11th ANNUAL RESEARCH SYMPOSIUM

Oklahoma Louis Stokes Alliance for
Minority Participation in Science, Technology,
Engineering, and Mathematics
(OK-LSAMP STEM)
Website: Ls-okamp.okstate.edu

OKLAHOMA STATE UNIVERSITY

Saturday, September 24, 2005
Noble Research Center (NRC)
9:00 AM - 3:00 PM

OK-LSAMP IS FUNDED BY
THE NATIONAL SCIENCE FOUNDATION

CONTENTS

SCHEDULE OF ACTIVITIES

8:00-10:00 AM – Poster Set-up
(NRC 3rd Floor Atrium, Department of Biochemistry & Molecular Biology)
(ALL POSTERS MUST BE SET UP BY 10:00 AM)

8:00-11:00 AM – Registration
(NRC 2nd floor Foyer, Department of Biochemistry & Molecular Biology)

9:00 AM-10:40 AM – Concurrent Oral Presentations
Biology, Chemistry, Biochemistry I.....NRC, Room 348B
Biology, Chemistry, Biochemistry II.....NRC, Room 140
Mathematics and Computer Science.....NRC, Room 141
Physics and Engineering.....NRC, Room 216-217

10:45 AM – 11:50 AM – Poster Presentations
(3rd Floor Atrium, NRC, Department of Biochemistry & Molecular Biology)
[Presenters must be at posters during this time]

12:00-12:50 - PRESENTATION/WORKSHOP FOR STUDENTS AND OTHER ATTENDEES

"Successful Graduate/Professional School Admission Strategies"
Michael Heppler
Assistant Director of Student Academic Service
Graduate College, Oklahoma State University
NRC, Room 348B

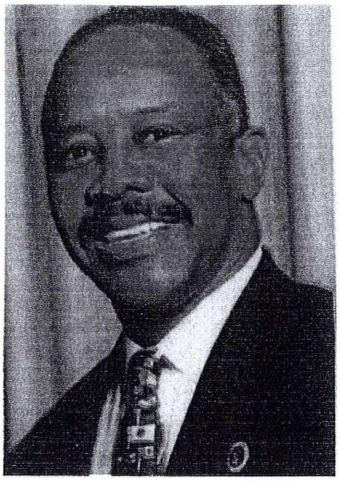
12:50-1:00 PM

12:00-1:00 PM - ALLIANCE MEETING, NRC ROOM 130
(PI's/Campus Coordinators and Other OK-LSAMP Staff)

1:00 PM -2:15 LUNCH AND PRESENTATION OF CERTIFICATES
Dr. Carl Rutledge, Room 348B

******5 Drawings for Presenters Only******

2:15-2:30 – Highlights of OK-LSAMP PHASE III
Dr. Earl D. Mitchell, Jr., Program Director
Room 348B



Dr. A. James Hicks, Program Director

Louis Stokes Alliances for Minority Participation program
National Science Foundation
Washington, DC

Dr. A. James Hicks, former Dean of Arts and Sciences at North Carolina A & T University, become *Program Director for the Louis Stokes Alliances for Minority Participation* program on September 1, 1997. He received the Ph.D. degree in biology from the University of Illinois at Urbana and additional training at Harvard University, the National Institutes of Health, and the Missouri Botanical Gardens. He has more than twenty years experience in addition to prior short-term assignments at National Science Foundation (NSF) involving proposal reviews, research evaluation, and Intergovernmental Personal Act (IPA).

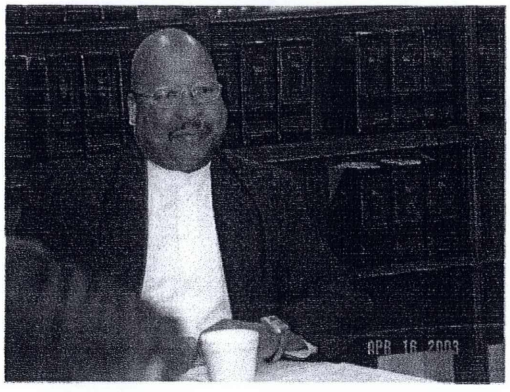
Alliance Program Named for Former Congressman Louis Stokes

Louis Stokes represented his Ohio District in the U.S. House of Representatives for 30 years. Elected on November 6, 1968 he was the first African American member of Congress from the state of Ohio. The thrust of his career focused on advocacy for the poor and disadvantaged, especially those in urban America. He sponsored legislation to help people of color enter the intelligence community, fought for adequate housing for the poor, and oversaw the passage of the Disadvantaged Minority Health Improvement Act of 1989. Other legislative efforts included sponsorship of programs for minority professionals in health, science, and engineering at the National Institutes of Health and National Science Foundation respectively. He served under six Presidents during his 30 years in Congress.

Congressman Stokes and his brother, Carl, grew up in an impoverished part of Cleveland. After serving in the U. S. Army during World War II he worked for the U. S. Department of the Treasury during the day while attending Case Western Reserve University at night. He earned a law degree from Cleveland-Marshall College of Law.

OKLAHOMA LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (OK-LSAMP STEM)

Historical Highlights



Earl D. Mitchell, Jr., Ph.D.,
OK-LSAMP Program Director

The Oklahoma Alliance, formed under the leadership of Oklahoma State University and the Oklahoma State Regents for Higher Education, was established to address the critical under-supply of minority students at state higher education institutions receiving degrees in STEM (Science, Technology, Engineering, and Mathematics) fields. Participating institutions include 3 research universities – Oklahoma State University, University of Oklahoma, and University of Tulsa; Langston University, Oklahoma's Historically African American University; one large metropolitan and urban university – University of Central Oklahoma; 9 regional universities of the state system; including Bacone College, a private American Indian College (that became 4-year in 2001); and 3 other private colleges and universities.

The primary goal of the program is to increase by 15% annually the number of underrepresented minorities enrolled and graduating in STEM (Science, Technology, Engineering, and Mathematics) fields, and also to increase the number of participants continuing in STEM graduate programs. Toward realizing these goals, the activities of OKAMP include 1) intense recruiting 2) retention programs that include mentoring, academic support, and social/emotional support programs 3) community building activities with ethnic minority communities and tribal entities and 4) research opportunities for all OKAMP-STEM Scholars.

Phase I of the program was inaugurated in 1994 and ended in 1999; Phase II, 1999-2004; and the current Phase III extends from 2004-2009. **Since the inception of the Oklahoma AMP, the number of STEM graduates has progressively increased from 214 in 1994 to 676 in 2004.**

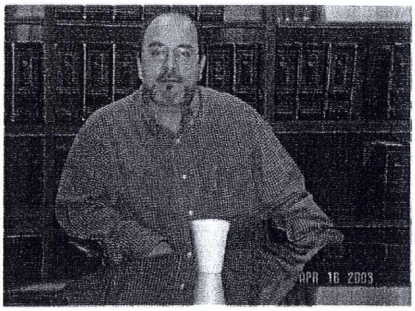
Oklahoma continues to lead the nation in the number of Native Americans receiving B.S. degrees in STEM fields. In addition, Oklahoma universities lead the nation in graduating Native Americans with PhD degrees. However, the number of Native Americans receiving Ph.D's in STEM areas still remains well below the B.S. degree parity

Three (3) Oklahoma institutions currently rank first in the nation in awarding baccalaureate degrees to American Indian students. These are *Northeastern State University*, *Oklahoma State University*, and the *University of Oklahoma*, respectively. Other Oklahoma universities ranking among the top 15 are *Southeastern Oklahoma State University, East Central University, and the University of Central Oklahoma.*

THE OKLAHOMA ALLIANCE

Zola J. Drain, Ph.D.
Program Manager

Rosemary Hayes, Ph.D.
Program Evaluator



Yousif I. Sherif, Ph.D.
Program Data Manager

Aarthi Narayanan, Webmaster

Nelda Driggs, Secretary

OK-LSAMP Campus Coordinators

Dr. T.E. Snider, Cameron

Dr. Carl Rutledge, East Central

Dr. Sharon Lewis, Langston

Dr. Myron Cherry, Northeastern

Timothy Mcharry, Northwestern

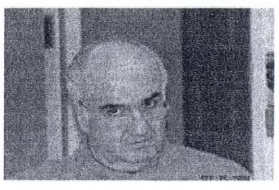
Valerie Shangreaux, OSU

Dr. Tim Patton, Southeastern

Dr. Brian Campbell, Southwestern

Dr. John Garic, Univ. of Central OK

Dr. Teri Rhoads, Univ. of OK



Dr. J.C. Diaz, Univ. of Tulsa

Bridge to Doctorate Program

The *Bridge to Doctorate (BD)* is a supplement of the Louis Stokes Alliance for Minority Participation program that began in 2003. This activity is designed to broaden the participation of minority students in STEM graduate programs by removing hesitancy resulting from fear of additional financial indebtedness. Approximately 25,000 baccalaureate degree recipients are produced annually at LSAMP institutions. In order to ensure matriculation of a larger number of well-qualified underrepresented minority students in graduate programs, the Bridge to Doctorate supplemental funding was made available to institutions in the third five-year phase of the LSAMP program.

In July 2004, the Oklahoma LSAMP program received funding for this new initiative, with Oklahoma State University as the BD site. Matriculating students in the program are:

Dominic Barrett, B.S., Fisheries and Wildlife Management, Southeastern Oklahoma State University; Masters student in Department of Zoology, Fisheries and Wildlife Ecology, Oklahoma State University.

Brett Cowan, B.S., Civil Engineering and M.S, Civil Engineering Construction Project Management, Oklahoma State University; Doctoral student in Civil Engineering.

Cara Cowan, B.S., Mechanical Engineering and M.S. in Telecommunications Management, Oklahoma State University; Doctoral student in Biosystems and Agricultural Engineering.

Marty Heppler, B.S., Entomology, Oklahoma State; Masters student in Entomology and Plant Pathology, Oklahoma State University.

Jacob Manjarrez, B.S., Microbiology and Molecular Genetics, Oklahoma State University; Doctoral student in Biochemistry and Molecular Biology, Oklahoma State University.

Thomas Patten, B.S. and M.S., Mechanical Engineering, Oklahoma State University; Doctoral student in Electrical Engineering, Oklahoma State University.

Lila Peal, B.S., Biology, Langston University; Masters student in Biochemistry and Molecular Genetics, Oklahoma State University.

Loretta Rush, B.S. in Biology and M.S. in Secondary Education, East Central University; M.S student in Plant Pathology, Oklahoma State University.

Adrian Sherman, B.S., Natural Resource Management, Langston University; Masters student in Biosystems and Agricultural Engineering, Oklahoma State University.

Nicole Singleton, B.S., Animal Science, Langston University; Masters student in Physiological Sciences (Toxicology), College of Veterinary Medicine, Oklahoma State University.

Brek Wilkins, B.S., Microbiology, Oklahoma State University; Doctoral student in Biomedical Sciences, Oklahoma State University Center for Health Sciences, Tulsa, OK.

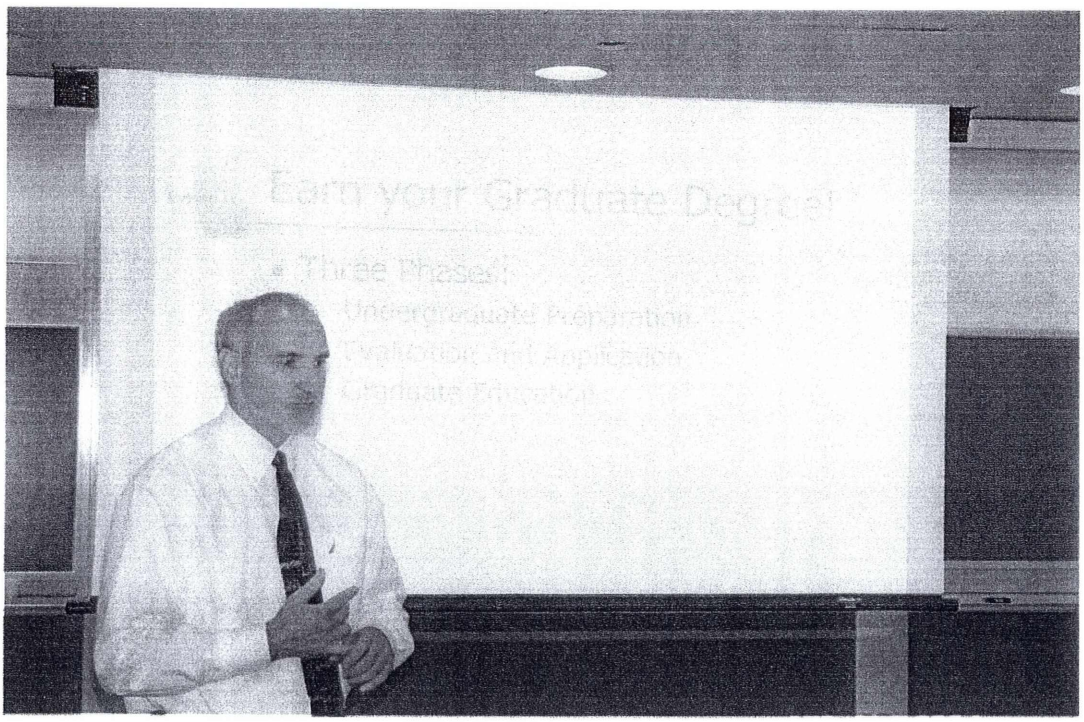
Cristee Wright, B.S., Biology/Microbiology, Southern University (Baton Rouge, LA); Masters student in Microbiology and Molecular Genetics, Oklahoma State University.

