better estimation of their potential threat to human health. DNA was extracted from the pure cultures followed by 16S rDNA gene's PCR. After sequencing, the obtained gene sequences were compared to other bacterial 16S rDNA sequences in GenBank. The search results revealed isolates exhibiting a 99% nucleotide similarity to *Ralstonia mannolilytica* and *Ralstonia picketsii*. These bacteria are rarely isolated from clinical specimens; nevertheless, they have been reported in neonatal bacteremia outbreaks, in patients with cystic fibrosis and in patients using respiratory gas humidifiers or catheters. The epidemiological implications of our findings are the subject of ongoing investigation. Salome JeanLouis is a Science-CSTEP participant.

Identification and Distribution of Octopamine in Ganglia and Innervated Organs of *Crassostrea virginica*. Dahnial Samuel, Elsie Lagares, Edward J. Catapane and Margaret A. Carroll, Medgar Evers College.

Octopamine is a biogenic amine first identified in octopus and has been well studied in arthropods and a few gastropods, serving as a neurotransmitter and hormone. Octopamine has been rarely reported in bivalves and not in *Crassostrea virginica*. We utilized HPLC to determine if octopamine is present in ganglia and tissues of *C. virginica*. Amines were measured by HPLC with fluorescence detection, using an isocratic, ion-pairing analysis with fluorescence detection. Cerebral ganglia, visceral ganglia, gill and palps were dissected, weighed, homogenized, centrifuged, filtered and injected into a Beckman HPLC system with a Phenomenex Gemini 5 μ C18 column and a Jasco FP 2020 Spectrofluorometer. The mobile phase was 50 mM acetate buffer (pH 4.7) with 1 mM EDTA, 1.1 mM SOS and methanol (85%/15%, v/v). Octopamine was found in ng amounts in gill, palps, cerebral ganglia and visceral ganglia. Endogenous octopamine levels were increase when animals were treated with tyramine, an octopamine precursor. The octopamine peak was verified by injecting samples spiked with standard octopamine. The study identifies octopamine in nervous system and innervated organs of *C. virginica*. The physiological role of octopamine in *C. virginica* is not known and should be explored.

Engineering CALB for Metal Binding. Mark Schofield¹, Jaladhi Nayak¹, Chandani Limbad¹, Susheel Gunasekar¹, Wenhua Lu¹, Zhang Xioyan¹ Jin Kim Montclare^{1,2} and Richard Gross¹, ¹Polytechnic University and ²SUNY Downstate Medical Center.

We are introducing a new metal binding site into a protein which is not a metalloprotein originally and will create metalloprotein capable of performing olefin metathesis. Candida Antarctica Lipase B (CALB) is selected as a scaffold to prepare a Ru metalloenzyme, which can perform olefin metathesis. CALB is reengineered for binding to Ru. We used metal search software to design proper mutants for metal binding. The mutants are created using site directed mutagenesis. Characterization of activity and ability to bind Ru is underway, which will be then tested for ring closing metathesis with diallylmalonate as a substrate.

Identifying Target Genes for Hypoxia-Inducible Factor-1 in the Testis. Anoop Shah and Rebecca Tyson, Monmouth University, Faculty Mentor: Dr. Michael A. Palladino.

Testicular torsion occurs from a twisting of the spermatic cord, resulting in diminished blood flow (ischemia) to the testis. The ischemic testis then reaches a state of hypoxia, where there is a severe deficiency in the amount of oxygen reaching tissues of the testis. Testis hypoxia and ischemia result in germ cell apoptosis and decreased spermatogenesis, yet other cells in the testis such as Leydig and Sertoli cells appear to be protected from apoptosis. Previously, we have shown that the transcription factor hypoxia-inducible factor-1 (HIF-1), a key regulator of oxygen homeostasis, is abundantly expressed in both the normoxic and hypoxic testis. Results from an enzyme-linked immunosorbent assay (ELISA) demonstrated the binding of testicular HIF-1 to a hypoxia-response element

promoter sequence, indicating HIF-1 is active in both normoxic and ischemic testis. However, target genes for HIF-1 in the testis have not been identified yet. We hypothesize that HIF-1 may activate *Mcl-1*, an antiapoptotic gene expressed in Leydig cells, to protect Leydig cells from torsion-induced apoptosis. Our prior studies using a model of experimentally induced torsion in male, retired-breeder Sprague-Dawley rats, demonstrated the presence of *Mcl-1* protein in Leydig cells of the normoxic and ischemic rat testis. Chromatin Immunoprecipitation (ChIP) analysis is currently underway to determine if *Mcl-1* is a HIF-1 target gene.

***In vitro* Anti-proliferative Effect of an Isoflavonoid on HO-1 Human Melanoma Cells. Julee A. Shah¹, Carleta A. Joseph¹, Virinder S. Parmar² and Anthony L. DePass¹, ¹Long Island University and ²University of Delhi.**

Polyphenols abundantly occur in the plant kingdom and may play an important role in cancer treatment. In this experiment, we investigated the influence of a newly synthesized isoflavonoid, 7-dimethylallyloxy-2-methyl isoflavone, which will refer to as VSP-29, on cell proliferation, viability and morphology in HO-1 human melanoma cancer cells. We observed that treatment with a single dose of VSP-29 at sub microgram/ml levels decreased cell proliferation without affecting viability as determined by the Trypan Blue exclusion method. We also find that a single treatment of VSP-29 stimulated cell dendricity, a morphological feature of differentiated melanocytes. A decrease in proliferation of treated cells after 48 and 72-hour treatment exhibited in VSP-29 treatment. This effect also observed after the removal of VSP-29 at the 24-hour treatment time point. We intend to identify the pathways through which VSP-29 employs to decrease the proliferation rate and induction of differentiation on HO-1 cells. Ongoing research includes identification of genes, which affected by the treatment of VSP-29.

The Biodiversity of Water Birds at Oakland Lake, Bayside, Queens, New York. Scott C. Sherman, Brandon O. Ford and Curtis S. Moore, Queensborough Community College.

The biodiversity of water birds is currently being studied at Oakland Lake in Bayside, Queens, New York. Oakland Lake is a freshwater glacial lake along the Atlantic Coast migratory flyway on Long Island in the highly urbanized New York City borough of Queens. It is part of Alley Pond Park and is administrated by the New York City Department of Parks and Recreation. The lake and the surrounding wetlands and wooded parkland have a rich biodiversity of animal and plant species. The birds are the most noticeable group of animals and large numbers of migratory birds visit the lake during the fall, winter, and spring. The current study began in September 2007 and the first year's results are given here along with information about the lake's geography, history, and ecology.

Developing a DNA barcode of black bullhead, *Ictalurus melas*, for identification and phylogeny. Ibrahim Shodunke and, Z.M.G Sarwar Jahangir, Kingsborough Community College CUNY.

Black bullhead (BBH), *Ictalurus melas*, is important in US economy, when catfish sales reached \$425 million in 2003. Identification of BBH from tissue and contaminated samples is

difficult which limits the effectiveness of regulatory agencies. A DNA barcode will help to identify samples of BBH and allow researchers to study its origin, evolution and phylogeny. BBH flesh was minced in 1X SSC, pH 7.0, with meat tenderizer, centrifuged at 850g at 4°C for 5 minutes, resuspended, and recentrifuged as above. The pellet was suspended in homogenizing solution containing 0.05 M Tris, 0.025 M KCl, 0.005 M Mg-acetate, 0.35 M sucrose and 0.5% Triton X-100, pH 7.6, centrifuged at 5,000g at 4°C for 10 minutes, the supernatant collected and digested with Proteinase K for 3 hrs at 37°C followed by centrifugation at 10,000g at 4°C for 10 minutes and the supernatant collected. Two volumes of 95% ethanol were added, chilled at -23°C and centrifuged at 10,000g at 4°C for 10 minutes. The precipitate (DNA) was resuspended in TE, pH 7.5. Each DNA sample amplified using the forward 5'GGTACAGCCCTCAGCCTCTAATT 3' and reverse 5'CTCTACCCAGAGGAGCGAGGAG 3' primers will be sequenced, aligned for a consensus sequence, and submitted to the GenBank database.

Alterations in Cell Density Influence Expression of E-cadherin. Michael Slisz, Ruth Adekunle and Dorothy Hutter Lobo, Monmouth University.

E-cadherin is an integral protein that plays an important role in cellular adhesion. Loss of E-cadherin through down regulation decreases the ability of the cell to adhere. E-cadherin can be cleaved to form an 80 kDa unit, which is inactive. Observations show that as the level of MMP-9 increases, a peptidase enzyme that plays a role in the degradation of the extracellular matrix, the level of intact E-cadherin expressed decreases. Observations also show that E-cadherin stimulates the mitogen-activated protein kinase (MAPK) pathway, specifically the ERK MAP kinase. It was hypothesized that upstream signaling pathways may inactivate ERK expression and cadherin-regulated signaling. Fibroblast cells (BJ) were used to determine whether E-cadherin was expressed differently in confluent and subconfluent cells, and also if E-cadherin expression was correlated to MMP-9 and ERK expression. Our results demonstrate that the inactive form of E-cadherin (80 kDa) is definitely expressed in normal fibroblasts (BJ cells), and is expressed at a slightly higher level in subconfluent cells than confluent cells. MMP-9 is also expressed in subconfluent BJ cells. These results suggest a possible regulation of E-cadherin-dependent signaling upon confluence. Expression of these proteins will also be compared in fibrosarcoma cells, which lack contact inhibition.

Controlling the Expression of Mammalian PKC α with GAL1 Promoter. Taramattie Singh¹, Mohammed Awan¹, Corinne A. Michels² and Nidhi Gadura¹, ¹Queensborough Community College, CUNY and ²Queens College, CUNY.