Successful Graduate/Professional School Admission Strategies

An Interactive Workshop Presented by

MICHAEL HEPPLER
Assistant Director of Student Academic Service
Graduate College, Oklahoma State University

12:00-12:50 PM
348B NOBLE RESEARCH CENTER



Michael Heppler has served OSU as the Assistant Director of Student Academic Service in the Graduate College since 1997. Along with his many responsibilities, he has traveled throughout the United States speaking to students about OSU Graduate Programs and successful graduate school application strategies.

Mr. Heppler has presented at regional and national conferences. A few of his prior appearances are the National Society of Black Engineers Region V Conference, the Rocky Mountain National McNair Scholars Conference at the University of Tennessee, and Heartland McNair Scholars Research Conference in Kansas City.

An overview of topics during this orientation include: evaluation of graduate programs, graduate applications, personal statements, recommendation letters.

ORAL PRESENTATIONS AT A GLANCE

BIOLOGY, CHEMISTRY, BIOCHEMISTRY I - Room 207 NOBLE RESEARCH CENTER

9:00 AM

HO-1 PLAYS AN IMPORTANT ROLE IN THE REGULATION OF COX-2 INDUCTION FOLLOWING ENDOTOXIN EXPOSURE. Elizabeth Saladin, Laura Fredenburgh, M.D., Mark Perrella, M.D., Brigham and Women's Hospital, Harvard Medical School, Boston, MA.

9:20 AM

SKELETAL MUSCLE PROPERTIES IN RELAXING, RIGOR-MG, AND CONTRACTING SOLUTIONS. Leethaniel Brumfield III*, Dr. Julian Borejdo, Dr. Irina Akopova; Department of Molecular Biology & Immunology, University of North Texas Health Science Center, 3500 Camp Bowie Blvd., Fort Worth, TX 76107, USA.

9:40 AM

MAPPING OF BLACK BASS ABUNDANCE AND HABITAT IN SELECTED STREAMS OF EASTERN OKLAHOMA. James Morel. Department of Biological Sciences, Southeastern Oklahoma State University, Durant, OK 74701. Daniel C. Dauwalter, Graduate Research Assistant, Oklahoma State University, Stillwater, OK 74708. William L. Fisher, Co-Project Leader, Oklahoma Cooperative Fish and Wildlife Research Unit, Oklahoma State University, Stillwater, OK 74708.

10:00 AM

ENVIRONMENTAL FACTORS INFLUENCING THE GROWTH AND SPORULATION OF *STACHYBOTRYS* ATRA., Sabrina Scroggins, Charles Biles, and Terry Cluck. East Central University, Ada, OK 74820.

10:20 AM

FLUORESCENT IMAGING IN TRABECULAR MESHWORK CELLS: A MODEL SYSTEM TO EVALUATE GLUCOCORTICOID-INDUCED PHAGOCYTOSIS. Cherie M. Ognibene1, Thomas Yorio, Ph.D.2, Xinu Zhang2. 1Langston University, Guthrie, OK, USA, 2University of North Texas Health Science Center, Fort Worth, TX, USA.

10:40 AM

NICOTINIC ACID ADENINE DINUCLEOTIDE PHOSPHATE (NAAD): AN INTRACELLULAR SECOND MESSENGER? Amir A. Isbell, University of Central Oklahoma, Edmond, OK and Eduardo Chini, MD, Ph.D, Anesthesiologist, Mayo Clinic, Rochester, MN.

BIOLOGY, CHEMISTRY, BIOCHEMISTRY II - ROOM 348B NOBLE RESEARCH CENTER

9:00 AM

UNRAVELING THE CHARACTERISTICS THAT CONTROL TRANSCRIPTIONAL ACTIVATOR POTENCY. Steven M Harris, Steven P. Rowe, and Anna K. Mapp, Department of Chemistry, University of Michigan, Ann Arbor, MI 48109.

9:20 AM

CHARACTERIZATION OF ORGANIC MOLECULES IN MOLECULAR DEVICES.
Desmond Harvey, Langston University, E. Delonno and Professor J. R. Heath, California Institute of Technology.

9:40 AM

THE INTERACTION OF IMODIUM A.D. (LOPERAMIDE HYDROCHLORIDE) ON *ESCHERICHIA COLI.* Elise Griffin, Kayla Smith, and K.J. Abraham, Department of Biology, Langston University

10:00 AM
CONFORMATIONAL DYNAMICS OF THE ATP SYNTHASE EPSILON SUBUNIT. Holland, Davia D., Langston University, Richter, Dr. Mark, Division of Biochemistry, University of Kansas.

10:20 AM
INTRODUCTION OF GFP EXPRESSION INTO PRIMARY HUMAN CELLS. QuaNetta Releford*, Jwalitha Shankardas** and S. D. Dimitrijevich***Langston University, Oklahoma, and **Department of Integrative Physiology, UNT Health Science Center, Fort Worth, Texas.

MATHEMATICS AND COMPUTER SCIENCE - ROOM 108 NOBLE RESEARCH CENTER

9:00 AM
CONVERSION OF DYNAMIC EXPLORER HAPI/LAPI DATA TO CDF'S FOR ARCHIVING AND EASY DATA BROWSING ANALYSIS. Shanequah Brison: SIECA Intern, Langston University, NASA Goddard Space Flight Center, Code 612.4-Space Physics Data Facility, Mentors: Dr. Shing Fung and Mr. Robert Candey.

9:20 AM
CREATING A WEB BASE PRESENTATION SYSTEM. Christa Burks and Dr. J. C. Diaz, Department of Computer Science, The University of Tulsa, Tulsa, OK, 74104.

9:40 AM
NETWORK-AWARE DYNAMIC POLICY ENFORCEMENT. Matthew Butler and Dr. John Hale, Department of Computer Science, The University of Tulsa, Tulsa, OK 74104

PHYSICS AND ENGINEERING - ROOM 216 NOBLE RESEARCH CENTER

9:00 AM
GAS-LIQUID CYLINDRICAL CYCLONES (GLCC). Rosa Madrid (Oklahoma State University, Stillwater OK) and Dr. Ovadia Shoham, Petroleum Engineering (The University of Tulsa, Tulsa OK).

9:20 AM
AGILE MANUFACTURING: INCENTIVES AND IMPROVEMENT PROGRAMS. Paul Wright and Dr. Charlene Yauch, Department of Industrial Engineering and Management, Oklahoma State University, Stillwater, OK 74078.

9:40 AM
IMPROVEMENTS TO TU STORM ROBOTICS COMPETITION. Zachary Scott Carpenter and Dr. G. Kane, Department of Electrical Engineering, The University of Tulsa, Tulsa, OK 74104

POSTER PRESENTATIONS AT A GLANCE

P1
AN INVESTIGATION OF TYPES OF CONTROLS USED IN ROBOTIC VEHICLES. Gregory Falling and Dr. Calvin Cole, Department of Physics, Northeastern University Tahlequah OK

P2
ELECTRODYNAMICS OF A GAUSS GUN AND ANALOG VS. DIGITAL ASTRO-PHOTOGRAPHY. Erik K. Gonzales and Dr. Carl T. Rutledge, Department of Physics, East Central University, Ada, OK 74820.

P3
LIMITS ON MUON DECAY FROM RECENT MEASUREMENTS. Nathan J. Williams (Langston University) and: Dr. Carl Gagliardi, Texas A & M University.

P4
FREESCALE SEMICONDUCTOR - "BOUNDLESS POSSIBILITIES". Donald Stutson II and Jan Gachioc (Web Engineer), Freescale, Inc., Austin, TX.

P5
MITEs IN POA ARACHNIFERA. Jamie L. Harrison, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

P6
MECHANISMS OF BACTERIA RESISTANCE DEVELOPMENT TO THE ANTIBIOTIC PENICILLIN G. Shannon Gipson, Tumen Wuliji, Department of Biology, Langston University, Langston, OK 73050

P7
EVALUATING PRYMNESIUM PARVUM UNDER THE FACTORS THAT BACTERIA MIGHT BE A LIMITING FOOD SOURCE AND POSSIBLE TRIGGER FOR CONTROLLING THE TOXICITY OF THE ALGAE. Ambrie Walker (East Central University), and Dr. Tim Canfield (United States Environmental Protection Agency, National Risk management Research Laboratory and Groundwater Restoration Division, Ada, Oklahoma.

P8
MOLECULAR MARKERS IN BROMUS INERMUS/BIOINFORMATICS IN POA ARACHNIFERA.
Jessia Wesson, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

P9
OUTCROSSING ABC MUTANTS IN CAENORHABDITIS ELEGANS. Syndia Todd1, Marquita Rowland1 , (Langston University), and Dr. Lisa Timmons2,, 2 University of Kansas, Kansas

P10
RATE OF HABITUATION ON LIGHT AND DARK ISOLATED CRAYFISH. Danny Terry (Langston University) and Dr. Kyle Frantz (Georgia State University); Research through Emory University's Center for Behavioral Neuroscience at Spelman College.

P11
MECHANISMS UNDERLYING NON-FEMINIZING ESTROGEN ZYC-26 PROTECION AGAINST ETHANOL TOXICITY. Contessa Majors, James Simpkins, Andrew Wilson, Varun Goyal, Marianna Jung Department of Pharmacology and Neuroscience, University of North Texas Health Science Center at Fort Worth, TX 76107.

P12
RETROTRANSPOSONS IN POA ARACHNIFERA. Johnnie Roseburr, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

P13
OPTIMIZATION OF VESTITONE REDUCTASE AND MEDICARPIN ACCUMULATION IN COPPER-TREATED MEDICAGO TRUNCATULA AND MEDICAGO SATIVA SEEDLINGS. Ricardo Lemus and Dr. Nancy L. Paiva, Department of Chemistry, Computer and Physical Sciences, Southeastern Oklahoma State University, Durant, OK.

P14
EFFECTS OF ESTROGEN ON CYTOKINES POSITIVE CELLS IN THE CEREBELLUM. Tomica D. Blocker, Argenia L. N. Doss, T. Wallace, Dr. S. J. Williams. Department of Biology, Langston University, Langston, OK, 73050

P15
INVESTIGATION OF TARGET EPITOPES OF PROTECTIVE ANTIGEN AND LETHAL FACTOR IN BACILLUS ANTHRACIS. Macole Mayweather, S. Crowe, PhD, J. Guthridge, PhD, J. James, MD, PhD, Langston University, The University of Oklahoma Health Sciences Center, Oklahoma Medical Research Foundation

P16
PROTHONOTARY WARBLER REPRODUCTIVE SUCCESS AT A WILDLIFE REFUGE. Stormy L. Shoopman and Dr. Doug Wood, Department of Biology, Southeastern Oklahoma State University, Durant, OK 74701.

P17
SYNTHESIS AND COMPARISON OF THIOL VS. NON-THIOL CLEAVAGES OF BOVINE LACTOFERRICIN PEPTIDES. Quincy Anderson and Dr. Denise V. Greathouse, University of Arkansas

P18
THE EFFECTS OF MICROWAVE IRRADIATION ON THE FREE RADICAL POLYMERIZATION OF STYRENE AND METHYL METHACRYLATE. Deborah Snell and Spence Pilcher, *Department of Natural Science, Northeastern State University, 600 N Grand Ave, Tahlequah, OK 74464*

P19
UTERINE SMOOTH MUSCLES CELLS IS PRESENT IN UTERINE SMOOTH MUSCLE CELLS AND CAN BE STIMULATED BY HISTAMINE. Amir Isbell and Eduardo Chini, MD., Ph.D., Anesthesiologist, Mayo Clinic, Rochester, MN

P20
PRENATAL DIAGNOSIS OF CHROMOSOMAL ANOMALIES: A FIVE-YEAR EXPERIENCE.
1Ashley Burdex, 2J. Mulvihill, and 2S. Li: Department of Biology, 1Langston University, Langston, OK 73050 and 2Section of Genetics, Department of Pediatrics, University of Oklahoma Health Science Center, Oklahoma City, OK 73104

P21
ORGANOMETALLIC SYNTHESIS: SYNTHESIS OF A NOVEL COMPOUND WITH FE (II)-S BOND. Courtney Hill, Valerie Toodle and Dr. Danny McGuire, Department of Chemistry, Cameron University, Lawton, OK.