Hsp90 is a molecular chaperone essential to the folding, activation and maturation of small number of distinct client proteins. Elevated PKC α activity increases the motility of human breast and melanoma cells. Results from Rotenberg laboratory show that Hsp90 and PKC α co-immunoprecipitate from mammalian cell lysates. We hypothesize that PKC α is a possible client protein of Hsp90. Our data indicates that mammalian PKC α overexpression in the *Saccharomyces* strain W303 significantly slows the growth rate. Overexpression was achieved using the constitutive GPD

promoter carried by a yeast CEN vector. Consistent with this finding, transformants carrying the GPD - PKC α gene vary up to 3 times larger than normal. To study this phenotype further, mammalian PKC α will be expressed under control of the easily regulated GAL1 promoter. Our project is to amplify the GAL1 promoter sequence from plasmid pFJ44 (provided by J. Brodsky) and insert the resulting fragment into sites upstream of the triple HA-tagged PKC α ORF in plasmid p413, a CEN plasmid.

Use of DNA Barcoding Utilizing the Cytochrome C Oxidase I Gene to Determine Whether Sub Speciation Exists Amongst the Eastern Oyster (*Crassostrea virginica*) Cultivated in Jamaica Bay over the Past Seven Years. Svetlana Solomonova, Gary Sarinsky and Craig Hinkley, Kingsborough Community College.

Jamaica Bay (JB) was once abundant with the Eastern Oyster (*Crassostrea virginica*). In the early 1900's, oyster beds began to disappear and now none are known to exist. Plans are being formed to rehabilitate the oyster into JB. It would be ideal if species indigenous to JB be used. Therefore, genetic studies must be conducted to understand the species and subspecies characteristics of the Eastern Oyster prior to its introduction. In this study, we performed DNA barcoding on oysters obtained seven years, five years and two years ago that were supplied by Frank M. Flowers & Sons, Oyster Bay, N.Y. and used in previous studies. DNA barcoding was used to determine if any polymorphisms are present utilizing the mitochondrial cytochrome-c oxidase subunit I (COI) gene. DNA from seven, five and two year old oysters was extracted and then amplified using the Folmer primer. Sizes of the COI PCR products for each sample were determined and confirmed by gel electrophoresis. The samples were then sent to Elim Biopharmaceuticals, Inc. for DNA sequencing. The seven, five and two year old oysters showed no polymorphisms suggesting that the oysters tested are all of the same species and do not exhibit sub speciation.

Morphological Variation in the Forelegs of the Hawaiian Drosophilidae. I. The AMC Clade. Julian B. Stark^{1,2} and Patrick M. O'Grady³, ¹Queensborough Community College, ²American Museum of Natural History and ³University of California.

Hawaiian Drosophilidae possess spectacular diversity in male foreleg modifications. The greatest diversity in foreleg morphology is in the *antopocerus*, *modified tarsus*, and *ciliated tarsus* clade, a group of 95 species. The *modified tarsus* flies are divided into the bristle, ciliated, split, and spoon tarsus subgroups. The bristle tarsus species feature one or two rows of thickened elongate setae on the basitarsus. The split tarsus species are characterized by only having four tarsal segments. Based on comparisons of the apparent ground state of ventral setal rows across the Hawaiian *Drosophila*, we suggest that it is the second tarsal segment which has been lost. The spoon tarsus species are characterized by having the second tarsomere modified into a setae-filled, concave-shaped spoon. The ciliated tarsus species, all of which possess one or more elongate setae on the tarsus of males are probably not monophyletic with respect to the bristle tarsus subgroup. The *antopocerus* flies are characterized by a long basitarsus, with extensive setation on the tibia and basitarsus of some species.

these foreleg modifications are used in courtship behavior, suggesting that they represent the results of sexual selection. The current work presents a level of detail not previously possible without SEM images.

Distribution, Diversity, and Abundance of Marine Sponges in Cape Eleuthera, The Bahamas. Jillian Stokley and Ursula Howson, Monmouth University.

With the increasing pressure on local fish stocks to sustain their economy, there is an unambiguous need for alternative and sustainable sources of income for the local communities of the Bahamas. The modern Bahamian sponge industry is currently underdeveloped despite the growing global demand in the cosmetic, medical, pharmaceutical, and chemical markets. The goal of this research is to categorize the species diversity and abundance in the surrounding marine areas of Cape Eleuthera. The information recorded will then be used to determine the location and abundance of commercially viable species. The sponges in this study are located in the semi-tropical waters of Cape Eleuthera, The Bahamas. Observers counted and identified sponge species located within one meter along a 10 meter transect line. Five transects were conducted at each of five different locations in Cape Eleuthera. The locations represented different habitats corresponding to different levels of wave energy. The data were then analyzed using the Shannon Diversity Index as an indicator of species diversity. Diversity index values were statistically compared across locations to determine site effect.

Molecular Analysis of *Drosophila* Nervous System Development in Odd-paired Mutants. Ozlem Tarhan and Eric Iannacone, Fairleigh Dickinson University.

The fruit fly, *Drosophila Melanogaster*, is a common model organism and molecular biology tools, used in developmental biology due to its powerful genetics. In this experiment, two types of *D. Melanogaster* were used to elucidate the role of the odd-paired (*opa*) gene in nervous system; wild type Oregon-R (Ore-R) and mutant strain 3222/*opa*¹. The embryos of Ore-R wild type and *opa*¹ mutants were collected at 24 and 48 hours of development and fixed with formaldehyde. We then performed immunocytochemistry with two different antibodies Elav and Fas II that mark neuron cell bodies and axons respectively. Then they were dissected and mounted to see the patterning defects on the nervous system. Here we report major defects in nervous system development in the *opa*¹ mutants.

Characterization of Novel Genes Potentially Involved in the Regulation of Bone Mass. Rachel Towlen¹, Randy Astaiza¹, Kevin Basile¹, Fayez Safadi², Steve Popoff² and Tom Owen¹, ¹Ramapo College of NJ and ²Temple University School of Medicine.

Osteoporosis is characterized by the progressive loss of bone mass, typically with age, to the point where bone architecture and mechanical strength is compromised resulting in an increased risk of fracture. Current therapies primarily rely on the administration of bisphosphonate drugs such as alendronate which stop further loss of bone but have little efficacy in restoring lost bone. The goal of our work is to characterize genes not previously associated with bone in

order to identify signaling pathways which may lead to new therapeutic targets for restoring lost bone mass. We previously performed a differential analysis of gene expression between the calvaria and long bones of osteopetrotic (too much bone) mutant rats (*op/op* mutants) and their normal littermates. This analysis identified approximately 160 genes whose expression may be related to the increased bone mass in the mutant rats. Two of these genes, connective tissue growth factor and osteoactivin, have been extensively characterized and reported. In our current work, we have amplified six more of these cDNAs by PCR and have cloned the products, ranging in size from 500 to 1500 bp, into a plasmid vector for DNA sequencing. Following bioinformatics analysis of the resulting DNA sequences, we plan to confirm the differential expression of each gene between high and low bone mass states, clone full length cDNAs for the genes of interest, and then pursue their roles in the regulation of bone mass.

Forests Under Pressure: Evaluating the Plant Diversity of 70-Year Old Conifer Stands Introduced by the Civilian Conservation Corps. Michael Trombatore, Robert French, Anthony Onyeagoro and Daniela Shebitz, Kean University.

In the 1930s, the Civilian Conservation Corps planted coniferous forest stands in New Jersey's Watchung Reservation, an otherwise deciduous forest ecosystem. Today, the Reservation is the largest park in Union County, New Jersey and contains almost 2000-acres of diverse habitat. Surrounded by urbanization, Watchung Reservation is highly vulnerable to invasion by non-native plants. Our project includes the comparison of biodiversity in coniferous stands planted by the CCC that were chosen based on their distances from Interstate 78, which runs through the Reservation's northwest boundary. We established nine 314 m² plots (three replicates for three distances from I-78) in which we estimated each plant species' percent cover, conducted soil analysis, and aged the trees. Preliminary data suggest sites closer to the road have earlier successional stages, despite having a stand age similar to those sites further in the reservation. The early successional stage is represented by their dense understory and relatively sparse overstory. We suggest that native plant growth and regeneration in sites near I-78 therefore are being inhibited by urban influences such as vehicular traffic and invasive species introduction. This work was made possible through a Kean University Students Partnering with Faculty Grant.

G-Quadruplex Motifs May Be Involved in Regulated Splicing of Human and Mouse Pre-mRNAs. Viktor Vasilev¹, Zachary Zappala², Lawrence D'Antonio¹ and Paramjeet S. Bagga¹, ¹Ramapo College and ²Ramapo College of New Jersey.

G-quadruplexes play diverse roles in key cellular processes and human disease. We have adopted a bioinformatics approach to study the composition and distribution patterns of G-quadruplexes in >12,000 human and mouse pre-mRNAs, including those that are alternatively processed. G-quadruplexes were found to be associated with 5' and 3' splice sites in more than 95% of the exons and ~80% of the introns. Over 400,000 of exons and introns were

analyzed. The quadruplexes were more frequently found near the terminal 5' splice sites in human and mouse pre-mRNAs. Highly stable G-quadruplexes were prevalent within 5-50 nucleotides of 5' splice sites in the introns. Stable RNA G-quadruplexes may be involved in modulating splicing via interactions with regulatory proteins that bind G-quadruplexes and influence alternative and tissue specific splicing events. We also discovered a very strong correlation between the distribution of the Exonic Splicing Enhancers (ESEs) and G-quadruplexes in alternatively spliced as well as constitutive exons. ESE mediated regulated splicing may in fact involve the G-quadruplex structure. We propose that the formation of G-quadruplex structure sequesters ESEs and makes them unavailable for binding to the splice regulatory proteins. Our findings suggest that G-quadruplexes play a regulatory role in splicing of pre-mRNAs.

Phenotypic Characterization of *Saccharomyces cerevisiae* Cells Expressing Mammalian PKC α . Josephine Welle¹, Taramattie Singh¹, Mohammed Awan¹, Corinne A. Michels² and Nidhi Gadura¹, ¹Queensborough Community College, CUNY and ²Queens College, CUNY.