P22
TRANSPOSONS IN POA ARACHNIFERA, La'Cheverjuan Bennett, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

P23
MOLECULAR MODELING OF ENZYME-INHIBITOR INTERACTION. George S. Kpeli (Langston University) and Dr. Krzysztof Kuczera, Chemistry and Molecular Bioscience, University of KS

P24
EXPRESSION OF MICROTUBULE-ASSOCIATED PROTEIN, TAU, IN PC12 CELLS. Aaron Washington (Langston University) and Dr. Chris Gamblin

P25

CLONING VARIOUS FRAGMENTS OF THE HUMAN GENE FOR THROMBOMODULIN AND EXPRESSING THEM IN PICHIA PASTORIS, Monique E. Robinson and Dr. John K. Coleman, Department of Chemistry, Langston University, Langston, OK

P26
THE EFFECTS OF PHOSPHOLIPIDS ON SUPEROXIDE RADICAL GENERATION BY UBIQUINOL-CYTOCHROME C REDUCTASE. Melissa D. Miller and Dr. Linda Yu, Department of Biochemistry and Molecular Biology, Oklahoma State University, Stillwater, OK 74078.

P27
AFFECTS OF KNOCKDOWN OF AHA1 WITH SILENCING RNA ON PHOSPHO-TYROSINE LEVELS. Tyler Weirick and Dr. Robert Matts, Department of Biochemistry and Molecular Biology, Oklahoma State University, Stillwater, OK 74078.

P28
AZOREDUCTASE ACTIVITY IN SACCHAROMYCES CEREVISIAE. Tiffany Reynolds and Dr. K.J. Abraham, Department. of Biology, Langston University, Langston, OK 73050

P29
ISOLATION AND CHARACTERIZATION OF AZOREDUCTASE GENE IN A SPECIES OF PSEUDOMONAS. Kariel Ross and Dr. K.J. Abraham, Department. of Biology, Langston University, Langston, OK 73050

P30
GLOBAL GENE EXPRESSION ANALYSIS TO DEFINE THE HIGH LIGHT RESPONSES IN THEPHOTOSYNTHETIC MODEL CYANOBACTERIUM, SYNECHOCYSTIS SP. PCC6803. *Christal R.Carpenter, Langston University; R. Nambudiri, and R. L. Burnap, Ph.D., Department. of Microbiology and Molecular Genetics, Oklahoma State University, Stillwater, OK 74078 USA*

P31
MUTAGENESIS ANALYSIS OF NON-LETHAL ALLELES OF HOLIN T. Makda Gebrehiwotea, Tram Anh T. Tranb, and Ry Young, a Department of Chemistry, Langston University, b Department of Biochemistry & Biophysics, Texas A&M University, College Station, TX.

P32
EFFECT OF PEANUT PLANT TISSUE AND ORGAN TYPES ON TOTAL RNA ISOLATION USING "CARTAGEN METHOD". Kimberly Jones*1, Kanyand Matand1,2, Adrian Sherman3, Ning Wu2, and George Acquaah3 Department of Biology1, School of Arts and Sciences; Departments of Agricultural Research and Extension2 and Agriculture and Natural Resources3, School of Agriculture & Applied Sciences; Langston University; Langston, OK 73050.

P33
PEANUT MAY HOLD THE KEY FOR THE IDENTIFICATION OF PLANT REGENERATION GENES.
Atabong Mbelem*1, Kanyand Matand2,3, Ning Wu3, and George Acquaah4 Departments of Nursing1 and Biology2, School of Arts and Sciences; Departments of Agricultural Research and Extension3 and Agriculture and Natural Resources4, School of Agriculture & Applied Sciences; Langston University; Langston, OK 73050.

P34
PROTONATION STUDIES OF (_5-C5H5)Fe(CO)2S(C6H4-p-I) and (_5-C5H5)CH2CH2SFe(CO)2, Valerie Toodle, Dr. Danny McGuire, Cameron University.

ABSTRACTS

ORAL PRESENTATIONS

BIOLOGY, CHEMISTRY, BIOCHEMISTRY I – Room 207

9:00 AM

HO-1 PLAYS AN IMPORTANT ROLE IN THE REGULATION OF COX-2 INDUCTION FOLLOWING ENDOTOXIN EXPOSURE. Elizabeth Saladin, Laura Fredenburgh, M.D., Mark Perrella, M.D., Brigham and Women's Hospital, Harvard Medical School, Boston, MA.

Background: Sepsis is a severe infection characterized by the release of lipopolysaccharide (LPS) from the cell wall of gram-negative bacteria. The body's defense mechanism during sepsis involves the production of anti-inflammatory mediators through the inducible enzymes heme oxygenase-1 (HO-1) and cyclooxygenase-2 (COX-2). HO-1 activation results in the production of carbon monoxide (CO) and bilirubin while induction of COX-2 leads to prostanoid synthesis. Prior studies have shown that LPS induction of COX-2 is exaggerated in the absence of HO-1, however the mechanism is not known. **Methods:** We studied the mechanism by which COX-2 expression is enhanced in the absence of HO-1 during sepsis using a mouse macrophage cell line (RAW). We used HO-1 byproducts of CO and bilirubin to model the expression of HO-1. We treated RAW cells with increasing concentrations of either a CO releasing molecule (10 μM, 50μM, or 100μM) or bilirubin (5μM, 10μM, 25μM, and 50μM) in the presence or absence of LPS. Following this exposure to HO-1 byproducts and LPS, we extracted RNA at 2, 4, 6, 8, 12, and 24 hours. Northern blot analyses were performed to quantify the difference in COX-2 expression levels among the exposed cells. Control groups received vehicle and did not receive CO or bilirubin at each of the time points.
Results: Baseline COX-2 expression in RAW cells was low, however increased significantly following LPS exposure. CO enhanced LPS-induction of COX-2 at low doses (50 M); however, at higher doses (100 M), CO exposure appeared to decrease COX-2 induction as measured by Northern blot band intensity. Bilirubin demonstrated no effect on LPS-induction of COX-2. **Conclusions:** Regulation of COX-2 expression by CO in the presence of LPS is dependent on the dose of CO, but not bilirubin. This provides evidence for a specific mechanism through which HO-1 regulates the induction of COX-2 during endotoxemia. *[Thank you OKAMP and NSF for the continued support].*

9:20 AM

SKELETAL MUSCLE PROPERTIES IN RELAXING, RIGOR-MG, AND CONTRACTING SOLUTIONS. Leethaniel Brumfield III*, Dr. Julian Borejdo, Dr. Irina Akopova; Department of Molecular Biology & Immunology, University of North Texas Health Science Center, 3500 Camp Bowie Blvd., Fort Worth, TX 76107, USA

Background: Skeletal muscle comprises some 40-50% of the total body mass index in mammals, it and constitutes part of the largest organ system in their bodies. Skeletal muscles vary in size, shape, and arrangement of fibers, which makes their properties quite unique. Each skeletal muscle fiber is a single cylindrical muscle cell. Interestingly, an individual skeletal muscle can be made up of hundreds, or even thousands, of muscle fibers bundled together and wrapped in a connective tissue covering. The basic unit of muscle contraction is the sarcomere, which requires the overlapping of both myosin and actin. When muscles

contract, protein filaments slide together, which best explains why muscle contraction is like climbing a rope, since the crossbridge cycle of "grab, pull, and release," is repeated over and over again. Just as ATP is required for the relaxation of muscles, ATP is also the energy supply for the contraction of muscles. ATP is so essential and inevitable to both relaxation and contraction that when it runs down after death, muscles go into a state of rigor mortis. **Purpose/Problem:** Since muscles can change their properties under different conditions, the specific focus of this research was on the properties of the muscles under two types of labeling procedures: RLC-Rhodamine (ATPase Activity #1) and 707-Rhodamine (ATPase Activity #2). The properties of the skeletal muscle fibers were examined both by their ability to contract and develop tension, and by the rate of ATPase activity of their myofibrils. **Hypothesis:** A hypothesis was proposed that neither of the labeling procedures, 707-Rhodamine or RLC-Rhodamine, would have an effect on contractile or enzymatic muscle properties. **Materials:** In the efforts to measure contraction, the tested fibers were dissected from New Zealand rabbit psoas fast-twitch (white fibers – Type IIa) skeletal muscle bundles in glycerinating solution. Fibers were labeled with Rhodamine, either at Cys-707 or RLC (regulatory light chain) of myosin. **Methods:** The skeletal muscle fibers were first isolated in glycerinating solution, then transferred to a microscope slide and examined under a microscope, in the attempt to attain an accurate count of fibers per bundle. Tension development was measured by a MKB force transducer (Scientific Instruments, Heidelberg, Germany), which was coupled to an analog counter (Model 6024E, National Instruments, Austin, TX). Before actually being placed in the contracting solution (at the MKB force transducer), it was mandatory for each measured skeletal muscle fiber to consequently undergo reaction to both the relaxing and the rigor-Mg solutions. In ATPase Activity #1, five samples of myofibril RLC-Rhodamine were absorbed and calculated in a spectrophotometer, and in ATPase Activity #2, six samples of myofibril 707-Rhodamine were absorbed and calculated with the same the spectrophotometer. The samples of myofibrils for ATPase were cross-linked to attain cross-linkage between myosin and actin, using an EDC cross-linker, and for ten minutes, at room temperature, the ATPase samples were filtered. ATPase was estimated as a result of the reaction in which ATP was hydrolyzed by myofibrils after 1 minute. One of the by-products of this reaction, inorganic phosphorus [Pi], was observed in experimental volume. Data was collected and calculated using the standard formula provided in the spectrophotometer kit. **Results:** Regarding the performed ATPase activities, the final calculations did not support the proposed hypothesis, since the levels of phosphorus in the sampled myofibrils of New Zealand rabbit psoas were indeed functional and experimentally sufficient. **Discussion:** Perhaps, due to inadequate time, temperature, and/or sequence of the solutions reliable results pertaining to the level of contraction (tension) on the fast-twitch skeletal muscle fibers sampled were not accumulated. Clearly, this was rather unfamiliar territory, but it is anticipated that further research can be administered to achieve more reputable skeletal contraction results, as well as more consistent data analysis in relation to ATPase and its effects on myofibrils. **Conclusion:** Nonetheless, the results of this research were inconsistent with the proposed hypothesis. In conclusion, the results confirmed that the value of the ATPase activities proved that the labeled skeletal muscles were functional, and that myosin was hydrolyzing ATP at the appropriate levels.

9:40 AM

MAPPING OF BLACK BASS ABUNDANCE AND HABITAT IN SELECTED STREAMS OF EASTERN OKLAHOMA. James Morel. Department of Biological Sciences, Southeastern Oklahoma State University, Durant, OK 74701. Daniel C. Dauwalter, Graduate Research Assistant, Oklahoma State University, Stillwater, OK 74708. William L. Fisher, Co-Project Leader, Oklahoma Cooperative Fish and Wildlife Research Unit, Oklahoma State University, Stillwater, OK 74708

We inventoried habitat and black bass abundances to provide quantitative information on habitat conditions and black bass (*Micropterus spp.*) populations of eastern Oklahoma streams. Global Information Systems (GIS) software was used to randomly select 160 points on different stream reaches within Strahler stream orders 1-4 throughout the four eco-regions of eastern Oklahoma: the Boston Mountains, Central Irregular

Plains, Ouachita Mountains, and Ozark Highlands. Reach length was determined as 20 times the stream width at the randomly selected point. For each reach, we conducted habitat evaluations and mapping using ArcView GIS software. Fish sampling was done by snorkeling or electrofishing, depending on the water clarity. Each reach was divided into channel units (e.g., run, riffle, pool) before fish sampling was conducted. Black bass data we collected included species, size structure, and habitat channel unit. Each unit was mapped with a Global Positioning System (GPS) receiver, and then transferred into GIS software. This, along with the black bass data, and the habitat evaluation was then coordinated into the GIS software to create a map showing black bass usage of channel units, and type of habitat used by the different size classes and species throughout the reach. *[This internship was sponsored by the Louis Stokes-Oklahoma Alliance for Minority Participation, U.S. Fish and Wildlife Service, and the Environmental Careers Organization].*

10:00 AM

ENVIRONMENTAL FACTORS INFLUENCING THE GROWTH AND SPORULATION OF *STACHYBOTRYS* ATRA., Sabrina Scroggins, Charles Biles, and Terry Cluck. East Central University, Ada, OK 74820.