PKC α is a member of the serine-threonine protein kinase family. It phosphorylates target proteins and is known to be involved in diverse cellular signaling pathways. Elevated PKC α activity leads to increased motility of human breast and melanoma cells. Hsp90 is an essential molecular chaperone required for folding, activation and maturation of several client proteins. Previous studies from our collaborator suggest that PKC α might be a client of Hsp90. Our study is designed to investigate the possibility of a PKC α Hsp90 interaction in a yeast model. As part of this project, we found that *Saccharomyces cerevisiae* transformants overexpressing mammalian PKC α resulted in a petite colony phenotype in a wild-type strain (W303) but not in isogenic strains carrying alterations in Hsp90 chaperon components. Spectrophotometry was used for the growth rate experiments. Digital microscopes were used to capture images of *S. cerevisiae* and Motic Images 2.0 software was used to measure cell size. Our data indicates that PKC α overexpression results in a significantly slowed growth rate. Interestingly, cells carrying the PKC α plasmid are up to 3 times larger in size. These findings suggest that abundant PKC α overexpression causes delays and defects in the cell cycle and that this phenotype is dependent on the Hsp90 chaperone. *GAL1* regulatory promoter will be used to study this phenotype in detail.

Periodontal Disease in Asian Indian Vegetarians. Darryl Williams, Raji Subramaniam and Patricia Schneider, Queensborough Community College.

While disparities in the prevalence and severity of periodontal disease have been reported for minority populations, there is a lack of research on Asian immigrants who appear to be particularly susceptible to periodontitis. This study investigated the distribution of the three pathogens in Asian Indian periodontal patients at a private dental clinic. The BANA enzyme assay was performed on subgingival plaque samples taken during routine scaling. DNA was extracted from paper points used by the dentist to collect samples of subgingival fluid. PCR detected specific pathogens based on

the amplification of signature sequences of the small subunit 16S rRNA genes. We examined the relationship between bacterial distribution, BANA score, demographic factors, Dietary habits and clinical parameters (pocket depth, dental history and bleeding on probing). Among vegetarian patients, *P. gingivalis* and *T. forsythensis* were detected with equal frequency (56%). *T. denticola* was found in only 31% of these patients. In non-vegetarian patients, *T. denticola* was the predominant pathogen (63%) while *P. gingivalis* and *T. forsythensis* were detected at low frequencies (25%, 13%). These differences in pathogen distribution suggest that dietary habits may impact the microbial flora of Asian Indians.

Preparation of the Histone Acetyltransferase tGCN5 For Fluorine NMR Studies. Ching-Yao Yang, Natalya Voloshchuk and Jin Kim Montclare, Polytechnic Institute of New York University.

Tetrahymena GCN5 (tGCN5) is histone acetyltransferase that acetylates the lysine residue of histones, enabling access to DNA by transcription factors. In order to search for the key residue of tGCN5 that affects the stability and activity, we incorporate the fluorophenylalanine into tGCN5. Incorporation of fluorinated phenylalanine allows for structural studies by fluorine nuclear magnetic resonance. For the experimental purpose, high concentration of protein is needed. However, protein aggregation is the main problem when we purify and concentrate tGCN5. Here we describe our efforts towards increasing the concentration of tGCN5 by ultrafiltration and stabilizing the protein using kosmotropic and chaotropic agents.

Determination Whether Sub Speciation Exists Amongst the Eastern Oyster (*Crassostrea virginica*) At Selected Locations Using DNA Barcoding of the Cytochrome C Oxidase I Gene. Marina Yapport, Gary Sarinsky and Craig Hinkley, Kingsborough Community College.

Over-harvesting, disease and the decline of water quality due to urbanization and industrialization are causes cited for the disappearance of the Eastern Oyster (*Crassostrea virginica*) in Jamaica Bay (JB). Preparations are now being made to reintroduce the oyster into JB. Agencies in charge of JB require that indigenous species be used. Since there are no known oysters in JB this requirement presents a problem. In this study, we performed DNA bar-coding on oysters grown in Shell Rock, Delaware Bay, Hope Creek, Delaware Bay and the Damariscotta River, Maine to determine if there were any polymorphisms that could indicate if there are oyster subspecies in this region. A portion of the mitochondrial cytochrome c oxidase I gene (COI) is known to vary between species making it an excellent candidate to determine a unique DNA barcode for species and subspecies identification. Mitochondrial DNA was extracted using a DNeasy Tissue Kit. PCR amplifications of the COI gene region were carried out using the Folmer primer. Sizes of COI PCR products for each tissue sample were compared by electrophoresis and the samples were submitted for DNA sequencing. A comparison of the DNA sequences from the three locations and oysters grown under controlled conditions in JB showed no polymorphisms suggesting that the oysters tested are of the same species and do not exhibit sub speciation.

The Effects of Two Forms of EDTA, on Cadmium Accumulations in Gill of the Eastern Oyster, *Crassostrea virginica*. Mona Yates, Margaret A. Carroll and Edward J. Catapane, Medgar Evers College.

Cadmium adversely affects a number of organs, including kidney, liver and lung by inducing apoptosis or carcinogenesis. Routes of exposure include cigarette smoke and ingestion of cadmium contaminated food. Cadmium pollution is widespread in aquatic environments and marine animals accumulate cadmium. Gill of *Crassostrea virginica* is a good tissue to study cadmium accumulations. We showed p-aminosalicylic acid did not reduce cadmium accumulations in gill. Sodium EDTA (EDTANA) was moderately effective in reducing accumulations. In clinical setting, calcium EDTA is preferred for metal chelation. We sought to determine if there was a difference in efficacy of the two forms of EDTA. Gills were incubated with 500 μ M cadmium then incubated with the EDTAs for 3 days. Cadmium levels were measured using Atomic Absorption spectrometry with a THGA graphite furnace. Low concentrations of EDTANA did not reduce cadmium accumulations; however, higher concentrations were moderately effective. EDTACA was significantly more effective in reducing cadmium accumulations, especially at low concentrations. Cadmium accumulations cause serious toxic effects in animals and it can be valuable to find effective agents that can remove cadmium from tissues and blood.

Protein Engineered Biomaterials Based on COMPcc and Elastin. Carlo Yuvienco¹, Jennifer S. Haghpanah¹, Hanna Barra¹, Min Dai¹, Susheel Gunasekar¹, Peter James Baker¹, Wendy Hom¹, Natalya Voloshchuk¹ and Jin K. Montclare^{1,2}, ¹Polytechnic Institute of NYU and ²SUNY Downstate Medical Center.

Advances in molecular biology techniques have revolutionized the ability to engineer protein-based biomaterials. We aim to design novel synthetic biodegradable protein polymer constructs composed of unique block polymers via genetic engineering techniques. By combining cartilage oligomeric matrix protein coiled-coil (COMPcc) and elastin-like polypeptide (ELP), we have generated diblock and triblock copolymers. We have synthesized and purified the homopolymers COMPcc and ELP, along with the COMPcc-ELP and ELP-COMPcc diblock copolymers, as well as the triblock ELP-COMPcc-ELP. These polymers have been characterized via circular dichroism (CD), dynamic light scattering and fluorescence. The lessons learned from our studies will provide insight into future biomaterials design.

The Alu Genotype and Ethnicity. Yun Zhao and Regina Sullivan, Queensborough Community College.

In contrast to prokaryotic genomes, eukaryotic DNA (including humans) contains large portions of noncoding sequences. The Alu sequences are present in human noncoding sequences. Our hypothesis is that the presence of Alu sequences varies ethnicities. Polymerase chain reaction was used to determine Alu genotypes of individuals from different ethnic groups.

ICER Binds to Multiple Loci Throughout the Genome. J.P. Zichella, L.C. Muniz and C.A. Molina, Montclair State University.

The events culminating in ovulation are controlled by the cyclical actions of hormones such as Follicular Stimulating Hormone (FSH) and Luteinizing Hormone (LH). The secondary messenger, cyclic AMP (cAMP) conveys the intracellular activity of these hormones. It is well established that a family of transcription factors facilitate cAMP mediated gene expression, yet it remains unknown how these factors directly affect ovulation. One of these factors, Inducible cAMP Early Repressor (ICER) has been implicated in the transcriptional regulation of cAMP inducible genes during folliculogenesis and ovulation. In order to better determine the role of ICER in ovarian function we have identified novel targets using a genome-wide approach. Using a modification of the chromatin immunoprecipitation (ChIP) assay we directly cloned and sequenced the immunoprecipitated ICER-associated DNAs from an immortalized mouse granulosa cell line (GRMO2). The subcloning of the immunoprecipitated DNA fragments for the generation of a DNA library has thus far revealed of the 70 clones that were sequenced: 16% were within the promoter region, 31% were within an intron, 14% were not within a gene, 6% were within 20kb of a promoter and 3% were within the 3' end.

The Fall 2008 Conference Member Presentations

STEP into Science at Medgar Evers College. Dereck Skeete, Margaret A. Carroll and Edward J. Catapane, Medgar Evers College, Brooklyn, NY.



Over the next decade, demand and job opportunities in science and engineering (S&E) are expected to continue to grow and questions arise as to whether America will be able to attract enough young people into Science, Technology, Engineering and Mathematics (STEM) to maintain a S&E workforce that is competitive globally; and considering recent U.S. Census reports, will our future STEM workforce reflect the racial and ethnic diversity projected for the growing U.S. population? In 2006, the authors initiated a *STEP into Science* program at Medgar Evers College. Funded under the Science, Technology, Engineering and Mathematics Talent Expansion Program (STEP) of the National Science Foundation (NSF) Division of Undergraduate Education, the main goal is to increase the number of STEM majors that graduate with baccalaureate degrees in Biology or Environmental Science. The program has had great success implementing the use of peer recruiters to attract more high school, transfer, and non-science college students into STEM majors and places emphasis on the role of undergraduate research experiences as a successful strategy to increase the quality and retention of science majors through their B.S. degree. Since the inception of the program, total STEM enrollment has more than doubled and the number of majors actively engaged in research has risen 38% with a concurrent increase in student research presentations at scientific conference, and the number of students receiving external research internships and travel awards to attend national conferences. STEM graduates have also increased and the program anticipates that these and future *STEP into Science* graduates will continue on to Masters and Doctoral programs in STEM and ultimately enter rewarding careers in the science enterprise. Supported by grant 0622197 of the DUE Program of NSF.