The fungus, *Stachybotrys atra*, is often found in water damaged buildings and has been associated with Sick Building Syndrome. Experiments were conducted to determine environmental factors that influence the growth and sporulation of *S. atra*. *S. atra* was isolated from a ceiling tile in the Physical and Environmental Science Building at East Central University. The fungus was grown on potato dextrose agar for at least 7 days before being used in various tests. Growth of *S. atra* on corn meal agar had the greatest growth diameter when compared to growth on potato dextrose, tile, carboxymethyl cellulose, sabourand's, malt extract, and water agars. The fungus grew the same in both the light and dark environments. When concentrations of PDA were compared, the best growth occurred at 39 g/L. *S. atra* grew best at 30°C and did not grow at 5 and 37°C. When the 5°C and 37°C where placed at room temperature, the 37°C exposed plates did not resume growth. Tile agar and PDA supplemented with $KClO_4$ showed inhibition of growth at 15 g/L and 10 g/L, respectively. Further experiments are being conducted to determine the effects of environmental factors on sporulation. *[This research was made possible by the support of the National Science Foundation and the Oklahoma Louis Stokes Alliance for Minority Participation Program].*

10:20 AM

FLUORESCENT IMAGING IN TRABECULAR MESHWORK CELLS: A MODEL SYSTEM TO EVALUATE GLUCOCORTICOID-INDUCED PHAGOCYTOSIS. **Cherie M. Ognibene**[1], Thomas Yorio, Ph.D.[2], Xinu Zhang[2]. [1]Langston University, Guthrie, OK, USA, [2]University of North Texas Health Science Center, Fort Worth, TX, USA.

To date millions of people worldwide have been diagnosed with glaucoma, the most common type being open-angle. Open-angle glaucoma occurs when the outflow pathway, which enables the aqueous humor to drain properly, is severely limited. The build up of pressure due to the lack of drainage causes the normal intraocular pressure to be elevated leading to damage of the optic nerve head and thus eventually leads to total vision loss. Glucocorticoids can exacerbate the effects of open-angle glaucoma by increasing the intraocular pressure. Glucocorticoids alter the ability of trabecular meshwork (TM) cells to phagocytose extracellular material and thus can increase the resistance to aqueous humor outflow. Glucocorticoids change the expression of a number of genes in TM cells and alter their performance. Dexamethasone (DEX) is a type of glucocorticoid that has been shown to inhibit the ability of trabecular meshwork cells to phagocytose. Thus, our hypothesis is that cultured cells from glaucoma patients and from patients without glaucoma treated with DEX would ingest less beads then untreated cells. Four assays were conducted on two lines of cells tTM3 and tTM5. The two cell lines were derived from a patient with glaucoma and without glaucoma respectively.

Florescent green beads were used to track the abilities of the cells to phagocytose. Cells were treated for twenty-four hours in the presence of DEX (100nM) then incubated with beads for one hour. After cells were incubated with beads they would be fixed and incubated with goat anti-rabbit IgG 633 (red) dye to differentiate intracellular from extracellular beads. DAPI (6'4-Diamidino-2Phenylindole) was used to calculate how many beads per one hundred cells were phagocytosed. A confocal microscope was used to show the different colors of the dyes and photographic images were used for documentation and review. The data collected showed that when tTM3 and tTM5 cells were treated with DEX they both ingested less beads. Ultimately, tTM3 cells were more sensitive to the DEX treatment then tTM5 cells. *[Thank you to the NIH, grant number 2T35HL007786-13, for supporting this abstract and thank you to OK-LSAMP for this opportunity].*

10:40 AM

NICOTINIC ACID ADENINE DINUCLEOTIDE PHOSPHATE (NAAD): AN INTRACELLULAR SECOND MESSENGER? Amir A. Isbell, University of Central Oklahoma, Edmond, OK and Eduardo Chini, MD, Ph.D, Anesthesiologist, Mayo Clinic, Rochester, MN.

Within multicellular organisms, there are many chemical mechanisms taking place that are needed to sustain life. These mechanisms are often the signal transduction pathways, referred to above, that allow cells to communicate to other parts of the organism. One of the most influential steps in any cell signaling process is the introduction of the second messenger. Second messengers transfer the effects of the first messengers. Some of the most important intracellular second messengers are cAMP, cGMP, IP_3, Ca^{2+}, and cADPR. However, with the discovery of Nicotinic Acid Adenine Dinucleotide Phosphate (NAADP), this list may be incomplete.

One of the most interesting findings in cell signaling in the past twenty years was a study uncovering that the incubation of nicotinamide adenine dinucleotide phosphate (NADP) at an alkaline pH created a Ca^{2+}-releasing metabolite later known as NAADP.

In this study, several aspects of Nicotinic Acid Adenine Dinucleotide Phosphate were explored to initiate the process to determine if this nucleotide is an intracellular second messenger. This encapsulates covering basic criteria of intracellular second messengers as seen by the scientific community. One of the criterions of declaring a molecule an intracellular second messenger was addressed through an experiment of observing the effects of an external histamine stimulation of NAADP production in uterine smooth muscle. It was hypothesized and then found that histamine would act as an agonist to NAADP production in uterine smooth muscle. To initiate this task, isolation methods such as cell scraping, extraction, HPLC, and drying methods were explored. To finish the task, a competitive binding experiment between NAADP and radioactive NAADP was performed to determine NAADP content. It was also found that optimum binding in sea urchin egg homogenate, a popular binding medium, was achieved at thirty seconds. Relationships between established intracellular second messengers and NAADP were explored.

BIOLOGY, CHEMISTRY, BIOCHEMISTRY II – ROOM 348B

9:00 AM

UNRAVELING THE CHARACTERISTICS THAT CONTROL TRANSCRIPTIONAL ACTIVATOR POTENCY.
Steven M Harris, Steven P. Rowe, and Anna K. Mapp, Department of Chemistry, University of Michigan, Ann Arbor, MI 48109.

With the sequencing of the human genome and other advances we have come to understand that many diseases, including cancer and diabetes, are fundamentally due to aberrant flaws in transcriptional regulation. These diseases could potentially be cured if we could find a way to produce potent yet tunable artificial regulators capable in correcting errors in transcription. Since a better understanding of the characteristics that control potency of transcriptional activators is needed, it has proven difficult to develop potent artificial activators. What has been found is that potency is likely controlled by some combination of affinity of the activators for their target protein, transcriptional machinery binding site, and the rate of proteolysis. Artificial transcriptional activating ligands with similar affinities but differing potencies and different binding sites have been developed, and we want to investigate the role of the binding site versus the rate of proteolysis for these ligands. We have undertaken the design of analogs to these ligands that would be resistant to proteolysis and are currently investigating the ability of the analogs to regulate transcription so that we can determine the relative roles of the binding site and rate of proteolysis in determining potency.

9:20 AM

CHARACTERIZATION OF ORGANIC MOLECULES IN MOLECULAR DEVICES.
D. D. Harvey, Langston University, E. Delonno and Professor J. R. Heath, California Institute of Technology.

One area of molecular electronics involves using bistable molecules as the active components in solid-state devices. These bistable molecules have been used in molecular memory and logic circuits. Such devices are fabricated by transferring a Langmuir-Blodgett molecular monolayer onto a substrate patterned with silicon electrodes, then metallic top electrodes are evaporated onto the molecular layer through a shadow mask. Titanium, because of its high reactivity, is used as the top electrode material. The titanium reacts with the upper part of the monolayer, creating a protective layer that prevents subsequent metal from penetrating through the monolayer. These monolayer/titanium films were made and studied spectroscopically using a sensitive reflectance/absorption Fourier Transform Infrared (FTIR) spectrometer. Films of eicosanoic acid, dimyristoylphosphatidic acid (DMPA), a [2] catenane, and a [2] rotaxane were measured. In addition, monolayers on a variety of substrates, including silicon dioxide, silicon (111), and platinum, were analyzed. Characterization of these thin films explores the titanium/molecule interface, which will directly affect the electrical

9:40 AM

THE INTERACTION OF IMODIUM A.D. (LOPERAMIDE HYDROCHLORIDE) ON *ESCHERICHIA COLI.*
Elise Griffin, Kayla Smith, and K.J. Abraham, Department of Biology, Langston University.

The effects of *Escherichia coli* occur in the digestive tract because of the ability of *E. coli* to penetrate the intestinal walls. The symptoms for *E. coli* infection include watery diarrhea, nausea, abdominal cramps, and

low-grade fever. The objective of this work was to study the reaction of *E. coli* and Imodium A.D. Cultures of *E. coli* were treated with 4mg and 8mg of Imodium A.D. (Loperamide Hydrochloride). The liquid cultures were then separated with Chloroform, Ethyl Acetate, and Petroleum Ether. Chromatographic and spectroscopic techniques will be further used to determine whether new compounds were produced as a result of the interaction between *E. coli* and Imodium.

10:00 AM

CONFORMATIONAL DYNAMICS OF THE ATP SYNTHASE EPSILON SUBUNIT. Holland, Davia D., Langston University, Richter, Dr. Mark, Division of Biochemistry, University of Kansas.

The ATP synthase is found in chloroplasts, mitochondria, and bacteria. The chloroplast ATP synthase is located on the thylakoid membrane. The enzyme has two structural units, chloroplast factor O (CFO) and chloroplast factor 1 (CF1). CFO is responsible for the translocation of protons from one side of the membrane to the other. CF1 contains the catalytic sites for ATP synthesis/hydrolysis. CF1 is composed of 5 subunits labeled a to e with a stoichiometry of 3a, 3b, 1g, 1d and 1e. The e subunit regulates ATP synthesis by inhibiting the rotation of the g subunit. The e subunit has two has two domains, the C- terminal domain (helix-turn-helix) and the N- terminal domain (b-barrel). How these two domains interact with the g subunit to regulate catalysis is the subject of this project.

The gene encoding chloroplast e subunit was transformed into *Eschericia coli* cells and the e protein was over-expressed. The resulting inclusion bodies were solubilized and the protein was folded and reconstituted with native 3 subunit CF1(-de). A mutation, S133C, was introduced into the C- terminus of the e subunit which was then titrated with CF1(-de). The MgATPase activity was measured in the presence of the activating oxyanion SO32-. The results showed a decrease in the production of phosphate as the concentration of e increased indicating that the mutant e subunit was fully functional. A fluoresceinyl maleimide tag was specifically targeted to cysteine 133 to examine the accessibility of this residues when the e subunit is bound to CF1. The results indicate that cysteine 133 is not solvent-accessible.

10:20 AM

INTRODUCTION OF GFP EXPRESSION INTO PRIMARY HUMAN CELLS. QuaNetta Releford*, Jwalitha Shankardas** and S. D. Dimitrijevich***Langston University, Oklahoma, and **Department of Integrative Physiology, UNT Health Science Center, Fort Worth, Texas.

Background: Labeling gene expression has become necessary technique in studies of regulation of transcription and translation. Utilization of luciferase colorimetric assay is gradually being replaced by proteins which fluoresce (FPs) at several wavelengths (green, red, yellow). To be useful in studies with human cells some of the fluorescent protein DNA sequences have been humanized, but in some cells FP expression may be cytotoxic. Although cytotoxicity may not be a serious problem, consistent toxic levels of FPs cause unacceptable cell death. These issues may be evaluated by a new simple electroporation method that delivers the FP DNA efficiently to the nucleus ("nucleoporation") and should lead to stable as well as transient expression.

Objective: To introduce GFP expression into primary human dermal fibroblasts and corneal and conjunctival epithelial cells with extended life-span (CEPI and conj,EPI hTERT), and evaluate the efficiency of transient and stable transfections.

Method: $1x10^6$ cells are suspended in 100 mL epithelial cell or fibroblast optimized transfection buffer (supplied by Amaxa), were exposed to programs T-23 and U-23 respectively in the Amaxa Neucleofactor. The cells were then plated into flasks and monitored hourly by fluorescence microscopy. After 18 hors of

attachment the unattached cells were removed and counted. After a further 24 hours the cells were harvested and the number of GFP expressing and non-expressing cells determined. The cells were re-plated to determine the percentage of stably transfected cells.
Results: All three cell types attached to the growth surface and began to express GFP within 4 hours. The transfection efficiencies were 75% (FBs), 50% CEPI hTERT) and 33% (conjEPIhTERT). Clonal colonies were observed for Fbs but not for CEPI hTERT and Conj EPI hTERT cells. The expression of GFP in the epithelial cells was coincidental with reduction in cell number.
Conclusions: High transfection efficiency of Fbs and epithelial cells was obtained using Nucleofector method. Stable expression of GFP was only observed in Fbs and it should be possible to isolate a fluorescent cell line. Even transient expression of GFP appeared to be cytotoxic to epithelial cells.

MATHEMATICS AND COMPUTER SCIENCE – ROOM 108

9:00 AM

CONVERSION OF DYNAMIC EXPLORER HAPI/LAPI DATA TO CDF'S FOR ARCHIVING AND EASY DATA BROWSING ANALYSIS. Shanequah Brison: SIECA Intern, Langston University, NASA Goddard Space Flight Center, Code 612.4-Space Physics Data Facility, Mentors: Dr. Shing Fung and Mr. Robert Candey.