The Biotechnology Bridge - A Collaboration of a TwoYear and a Four Year College to Create a Pathway from High School through College to Biotechnology Careers. R. Eckhardt, C. Hinkley, S. Jahangir, M. Kogen, M. Ortiz, C. McEntee, P. Pilchman, K. Polizzotto and A. Zeitlin, Kingsborough Community College, Brooklyn, NY.



Kingsborough Community College announces a new 2-year (A.S., Biotechnology) degree program. The program is designed for high school graduates who wish to gain job-related skills for immediate employment in the biotechnology industry. Students can also continue their studies toward a 4-year Bachelor's degree in biological sciences at Brooklyn College, further enhancing their earning potential in the biotechnology field. The program's content is based on industry need determined by direct contact and questionnaires to local and national Biotech companies, and grant personnel capable of teaching that content in newly created biotech courses to be taught during the students' first 2 years at Kingsborough. All students recruited into the BT Bridge will also become part of our currently running, NSF-funded, Brooklyn Gateway project entitling them to enroll in gateway courses (Biology 1, Chemistry 1 and Physics 1) taught utilizing the demonstrably successful Peer-Led-Team-Learning (PLTL) approach, to receive free tutoring, attend science-oriented seminars, attend trips to local science centers, and the opportunity to participate in mentored research. The program is front-loaded: students completing their first two years at KCC will be immediately qualified for entry-level jobs in the BT industry. Further study at BC leading to the BA/BS degrees will enhance their knowledge and increase chances for advancement in the BT field. Additional program highlights include summer workshops for high school teachers to enhance our recruitment efforts in the high schools during the academic year, summer workshops for college teachers to increase biotech awareness in local college curricula, the development of instructional videos on biotech topics to be made available on the Internet, and comprehensive tracking of students and assessment of the program's effectiveness.

Introducing Research and Primary Literature to community College Students. Regina Sullivan, Queensborough Community College, Bayside, N.Y.



It is well known that traditional lecture teaching methods usually do not lead to a high level of student success rates in STEM courses. The current research also shows STEM students are disconnected from the Scientific process. In order to address these failings in STEM post-secondary education, Sally Hoskins of CUNY and Leslie Stevens of University of Texas, Austin developed the C.R.E.A.T.E. teaching method. C.R.E.A.T.E is an acronym for consider, read, elucidate hypothesis, analyze and interpret data, and think of the next experiment was implemented in a biological research course at Queensborough Community College. The mechanism of the method, student reaction and student outcomes will be discussed.

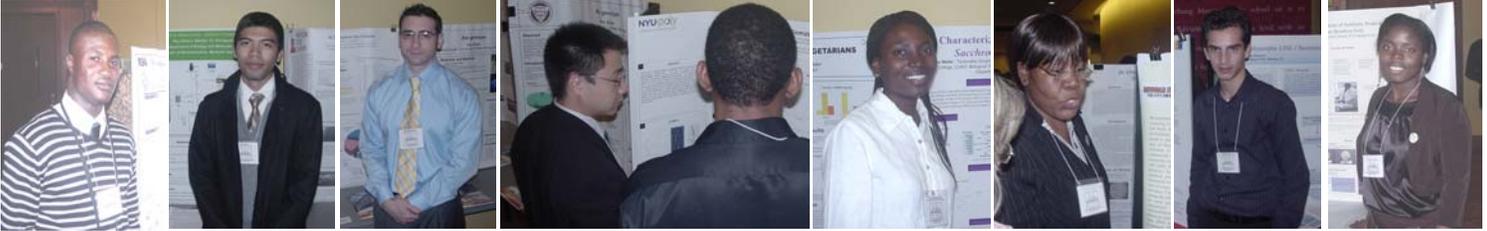
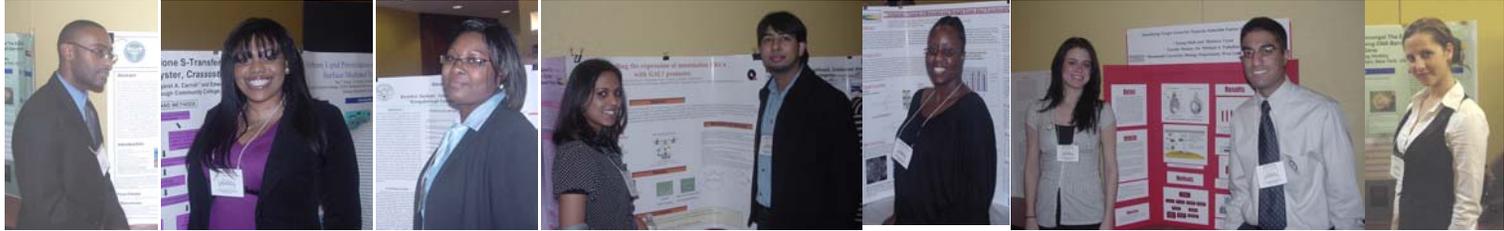
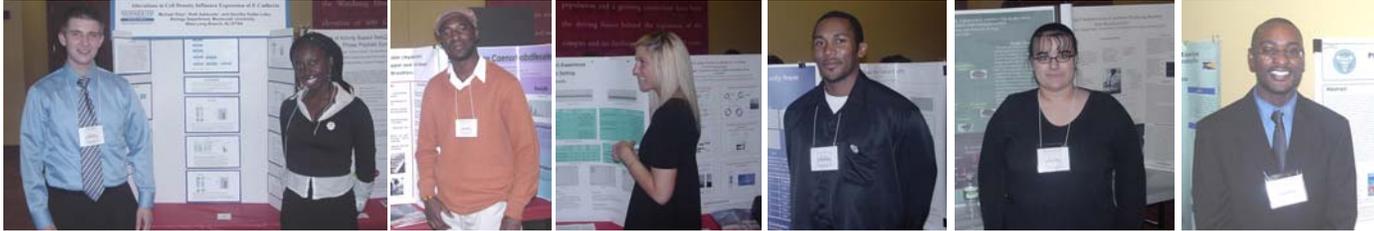
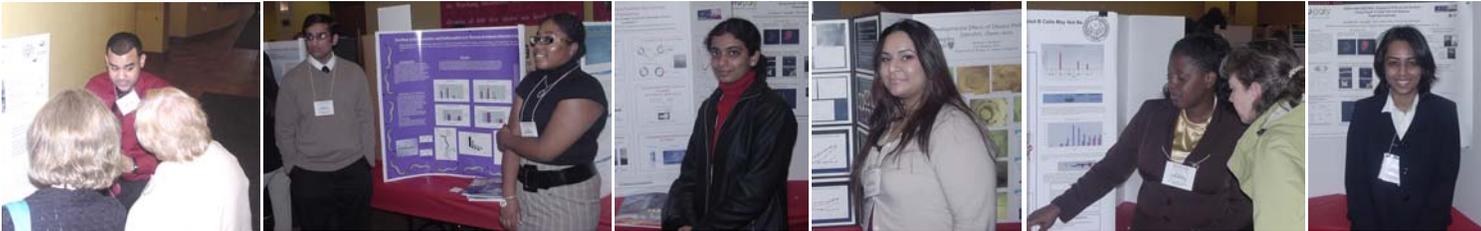
Some Ecological Observations of an Old Growth Forest Corson's Woods, Staten Island, New York. Richard Stalter, Anna Jung and Swampan Bhuiyan, St. John's University, Queens, N.Y.



Corson's Woods, a 150 year old growth woodland, is located in Staten Island, New York. Trees at Corson's Woods, were sampled by the quadrat method in April and May, 2008, and compared with the trees present at a similar moist woodland at Inwood Park, Manhattan, New York, sampled by Stalter in 2005. *Liriodendron tulipifera* and *Acer saccharum* were the dominant trees at Corson's Woods and at the Moist Valley, Inwood Park, ranking first and second respectively in importance. *Liriodendron* was the first in relative dominance at both sites. *Acer saccharum* ranked second in relative dominance at Corson's Woods and third in relative dominance at the moist woodland, Inwood Park. We compared the present forest at Corson's Woods with the historical (1935) forests at Inwood Park and Alley Park, New York. In the future we will sample and analyze the sapling, shrub and herbaceous vegetation at Corson's Woods.



Conference Highlights



Benjamin Cummings/MACUB Student Research Grants

Purpose

To provide investigative research support for undergraduate students working under the supervision of faculty who are current members of MACUB.

Awards

Applications will be evaluated and awards granted based on the scientific merit and overall quality of the proposed research experience.

4 grants of \$500 each will be awarded annually (provided by BC).

Complimentary registration for the annual fall conference of MACUB and membership in MACUB for student research grant awardees (provided by MACUB)

Eligibility

Only undergraduate students currently enrolled at the institution of a MACUB faculty mentor may apply.

Undergraduates who are graduating seniors must plan to complete their research prior to graduation.

A student is only eligible to receive one award.

Requirements

Student research grants may be used to support scientific investigation in any field of biology. Funding may be used to purchase equipment or supplies required for the proposed project, and/or travel to and from a research location.

Grant winners are required to present the results of research supported by this award at the MACUB annual fall conference following the year of the award.

Institutional support is required. This may include research supplies, travel expenses, in-kind matches and other forms of support.

All application materials must be submitted on-line at <http://www.macub.org> by February 15, 2009 and all applicants will receive notification of award status by March 1, 2009.

Application

On-line proposal requires:

Student contact information.

Faculty advisor contact information.

Faculty reference letter from the research advisor. This letter must include a statement of institutional support for the project.

Proposal title.

Proposal (maximum of 500 words). The proposal should provide a brief background on the project with reference, a statement of the proposed question or hypothesis to be tested, and a description of the experimental approach.

References

Basic budget justification.

Include discipline. For example, molecular biology, cell biology, genetics, etc.

Register on-line at:

www.macub.org

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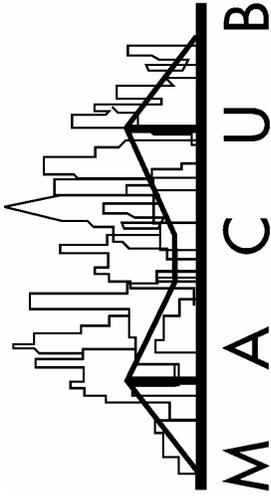
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