The Dynamic Explorer (DE) program consisted of two satellites, the DE-1 and DE-2. They were launched together on Aug 3, 1981 to study the coupling of energy, electric currents, electric fields, and plasmas between the magnetosphere, ionosphere, and the atmosphere. The DE-1 satellite was placed in a highly elliptical orbit having an apogee of 4.65 Earth radii (6378 km per Earth radius) and a perigee altitude of 675 km, where as DE-2 had a nearly circular orbit with a required perigee to be below 350 km and a apogee above 1000 km. For my project I will be focusing on refurbishing the data from the High Altitude Plasma Instrument (HAPI) on DE-1 and the Low Altitude Plasma Instrument (LAPI) on DE-2, so that they can be accessed and used by modern data accessing tools. Converting the data to a Common Data Format (CDF) will be helpful in building generic software on that data. This allows scientists to view trends or events in different data sets.
The SKTEditor, a CDF tool developed by the Space Physics Data Facility (SPDF), is used to develop the initial empty CDF with metadata. The programming language, IDL, is used to convert the HAPI and LAPI data and store into CDF's that will be used by the SPDF data browsing system, CDAWeb. *[I would like to acknowledge the National Science Foundation and OK-LSAMP].*

9:20 AM

CREATING A WEB BASE PRESENTATION SYSTEM. Christa Burks and Dr. J. C. Diaz, Department of Computer Science, The University of Tulsa, Tulsa, OK, 74104.

This project aims at the implementation of a web interface that allows users to create dynamic presentations that can use a multimedia and real time applications. A proof of concept prototype will be illustrated that allows a presentation to be delivered through the Web. The objective this fall is to develop a low-fidelity prototype for user evaluation and testing, in order to determine which minimal features of a presentation software will be required in the final product.

9:40 AM

NETWORK-AWARE DYNAMIC POLICY ENFORCEMENT. Matthew Butler and Dr. John Hale, Department of Computer Science, The University of Tulsa, Tulsa, OK 74104

Security Enhanced Linux (SELinux) has proven itself very capable of defending against conventional attack strategies, but often impairs the flexibility of the system. We can mitigate this by using SELinux's conditional policy and a Dynamic Policy Enforcement Agent (DPEA) to dynamically adjust the system's security policy based on its environment. DPEA makes decisions based on events recorded in system logs and/or forwarded from other hosts on the network. These decisions may include activating or deactivating portions of SELinux policy or forwarding warnings to other hosts.

PHYSICS AND ENGINEERING – ROOM 216

9:00 AM

GAS-LIQUID CYLINDRICAL CYCLONES (GLCC). Rosa Madrid (Oklahoma State University, Stillwater OK) and Dr. Ovadia Shoham, Petroleum Engineering (The University of Tulsa, Tulsa OK).

During the summer of 2005 I worked with the Tulsa University Separation Technology Projects (TUSTP) for 8 weeks and I was supported by the National Science Foundation and OK-LSAMP. My work consisted on helping TUSTP conduct experimental study for a specific Gas-liquid Cylindrical Cyclones (GLCC) application. GLCC is a pipe gas-liquid separator that utilizes centrifugal force to separate gas form liquids. It is mainly used in the oil/gas industry to separate natural gas and oil and/or water. It is an alternative for the conventional separators that are large heavy and expansive. When the multiphase flow goes into the GLCC, the tangent inlet causes swirling flow. Then the centrifugal force pulls the heavier liquid toward the inner wall and the light liquid against the center. The liquid flow goes out from the bottom and the gas flows out from the top. The liquid I mainly worked with was water. I observed the flow loop and helped acquire data and took pictures and videos for each test. Tests were conducted at different levels and velocities of the liquid.

9:20 AM

AGILE MANUFACTURING: INCENTIVES AND IMPROVEMENT PROGRAMS. Paul Wright and Dr. Charlene Yauch, Department of Industrial Engineering and Management, Oklahoma State University, Stillwater, OK 74078.

A modern characteristic that is sought after by manufacturing plants is agility, which is defined as the ability to succeed in a turbulent environment. This presentation discusses a recent survey of U.S. manufacturing companies. A quantitative measure of manufacturing agility is described, as well as results related to performance incentives and manufacturing improvement programs. The survey results show that all respondent companies utilize at least one type of performance incentive, and most companies use multiple types. Levels of success and agility were found to be higher for those companies employing a skill based pay system. It was also found that most respondents have 7 to 12 improvement programs in place, and that implementing a lean manufacturing or agile manufacturing program is not significantly related to agility levels.
[This research is supported by the National Science Foundation and OK-LSAMP].

9:40 AM

IMPROVEMENTS TO TU STORM ROBOTICS COMPETITION. Zachary Scott Carpenter and Dr. G. Kane, Department of Electrical Engineering, The University of Tulsa, Tulsa, OK 74104

TU Storm is an autonomous robotics programming competition for high schools hosted by The University of Tulsa (TU). Each high school is issued an identical robot designed and built by TU. The robots are physically capable of completing the challenges, but are issued to the high schools with only a simple default code.

The purpose of this research is to explore different placement and/or new sensors for the TU Storm robots. These changes will increase the capabilities of the robot, thus allowing us to add new challenges to the competition and make the old challenges more elaborate.

POSTER PRESENTATIONS

PHYSICS AND ENGINEERING; MATHEMATICS AND COMPUTER SCIENCE

P1

AN INVESTIGATION OF TYPES OF CONTROLS USED IN ROBOTIC VEHICLES. Gregory Falling and Dr. Calvin Cole, Department of Physics, Northeastern University Tahlequah OK

This project involves the identification of strengths and commonalities for some of the main methods of control and locomotion in robotics. Once more clearly identified we want to see for what purposes and by what means they might be jointly exploited. The work is presently at its very beginning. This poster presents examples of programmed and hardwired control for robotic vehicles. This is initially demonstrated through use of "Stamp" controlled microcomputers from Parallax^{tm}, the Lego^{tm} robotics system, and hardwired control using Mark Tilden's BEAM (Biology, Electronics, Aesthetics, and Mechanics) approach. While programmed control is relatively easy to use it is somewhat limited when using simple microcontrollers because only one process can be used at a time. This is overcome in part by creating triggers that exit the main process to enter another. This can create lengthy and sometimes error prone code. The hardwired approach on the other hand allows more than one process at a time, exiting or entering a process at any point while continuing the current process if desired. Hardwiring has the problem that sometimes intricate circuits must be designed and built. We hope to see if a hybrid approach can be developed to knit basic functional blocks from the various methods together while avoiding some of the complexities and limitations of a single method alone. *[We are grateful for the support of the National Science Foundation and OK-KLSAMP STEM for helping to make this work possible].*

P2

ELECTRODYNAMICS OF A GAUSS GUN AND ANALOG VS. DIGITAL ASTRO-PHOTOGRAPHY. Erik K. Gonzales and Dr. Carl T. Rutledge, Department of Physics, East Central University, Ada, OK 74820.

To demonstrate some laws of electrodynamics for educational purposes, a Gauss gun was designed, built, and tested. The apparatus showed how electrical energy stored in capacitors can be quickly converted to mechanical (kinetic) energy. The gun effectively covers many concepts of electricity and magnetism. In the later part of the day, another experiment was carried out which involved making distinct comparisons between analog and digital abilities in astro-photography. Detailed photographs of Moon craters Pythagoras, Grimaldi,

and Riccioli were made along with other astro-media. In order to distinguish the two types, various shutter speeds, filters, setups, etc. were used in an effort to optimize clarity and quality for both forms of photography.

P3

LIMITS ON MUON DECAY FROM RECENT MEASUREMENTS. Nathan J. Williams (Langston University) and: Dr. Carl Gagliardi, Texas A & M University.

All measurements of muon decay are successfully described by the "V-A interaction". Each measurement is a parameter with its own experimental value. There are nine parameters, which are: , , / , ′, ″, ′/A,, ′/A. These parameters describe the momentum spectrum, asymmetry, and the longitudinal/transverse polarizations of electrons emitted in muon decay.

The muon decay interaction may be written as a local, derivative-free, lepton-number-conserving, four fermion interaction. My project consists of writing a computer program, based on the language of C++, to calculate new limits on this general interaction based on the new measurements, that have been performed at PSI and TRIUMF, and added in the last half year. This program will incorporate the nine muon decay parameters, the new re-measured values for some of the parameters, the new correlation of the parameters and the original constraints which the measurements must follow.

(I would like to acknowledge the National Science Foundation and OK-LSAMP for their support).

P4

FREESCALE SEMICONDUCTOR - "BOUNDLESS POSSIBILITIES". Donald Stutson II and Jan Gachioc (Web Engineer), Freescale, Inc., Austin, TX.

My project this summer at Freescale in Austin, Texas was to design, implement, and update pages for the USA Careers section for the College Recruiting team. I first benchmarked all of our competitors who recruit the same majors as Freescale does. I then made a chart of similarities found in their careers pages to create a rating system compared to that of Freescale.

I then presented the data to my team and we decided we needed graphics in the form of banner and video content provided by the visual department of Freescale. The group really stressed the importance of having an employee testimonial page to which potential employees could get incite to Freescale culture.

Before I got to testing pages I had to learn how to use Freescale's internal web management system known as TeamSite. I found a collection of images which reflect Freescale culture to be displayed on the pages. I came up with the concept of "Boundless Possibilities" to apply to the banners. Aside from banner design, my biggest task was interviewing several Freescale interns and employees for their ideas on what they think about Freescale along with obtaining their photographs.

Once all of the changes were successfully made in the testing environment the college recruiters gave me their approval. The new site is still in staging waiting to be deployed pending upper level management approval. I would like to thank the National Science Foundation and OKAMP for providing me with a stipend which assisted a great deal with relocation and bills of that nature.

BIOLOGY, CHEMISTRY, AND BIOCHEMISTRY

P5

MITEs IN POA ARACHNIFERA. Jamie L. Harrison, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

Poa arachnifera (bluegrass) is a cool seasonal, perennial grass with a polypoid genome typically consisting of n=7=56 to 84 chromosomes. Little is known about the genomic composition or relationship of the *Poa* genus and few molecular markers have been generated. Recently, researchers with the USDA, Logan, UT examined genome relationships and history of polyploidy evolution among twenty-two *Poa* species. The results suggest that the genus consists of overlapping species relationships of which *Poa arachnifera* fell within four distinct groups of the phylogenetic tree. As a consequence, this species may represent an ancient *Poa* species and may be an ideal source for the derivation of genomic information and *Poa* ssp. molecular markers. The purpose of this study was to identify transposable elements in *Poa arachnifera* contained in 300 nucleotide sequences obtained from USDA.
The three classes of transponsons (mobile genetic elements) are retrotransposons, transposons, and MITEs. MITEs are Miniature Inverted-repeats Transposable Elements. The completion of the genomic sequence of human, rice, and worm has revealed that their genomes contain thousands of copies of recurring motifs consisting of: 1) almost identical sequence of about 400 base pairs;
2) characteristic inverted repeats of about 15 base pairs such as:

5' GGCCAGTCACAATGG..~400 nt..CCATTGTGACTGGCC 3'
3' CCGGTCAGTGTTACC..~400 nt..GGTAACACTGACCGG 5'

There are over 100,000 MITEs in the rice genome representing some 6% of the total genome. Some of the mutations found in certain strains of rice are caused by insertion of MITEs in the gene.
The interns in the Chemistry Department at Langston University identified a total of 21 MITEs, including: Castaway, Ditto, Gaijin/Gaigin, ID – 3, adh type G & B, pangrangja, and Tourist – like.
In addition, the interns identified 17 molecular markers for *Bromus inermus* (smooth brome grass). In the last hundred years smooth brome grass has been extensively seeded in pastures, hayfields, and along roadside ditches throughout the United States and Canada. Smooth brome is a cool season grass that has become a problem in disturbed portions of pastures in the aspen parkland, fescue, and the mixed grass prairie regions. Controlling smooth brome grass invasion is a challenge because many of our native plants grow at the same time as smooth brome grass. In most cases, the presence of smooth brome grass is too great, and to try to eradicate it would prove to be not only extremely difficult but impossible in many situations.

P6

MECHANISMS OF BACTERIA RESISTANCE DEVELOPMENT TO THE ANTIBIOTIC PENICILLIN G. Shannon Gipson, Tumen Wuliji, Department of Biology, Langston University, Langston, OK 73050

The massive use of antibacterial reagents in households, antibiotic additives in domestic animal feeds, and frequent oral application of antibiotic treatment I patients have triggered a gradual and widespread resistance development in bacteria. One of the most common bacteria, Escherichia coli (E. coli) normally resides in the digestive tract of human and animals without harm to the hosts. Now a number of strains have become resistant to antibiotics. There was little documentation about the mechanisms of such resistance development to antibiotics by various bacteria. However, it is clear that antibiotic resistances in both pathogenic and nonpathogenic microbes are on the rise. The objective of this experiment is to elucidate the common mechanism in microbial strains to acquire resistance to antibiotics. Two bacteria stock samples, a pure culture of E. coli strain supplied by Langston University Biolab and some dairy farm bacteria swab samples were

obtained for antibiotic resistance selection. Dairy farm swab samples were collected shortly after the normal washing and sanitation for milking preparation of goats. Both bacteria stock samples were inoculated on the basic culture media in lab for initial period. Basic culture media was made up of 5.0g peptone, 3.0g of beef extract, and 15.0g of agar. Media was then autoclaved at 121°C for 45 minutes and 50ml was distributed into Petri dishes. Penicillin G solution was added to the basic culture at a gradual increasing gradient concentration for an antibiotic resistance culture. Penicillin G concentration gradient was at 0 units/ml at the first interval and increased with 22 units/ml at each subsequent interval per culture until 594 units/ml at 28th interval which is equivalent to the prescribed effective dose in an adult person. Each bacteria source was used in both control and treatment setups. Bacteria culture plates were incubated at 37°C for 18-24hrs before transferring to each of the subsequent intervals. After end of incubation, culture plates were examined for the bacteria colony shape and sample for Gram's stain classification under microscope. A fresh inoculation was made from each plate for each of the subsequent intervals and the growth arrested bacteria plates were stored for further examination. The initial observation of this experiment indicated that both bacteria culture lines possess the capability to grow on antibiotic medium with a gradual increase in concentration. An extended study is required to complete the project and to identify the common mechanisms of the bacteria resistance to Penicillin G.

P7

EVALUATING PRYMNESIUM PARVUM UNDER THE FACTORS THAT BACTERIA MIGHT BE A LIMITING FOOD SOURCE AND POSSIBLE TRIGGER FOR CONTROLLING THE TOXICITY OF THE ALGAE. Ambrie Walker (East Central University), and Dr. Tim Canfield (United States Environmental Protection Agency, National Risk management Research Laboratory and Groundwater Restoration Division
Ada, Oklahoma. [National Science Foundation and OK-LSAMP support]

Prymnesium Parvum, is a micro alga in the class of Prymnesiophyceae, and is a common species of the lake phytoplankton. It has a uninucleate, and has an oval shape that is eight to eleven micrometers long and four to six micrometers wide. This alga has a unique unicellular flagellate type appendage that is usually twelve to fifteen micrometers long and is flexible. Golden Algae are common in lakes and pounds from Mexico into the south western United States golden algae exude a toxin that is lethal to fish and other aquatic gill breathing animals. This algae has become more and more of a problem in Oklahoma and Texas over the last few years. Some controls are possible but we still do not know the mechanisms that control this toxicity it is possible but we still do not know.

Looking at two theories this project was designed to evaluate factors influencing golden algae becoming toxic to fish. The first theory is bacteria might be a limiting food source for the algae and the second theory is bacteria might be a possible trigger in controlling the toxicity of the algae (TPWD, 2004). P. parvum is able to satisfy nutrient requirements from other compounds sources like bacteria when phosphate nutrients are limited. The toxic bloom could be a response when the algae start to die off. The algae produces a toxin to kill other organisms that it competes with to keep feeding itself. The ability alone to destroy or minimize the growth of other species increases the severity of the toxic problem with the golden algae when it is in danger or being threatened. This study is designed to evaluate if the lack of food will cause P. parvum to cause fish toxicity.

P8

MOLECULAR MARKERS IN BROMUS INERMUS/BIOINFORMATICS IN POA ARACHNIFERA.

Jessia Wesson, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

Bromus inermus (smooth brome grass) is a cool season grass that has become a problem in disturbed portions of pastures in the aspen parkland, fescue, and the mixed grass prairie regions. Controlling smooth brome grass invasion is a challenge because many of our native plants grow at the same time as smooth brome grass. In most cases, the presence of smooth brome grass is too great, and to try to eradicate it would prove to be not only extremely difficult, but impossible in many situations. Little is known about the genomic composition of smooth brome grass. The interns in the Chemistry Department at Langston University identified seventeen smooth brome grass molecular markers for the United States Department of Agriculture (USDA). The molecular biology protocol included the following: macerate the leaf, isolate the DNA, perform polymerase chain reactions (PCR) and primer walking, verify PCR bands on agarose gels. The bioinformatics showed that six markers for smooth brome grass have homologous sequences in *Glycine max* (soybean); seven have homologous sequences in *Arabidopsis thaliana*; two have homologous sequences in *Oryza sativa* (rice); and two have homologous sequences in *Sorghum biocolor.*

Poa arachnifera (bluegrass) is a cool seasonal, perennial grass with a polypoid genome typically consisting of n=7=56 to 84 chromosomes. Little is known about the genomic composition or relationship of the *Poa* genus and few molecular markers have been generated. The purpose of this research was to identify transposable elements contained in 300 *Poa arachnifera* nucleotide sequences obtained from the USDA. Transposable elements make up a large portion of plant genomes and comprise fifty to eighty percent of some plant genomes. The three classes of transposable elements are as follows: class one are RNA - mediated (retrotransposons), class two are DNA–mediated (transposons), and class three are Miniature Inverted-Repeat Transposable Elements (MITES). The interns in the Chemistry Department at Langston University identified fifty-five retrotransposons, three transposons, and twenty one MITES using the plant repeat database at the URL: www.tigr.org. More specifically, twenty-four inverted repeats (palindromes), 141 protein motifs (ppsearch), thirty tandem repeats (equicktandem), forty contiguous repetitions (periodicities) from mreps, fifteen interspersed repeats and low complexity DNA sequences, and four simple sequence repeats (SSRs) from gramene were identified.

[This research was supported by the National Science Foundation-The Undergraduate Biomedical Education at Langston University Program, Langston Integrated Network College (L.I.N.C.) at Historically Black Colleges and Universities-Undergraduate Programs (HBCU- UP), and the Oklahoma Louis Stokes Alliance For Minority Participation (OKAMP) at OSU, and Dr. Bryan Kindiger at the United States Department of Agriculture (USDA)-Grazinglands Research Laboratory].

P9

OUTCROSSING ABC MUTANTS IN CAENORHABDITIS ELEGANS. Syndia Todd[1], Marquita Rowland[1] , (Langston University), and Dr. Lisa Timmons[2], [2] University of Kansas, Kansas

There are 60 confirmed ATP-Binding Cassette Transporters Proteins (ABC's) in *Caenorhabditis elegans.* ABC's are part of a family of membrane proteins that require ATP for the transfer of substrates across membranes. It is believed that ABC Transporters are needed in the RNA interference (RNAi) mechanism in *C. elegans.* RNAi is a natural mechanism that through double stranded RNA (dsRNA) silences specific genes; the gene is suppressed by the breakdown of mRNA. This process also protects the genome from endogenous transposable elements and from viral infections. Since many diseases are caused by the inappropriate activity of specific genes, the ability to silence and regulate such genes selectively through RNAi could provide a means to treat a wide range of human diseases. In this study, worms with deletions in ABC genes were obtained from the *C. elegans* gene knockout consortion. Several strains were outcrossed in order to get rid of unwanted mutations that may have been introduced during the course of generating the deletions in ABC

genes. After a series of breeding experiments, mutant strains homozygous for ABC gene deletion were confirmed as homozygotes via PCR. Six ABC mutant strains were successfully outcrossed. These strains will be outcrossed 2-3 more times, following which a search for phenotypes.

P10

RATE OF HABITUATION ON LIGHT AND DARK ISOLATED CRAYFISH. Danny Terry (Langston University) and Dr. Kyle Frantz (Georgia State University); Research through Emory University's Center for Behavioral Neuroscience at Spelman college.

Crayfish (Procambarus clarkii) are used as a model for understanding integration of sensory and motor neurons because of their extremely large neurons and well-mapped circuitry. The crayfish Lateral Giant Neurons (LG) mediate a stereotyped tail flip escape response. A stimulus to the tail creates sensory input to the LG and causes motor output from the LG, which thrusts the animal up and away from the stimulus. The present study aims to determine the influence of low illumination conditions (dark ambient light) on habituation of the tail flip escape response to tactile stimuli (light touch to the tail) in adult crayfish of similar size. Animals will be isolated in the dark (constant low illumination) or in the light (normal circadian rhythm) for 24 hours. Then the time it takes for the animals to habituate to a tactile stimulus will be tested. Crayfish isolated and tested in the dark will not be able to use visual input to help determine whether the source of the tactile stimulus is harmful. Thus, the expected results are that the crayfish isolated in the dark will habituate more slowly to the tactile stimulus than light-isolated crayfish, or will fail to habituate entirely. We predict that electrophysiological changes in the LG neuron mediate changes in habituation. Therefore, follow-up electrophysiological analysis will show that the LG in dark-isolated animals is more responsive to low voltage stimuli, compared with the LG from light-isolated animals. This experiment will contribute valuable information regarding changes in sensorimotor integration under varying environmental conditions.

P11

MECHANISMS UNDERLYING NON-FEMINIZING ESTROGEN ZYC-26 PROTECION AGAINST ETHANOL TOXICITY. *Contessa Majors, James Simpkins, Andrew Wilson, Varun Goyal, Marianna Jung Department of Pharmacology and Neuroscience, University of North Texas Health Science Center at Fort Worth, TX 76107, USA*

This study investigated mechanisms underlying potential protective effects of a non-feminizing estrogen, ZYC-26, on ethanol toxicity in an Immortalized Hippocampal Cell line (HT-22). It was reported that ZYC-26 neither binds to estrogen receptors nor elicits a uterotrophic response. We tested the hypothesis that ZYC-26 protects against ethanol-induced cytotoxicity through antioxidant mechanisms in a manner that interacts with the GABA (γ-Amino Butyric Acid) neurotransmission. GABA is the major inhibitory neurotransmitter and mediates some of ethanol activity in the brain. HT-22 cells were incubated with a media containing ethanol (0, 50, 100, and 200 mM) for 24 hours. Drugs (ZYC-26 or ZYC-26 + GABA-A antagonist) were simultaneously treated with ethanol to determine whether ZYC-26 attenuates ethanol toxicity and whether GABA-A antagonist bicuculline blocks the ZYC-26 protection. At the end of 24 hours of ethanol exposure, three dependent variables were measured; 1) cell viability was measured by a Calcein-AM Assay. Calcein-AM permeates intact live cells and is hydrolyzed to calcein, a strongly fluorescent compound which enables us to measure relative fluorescent units. 2) Lipid peroxidation was measured by a Thio Barbituric Acid Reactive Substances assay to detect malondialdehyde (MDA) with and without 4-hydroxyalkenals (HAE) (end-products of lipid peroxidation). 3) Protein oxidation was measured by a Carbonyl assay to detect carbonyls (products of oxidized proteins). Results indicate that high doses of ethanol decreased cell viability, increased MDA ± HAE, and increased carbonyl contents in a manner that is prevented by ZYC-26. All of the ZYC-26 protection was inhibited by

bicuculline. These data suggest that ZYC-26 protects against ethanol-toxicity in part through normalizing oxidative imbalance associated with the GABA neurotransmission. Our findings may provide a potential therapeutic strategy for treating alcohol toxicity without the feminizing side effects of estrogenecity. *[Research was supported by the Ronald E. McNair Program, the National Science Foundation, OK-LSAMP, and Langston's Integrated Network College (LINC)].*

P12

RETROTRANSPOSONS IN POA ARACHNIFERA. *Johnnie Roseburr, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050*

The three classes of retrotransposons (mobile genetic elements) are retrotransposons, transposons, and MITEs. Retrotransposons copy themselves to RNA and then, via reverse transcriptase, back to DNA. The two subtypes of retrotransponsons include long terminal repeat (LTR), and non-LTR. The size of LTR range from approximately 100 base pair to over 5 kilobase pairs, and are further sub-classified into Ty1-copia and Ty3-gypsy groups based on their degree of sequence similarity and the order of encoded gene products. Ty1-copia and Ty3-gypsy groups of retrotransposons are commonly found in high copy number (up to a few million copies per haploid nucleus) in plants with large genomes. Ty1-copia retrotransposons are abundant in species ranging from single-cell algae to bryophytes, gymnosperms, and angiosperms. Ty3-gypsy retrotransposons are also widely distributed, including both gymnosperms and angiosperms. Retrotransposon can induce mutations by inserting near or within genes. Furthermore, retrotransposon induced mutations are relatively stable, because the sequence at the insertion site is retained as they transpose via replication mechanism.

The purpose of this research was to identify retrotransponsons in *Poa arachnifera* contained in 300 nucleotide sequences obtained from the USDA. *Poa arachnifera* (bluegrass) is a cool seasonal, perennial grass with a polypoid genome typically consisting of n=7=56 to 84 chromosomes. Little is known about the genomic composition or relationship of the *Poa* genus and few molecular markers have been generated. The interns in the Chemistry Department at Langston University identified a total of 55 retrotransposon, including: P-SINE r31, copia-type, RIRE5 DNA, RIRE9 DNA, OSR3 – 1, Ty1 – copia, Ty3 – gypsy, CACTA, En/Spm like, CACTA, RIRE, RIRE1, and Rrt23- copia – like.

In addition, the interns identified 17 molecular markers for *Bromus inermus* (smooth brome grass). In the last hundred years smooth brome grass has been extensively seeded in pastures, hayfields, and along roadside ditches throughout the United States and Canada. Smooth brome is a cool season grass that has become a problem in disturbed portions of pastures in the aspen parkland, fescue, and the mixed grass prairie regions. Controlling smooth brome grass invasion is a challenge because many of our native plants grow at the same time as smooth brome grass. In most cases, the presence of smooth brome grass is too great, and to try to eradicate it would prove to be not only extremely difficult but impossible in many situations

[This research was supported by Langston Integrated Network College (L.I.N.C), which is funded by the National Science Foundation (NSF), at Historically Black Colleges and Universities-Undergraduate Programs(HBCU- UP), and the Oklahoma Louis Stokes Alliance For Minority Participation (OKAMP) at OSU, and Dr. Bryan Kindiger at the United States Department of Agriculture, Grazinglands Research Laboratory].

P13

OPTIMIZATION OF VESTITONE REDUCTASE AND MEDICARPIN ACCUMULATION IN COPPER-TREATED MEDICAGO TRUNCATULA AND MEDICAGO SATIVA SEEDLINGS. Ricardo Lemus and Dr. Nancy L. Paiva, Department of Chemistry, Computer and Physical Sciences, Southeastern Oklahoma State University, Durant, OK.

The purpose of my research was to optimize vestitone reductase (VR) accumulation in *Medicago truncatula* and *Medicago sativa* seedlings. VR is an important enzyme in *Medicago truncatula* and *Medicago sativa* because it is one of the last two enzymes in the biochemical pathway responsible for the production of medicarpin and other phytochemicals. Medicarpin acts as a "self-made" antibiotic in these plants to fight off harmful fungi. VR reduces vestitone, and then DMI dehydratase (DMID) dehydrates the product DMI to medicarpin. Previous studies revealed that VR and DMID enzyme activities were shown to increase in parallel, and the two proteins actually interact physically. cDNA clones encoding VR have been isolated and characterized, but no cDNA clones encoding its partner enzyme, DMI dehydratase (DMID) have been identified, nor has DMID been purified completely. In order to produce a usable source of tissue to use for DMID enzyme purification and eventual cloning, different treatments were examined for their use in increasing the levels of DMID. Because the direct DMID assay is very complicated and the enzyme substrate is hard to produce, and VR and DMID are closely associated, the initial screening of treatments was carried out by monitoring VR accumulation by western blots, or medicarpin accumulation by HPLC.

I induced the production of VR by treating young seedlings with different concentrations of $CuSO_4$ (0 to 50 mM). $CuSO_4$ in this experiment mimics a pathogenic fungus, in that it can stimulate the accumulation of defensive enzymes and compounds involved in the same way a fungus does. $CuSO_4$, unlike a fungus, can be more easily measured and replicated. Too little of an inducer such as a fungus or $CuSO_4$, and the seedlings will remain healthy but make little medicarpin, while too much $CuSO_4$ and the seedlings will die before the medicarpin or VR or DMID can accumulate. The first trial was to determine roughly how much $CuSO_4$ the seedlings could tolerate without severe visible damage and death. Using the limited range indicated by this preliminary data, several trials were carried out with seedlings grown in different ways or for different times, followed by analysis of VR accumulation by Western blots. Some seedlings were grown in light, while others were grown in the dark, which can alter sensitivity to $CuSO_4$. The Western blots indicated that 7 mM for the most part produced the highest VR levels. The HPLC analysis is in progress.

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P14

EFFECTS OF ESTROGEN ON CYTOKINES POSITIVE CELLS IN THE CEREBELLUM. Tomica D. Blocker, Argenia L. N. Doss, T. Wallace, Dr. S. J. Williams. Department of Biology, Langston University, Langston, OK, 73050

The primary functions of the cerebellum are to facilitate motor coordination, equilibrium and balance, and more recently provide projections to cortical areas that carry out cognitive functions. Advances have been made in our understanding of estrogens actions on cells in the cerebellum. Estrogen has been described as an anti-inflammatory agent with the ability to modulate immune responses. Estrogen responsive cells and cells expressing the estrogen receptor have been identified in cerebellar Purkinje cells. Several cell types within the cerebellum (i.e., microglia, astrocytes, endothelial cells and neurons) express tumor necrosis factor alpha (TNF-α), Interleukin 1 Alpha (IL-1α), Interleukin 1 Beta (IL-β), and Interleukin 6 (IL-6). These cytokines, described as pro-inflammatory, have been implicated as having estrogen response elements in their promoter

region and may also be targets of estrogen action. **Objectives:** The objectives of this study were to determine if estrogen promotes changes in the density of cells expressing cytokines in the cerebellum and determine if activated cells also express estrogen receptor-β in ovariectomized and a group of ovariectomized rat that received estrogen treatment. **Materials and Methods:** Adult female rats were ovariectomized and ovariectomized and administered estradiol implants. Using light microscopy and computer digital analysis, the number of each cytokine immuno-positive cell was counted and mapped onto computer generated cerebellar drawings. **Results:** We were able to identify all four populations of cytokine-IR cells in about 10 different regions of the cerebellum as defined by the rat atlas (Paxinos and Watson). Females treated with 17β estradiol exhibited a larger number of TNF-α-IR cells when compared with the ovariectomized rats that received no treatment. We noted a larger number of IL-1-α-IR, IL-1β-IR, and IL-6-IR cells in the ovariectomized rats than the estrogen treated rats. Some cells expressing cytokines also expressed ER-β. More importantly these cells were identified in the Purkinje cell layer and in the deep cerebellar nuclei. **Conclusions:** We concluded that a significant number of cells cytokine-IR cells contain ER-β and therefore could be directly regulated by estrogen. We concluded that estrogen does play a role in the modulation of IL-1-α-IR, IL-1β-IR, IL-6-IR in the cerebellum but not TNF-α. This information, along with further research, can aid in the determination to find out how estrogen affects pro-inflammatory cytokines that may play a role in neurodegenerative diseases and in decreasing cerebellar function. *[Supported by the NIH Grant Numbers: P20RR016475 from the INBRE Program of the National Center for Research Resources and R25HC6354604 from the National Heart Blood Lung Institute]*

P15

INVESTIGATION OF TARGET EPITOPES OF PROTECTIVE ANTIGEN AND LETHAL FACTOR IN BACILLUS ANTHRACIS. **MACOLE MAYWEATHER,** S. Crowe, PhD, J. Guthridge, PhD, J. James, MD, PhD, Langston University, The University of Oklahoma Health Sciences Center, Oklahoma Medical Research Foundation

Bacillus anthracis, a gram-positive spore forming bacteria, is the cause of anthrax. The cutaneous form of the disease is relatively common amongst farming occupations; however, bioterrorism attacks around the world have focused on inducing the inhalation form and future attacks are concerning. Anthrax survives as a resilient bioterrorism agent because its endospores last for many years; it also easily transportable and accessible in nature. The current anthrax vaccine is cumbersome, requiring multiple shots, annual boosters, and having serious adverse effects in some individuals. Improved understanding of the key protective regions of this induced response would allow refined vaccine development and potentially fewer side effects. The purpose of this study is to determine the major protein and humoral epitope targets of *B. anthracis.* To accomplish these goal we have prepared over 750 peptides spanning the coding regions of protective antigen (PA) and lethal factor (LF). Sera from at least ten immunized individuals and ten matched controls have been tested for reactivity with the parent proteins and with these decapeptides using a modified ELISA assay. We have found that the antibody response to PA is much higher than that to LF. Several key, common antigenic regions have been determined for these responses. Further evaluation will be done to determine their protective role following infection.

P16

PROTHONOTARY WARBLER REPRODUCTIVE SUCCESS AT A WILDLIFE REFUGE. Stormy L. Shoopman and Dr. Doug Wood, Department of Biology, Southeastern Oklahoma State University, Durant, OK 74701.

Between the months of April and August 2005, warblers arrive from the tropics and start the reproduction process. Oklahoma's only cavity nesting warbler, the Prothonotary Warbler (*Protonotaria citrea*), was the topic of my research this summer. I conducted the research in southeastern Oklahoma at the Tishomingo National Wildlife Refuge in Johnston County, Oklahoma. Prior to their arrival, wooden boxes attached to T-posts were set up for the birds to use as nesting boxes. My study consisted of 56 boxes located in each of the different types of habitats inside the refuge. The boxes were checked twice a week to determine reproductive success and study the habits of the Prothonotary Warblers. The documentation included the odd materials the birds used to build their nest, clutch size, number of chicks hatched, fledglings, and bandings on returning birds. I banded all the nestlings and tried to band the parents for future research. My results show that the females will breed at a certain location and then return the following year within 200 meters of the same location. Nestling survival depends on weather, temperature, and predators, such as raccoons (*Procyon lotor*) and snakes. Data collected has shown that Prothonotary Warblers at the Tishomingo National Wildlife Refuge have a high nest success rate. Through different methods of capture, we were able to band 249 new individuals, and had a 10 percent recapture rate of birds banded in previous years. In addition to the warbler research, I assisted in vegetation sampling within the study area of the Prothonotary Warbler to study the different types of vegetation surrounding our boxes. The goal of the sampling was to determine if a certain type of vegetation was preferred by the Prothonotary Warblers.

[I would like to thank the National Science Foundation and the OK-LSAMP for funding my research].

P17

SYNTHESIS AND COMPARISON OF THIOL VS. NON-THIOL CLEAVAGES OF BOVINE LACTOFERRICIN PEPTIDES. Quincy Anderson and Dr. Denise V. Greathouse, University of Arkansas

With the increase in multidrug resistant bacteria there is a need to understand the properties of natural occurring antimicrobial peptides. Antimicrobial peptides are future candidates for newly made antibiotics. Lactoferricin Bovine (20-25), an antimicrobial hexapeptide, is believed to exert its effect directly on bacterial cellular membrane lipids. In order to learn more about these interactions three derivatives of Lactoferricin B were synthesized by Solid Phase Peptide Synthesis (SPPS) and cleaved with Thiol and Non-Thiol (TIPS) cleavage cocktails. The qualities of the peptides were analyzed by HPLC and MS and the peptide/lipid interaction was observed through NMR. Non-Thiol cleavages produced better yields of peptides and more consistent results.

[I would like to acknowledge Langston Integrated Network College (Linc), Undergraduate Biomedical Education Program at Langston University (UBEP), and the National Science Foundation OK-LSAMP].

P18

THE EFFECTS OF MICROWAVE IRRADIATION ON THE FREE RADICAL POLYMERIZATION OF STYRENE AND METHYL METHACRYLATE. Deborah Snell and Spence Pilcher, *Department of Natural Science, Northeastern State University, 600 N Grand Ave, Tahlequah, OK 74464*

The thermal free radical polymerization of both styrene and methyl methacrylate were conducted using microwave irradiation and a fiberglass heating mantle as the respective heat sources at 60 °C and 70 °C employing the use of three water-soluble initiators, namely, potassium persulfate (KPS), 2,2-

azobisisobutyronitrile (V-50), and 4,4 -azobis(4-cyanovaleric acid), along with one oil soluble initiator, 2,2 -azobis(2-methylpropionamidine) dihydrochloride (AIBN). Percent recoveries of the polymer were measured at 5, 15, 30, and 60 minute time intervals after the addition of the water-soluble initiators and at 30 and 60 minute time intervals in trials conducted using the oil-soluble initiator. When comparing the amount of polymer recovered from a conventional-heating trial to the amount of polymer recovered from the same settings in a microwave-heating trial, reactions run using a water-soluble initiator predominantly showed a higher percent recovery of the polymer in the microwave trials compared to the trials using a conventional heating method. Additionally, the results were even more marked in the polymerizations of methyl methacrylate. However, when comparing the results of the polymerizations using the oil-soluble initiator, AIBN, a significant difference was not found. This research was supported by National Science Foundation Oklahoma Louis Stokes Alliance for Minority Participation in Science, Technology, Engineering, and Mathematics Program (NSF OK-LSAMP).

P19

UTERINE SMOOTH MUSCLES CELLS IS PRESENT IN UTERINE SMOOTH MUSCLE CELLS AND CAN BE STIMULATED BY HISTAMINE. Amir Isbell and Eduardo Chini, MD., Ph.D., Anesthesiologist, Mayo Clinic, Rochester, MN

Many birth complications such as premature birth and irregularity of uterus contractions inhibiting muscle expansion at the correct time to release the fetus from the uterus, not excluding the vagina, are problems attributed in part to lack of appropriate regulation of smooth muscle. It already known that smooth muscle is present in the uterus. Moreover, it is known that the smooth muscle regulates the contraction in the uterus. Although there is a partial knowledge base of intracellular calcium release, associated with smooth muscle contraction throughout mammalian systems, as seen by the contributions of inositol trisphosphate (IP_3) and cyclic ADP-ribose (cADPR) to uterine smooth muscle, the calcium releasing nucleotide Nicotinic Acid Adenine Dinucleotide Phosphate (NAADP), as a contributor or present factor, had not been explored in this smooth muscle type.

To determine if NAADP was present in these cells, the cells were quiesced, extracted, and purified by several methods. The final step was a competitive binding assay to determine the final concentration of NAADP present. To determine if histamine was acting as an agonist for the synthesis of NAADP, similar methods were used except the cells were treated with histamine. The findings supported the presence of NAADP in these myometrium cells as well as heightened synthesis of NAADP as a result of a histamine induced reaction.

P20

PRENATAL DIAGNOSIS OF CHROMOSOMAL ANOMALIES: A FIVE-YEAR EXPERIENCE.

[1]Ashley Burdex, [2]J. Mulvihill, and [2]S. Li: Department of Biology, [1]Langston University, Langston, OK 73050 and [2]Section of Genetics, Department of Pediatrics, University of Oklahoma Health Science Center, Oklahoma City, OK 73104

Over a five-year period, we evaluated 913 amniotic fluid samples in parallel by both FISH and conventional cytogenetic analysis. The indications for combined conventional cytogenetic analysis and FISH testing included advanced maternal age, abnormal sonography, abnormal maternal serum mothers, or family history of chromosomal anomaly. Of the 913 cases, 107 (11.7%) had abnormal karyotypes; 30 with trisomy 21, 25 with trisomy 18, 9 with trisomy 13, 16 with Turner syndrome, and 5 with triploidy. The remaining 22 samples had deletions, insertions, translocations, and other chromosomal abnormalities. Sex ratio was near 1.0 in all of the categories, except for trisomy 18, with 40% males and 60% females, perhaps due to inadequate cellular division in maternal meiosis. Overall, our findings are typical of the high frequency of chromosomal

abnormalities from highly selected patient population, in our case, mostly referred from the University of Oklahoma Health Sciences Center (OUHSC) High Risk Pregnancy Clinic.

P21

ORGANOMETALLIC SYNTHESIS: SYNTHESIS OF A NOVEL COMPOUND WITH FE (II)-S BOND. Courtney Hill, Valerie Toodle and Dr. Danny McGuire, Department of Chemistry, Cameron University, Lawton, OK.

Purpose: This experiment was designed to synthesize a novel compound with a Fe (II)-S bond. Organometallic synthesis requires us to handle moderately air-sensitive compounds using both inert-atmosphere and vacuum-line techniques. In addition it will show us the nature of a typical organo-carbonyl compound and demonstrate the application of H^1 n.m.r and infrared spectroscopy to the characterization of organometallic carbonyl derivatives.The Fe (II)-S bond is found in two proteins rubredoxin and ferredoxin. Rubredoxin is a small iron-sulfur protein found in various sulfur metabolizing bacteria and tetrahedral in symmetry. Ferredoxin is acidic with low molecular weight and is a soluble iron sulfur protein. We will be using purification techniques, synthesizing novel compounds and setting parameters to test the unique bonding between iron (II) and sulfur molecules. Laboratory techniques will consist of distillations, reflux, and rotary evaporation. We will also use a technique known as degassing or freeze-pump-thaw (FPT).

P22

TRANSPOSONS IN POA ARACHNIFERA, La'Cheverjuan Bennett, Dr. Sharon Lewis, and Dr. John Coleman, Department of Chemistry, Langston University, Langston, OK 73050

Poa arachnifera (bluegrass) is a cool seasonal, perennial grass with a polypoid genome typically consisting of n=7=56 to 84 chromosomes. Little is known about the genomic composition or relationship of the *Poa* genus and few molecular markers have been generated. Recently, researchers with the USDA, Logan, UT examined genome relationships and history of polyploidy evolution among twenty-two *Poa* species. The results suggest that the genus consists of overlapping species relationships of which *Poa arachnifera* fell within four distinct groups of the phylogenetic tree. As a consequence, this species may represent an ancient *Poa* species and may be an ideal source for the derivation of genomic information and *Poa* ssp. molecular markers. The purpose of this research was to identify transposable elements in *Poa arachnifera* contained in 300 nucleotide sequences obtained from the United States Department of Agriculture (USDA). Transposons are mobile genetic elements found in most, if not all, prokaryotic and eukaryotic genomes. Transposabe elements (TE) make up a large portion of plant genomes and comprise fifty to eighty percent of some plant genomes. **The three classes of transposable elements are as follows:** class one are RNA -mediated (retrotransposons), class two are DNA–mediated (transposons), and class three are MITES. CACTA is a transposon family having 16 base pair consensus terminal inverted repeat (TIR) sequences. CACTA elements are flanked by relatively short TIRs (100 – 300 base pair) which terminate in a conserved CACTA motif, many of which are non-autonomous elements (do not encode any proteins). It can be very difficult to recognize CACTA family because the TIRs of different subfamilies (hipa and En/Spm-like) show very little sequence conservation. The interns at Langston University in the Chemistry Department identified three transponsons out of 300 nucleotide sequences. Hipa is a CACTA transposon family having 16 base pair consensus TIR sequences to be present in high copy numbers in rice genome.

In addition, the interns identified 17 molecular markers for *Bromus inermus* (smooth brome grass). In the last hundred years smooth brome grass has been extensively seeded in pastures, hayfields, and along roadside ditches throughout the United States and Canada. Smooth brome is a cool season grass that has

become a problem in disturbed portions of pastures in the aspen parkland, fescue, and the mixed grass prairie regions. Controlling smooth brome grass invasion is a challenge because many of our native plants grow at the same time as smooth brome grass. In most cases, the presence of smooth brome grass is too great, and to try to eradicate it would prove to be not only extremely difficult but impossible in many situations.

[This research was supported by the National Institute of Health-The Undergraduate Biomedical Education at Langston University Program, National Science Foundation-Langston Integrated Network College (L.I.N.C.) at Historically Black Colleges and Universities-Undergraduate Programs (HBCU- UP), and the Oklahoma Louis Stokes Alliance For Minority Participation (OKAMP) at OSU, and Dr. Bryan Kindiger at the United States Department of Agriculture (USDA)-Grazinglands Research Laboratory].

P23

MOLECULAR MODELING OF ENZYME-INHIBITOR INTERACTION. George S. Kpeli (Langston University) and Dr. Krzysztof Kuczera, Chemistry and Molecular Bioscience, University of KS

S-adenosylhomocysteine hydrolase (AdoHcyase) is an enzyme generally known to be a regulator of biological transmethylation. The report by de Clercq et al. in 1978(25), that the Adohcyase inhibitor (S)- DHPA) was a broadspectrum antiviral and antiparasitic agents, sparked pharmacological interest in the enzyme as a target for inhibition. These studies are being performed in the hope of seeking new AdoHcyase inhibitors through the combination of rational drug design and high-throughout screening.

The project will help characterize the strength and nature of enzyme-inhibitor interaction, guiding the design of improved drugs and may contribute to curing several serious diseases, such as malaria. In this project we use known crystal structure of AdoHcyase and such modern tools of molecular modeling as SYBYL, QUANTA and AutoDock to enable us interact a new rigid ligand to the enzyme active site. We then compared the original protein-inhibitor complex with the generated models of protein ligand complexes and result shows that the rigid ligand successfully docked with the rigid protein.

P24

EXPRESSION OF MICROTUBULE-ASSOCIATED PROTEIN, TAU, IN PC12 CELLS. Aaron Washington (Langston University) and Dr. Chris Gamblin

Alzheimer's Disease (AD), named after Alois Alzheimer, is a neurodegenerative disease which causes massive cell death (apoptosis) to the frontal region of the brain. These deaths correlate to the amount of tau filaments, neuritic plaques, neurofibullary tangles (Tau), senile plaques (Beta-Amyloid), and other proteins present inside each deterioration cell. When frontal neuronal apoptosis is high enough, dementia occurs and later death. It is predominant in men and women at the age of 65 and older (National Mental Health Association). Tau is one of the proteins used to support microtubules in the nerve cells. In Alzheimers's Disease, tau detaches from the microtubules and bind to other tau molecules, which then form the tau filament, neuropil threads, neuritic plaques, and neurofibullary tangles.

Tau has a helical form which twists a different lengths, depending on the specific type of tau-isoform (6 isoforms). Tau also varies in its ability to polymerize, such as the mutant tau that does not polymerized. To imitate the affected frontal nerve cells, PC12 cells are used. The PC12 cells come form the adrenal medullary gland, and are model imitators for frontal and cerebral nerve cells. If Nerve Growth Factor (NGF) is introduced to the PC12 cells , they will grow pseudo-axons and pseudo-dendrites called processes. PC12 cells can demonstrate how the tau protein effects the cells, and how a Tet-off cell lin shows the amounts of tau producedin the presence of tetracycline and in the absence of tetracycline in relation to the frontal nerve cells. The reason for using the Tet-off cell line is to see how well it works for tau expression by introducing a foreign linearized plasmid (TRe-tight tau Midi) in which our gene of interest (tau) was incorporated. If the amount of

tau that was produced visually varied on a western blot to the corresponding Tet-off system. Therefore the Tau expression in PC12 cells by use of the Tet-off cell line accurately demonstrates the viability of the PC12 cells to be transfected without apoptosis.

P25

CLONING VARIOUS FRAGMENTS OF THE HUMAN GENE FOR THROMBOMODULIN AND EXPRESSING THEM IN PICHIA PASTORIS, Monique E. Robinson and Dr. John K. Coleman, Department of Chemistry, Langston University, Langston, OK

Cardiovascular disease is the most common cause of death in smokers. The thrombotic arterial occlusive diseases are the most common. The blood of smokers is much more prone to clot than that of non-smokers. It is hypothesized that the level of oxidation of methionine 388 in thrombomodulin, a key regulatory protein in blood coagulation, is elevated in smokers and in various diseases, which impose oxidative stress. It is further hypothesized that this oxidation is a key molecular cause of the prethrombotic state in individuals with these diseases and in smokers and thus a critical factor in the development of thrombosis and premature death in these populations. Cloning various fragments of the human gene for thrombomodulin and expressing them in Pichia Pastoris will facilitate in further work. This research, if correct, could eventually lead to treatments alleviating some the consequences of smoking and these other diseases, thus dramatically reducing the risk of heart attack and stroke for millions of Americans.

P26

THE EFFECTS OF PHOSPHOLIPIDS ON SUPEROXIDE RADICAL GENERATION BY UBIQUINOL-CYTOCHROME C REDUCTASE. Melissa D. Miller and Dr. Linda Yu, Department of Biochemistry and Molecular Biology, Oklahoma State University, Stillwater, OK 74078.

The mitochondrial respiratory chain, which resides in the inner mitochondrial membrane, contains four electron transfer complexes and an ATP synthase. These four electron transfer complexes are: complex I, NADH-ubiquinone (Q) oxidoreductase; complex II, succinate-Q oxidoreductase; complex III, ubiquinol-cytochrome *c* oxidoreductase; and complex IV, cytochrome *c* oxidase. The electrons from NADH or succinate, which derived from TCA cycles, are transferred through these four complexes to generate a proton gradient and membrane potential for ATP synthesis by ATP synthase. Previous studies show that during electron transferring through the respiratory chain, superoxide radicals ($O_2^{\cdot-}$) are generated. The $O_2^{\cdot-}$ generation sites are found at complex I and complex III. Both complexes I and III are multi-subunit lipoprotein complexes. My research project is to study the effect of phospholipids on $O_2^{\cdot-}$ generation by complex III. Since no $O_2^{\cdot-}$ generation by complex II is observed, succinate-cytochrome *c* reductase (complex II + complex III) is used in this study. Bovine heart submitochondrdial particles (SMP) were prepared from frozen heart muscles, which have been trimmed off all connecting tissues and fats, by a procedure involving grinding, blending, filtration, acid precipitation, and centrifugation. Crude succinate-cytochrome c reductase (SCR) was prepared from SMP by a procedure involving sodium cholate solubilization, ammonium sulfate fractionation, overnight storage at 4 °C, ultracentrifugation, and dialysis. Purified SCR was obtained from crude SCR by deoxycholate solubilization followed by ammonium acetate fractionations. Purified SCR shows 15 protein bands in a high resolution sodium dodecylsulfate polyacrylamide gel electrophoresis (SDS-PAGE) and contains three major phospholipids: phosphatidylcholine (PC), phosphatidylethanolamine (PE), and cardiolipin. Purified SCR catalyzes electron transfer from succinate to cytochrome c with a specific activity of 2 μmoles cytochrome c reduced per min per nmol cytochrome b, at room temperature. When SCR was subjected to phospholipase A_2 digestion, the succinate-cytochrome *c* reductase activity decreased as the digestion time increased. On the

other hand, the rate of $O_2^{\cdot-}$ generation by SCR increased as the digestion time increased. By adding the compound MCLA, I was able to measure the luminescence at the time intervals of 1 minute, 5 minutes, 10 minutes, 30 minutes and 1 hour. As the time interval increased the superoxide radical production increased. The radical production was measured by using the TD Luminator 20/20 by Turner Designs. These results indicate that phospholipids can prevent electron being deviated from normal electron transfer pathway in SCR to react with molecular oxygen to generate superoxide radical. *[This work was supported by grants from the National Science Foundation and OK-LSAMP].*

P27

AFFECTS OF KNOCKDOWN OF AHA1 WITH SILENCING RNA ON PHOSPHO-TYROSINE LEVELS. *Tyler* Weirick and Dr. Robert Matts, Department of Biochemistry and Molecular Biology, Oklahoma State University, Stillwater, OK 74078.

Aha1 is thought to be an Hsp90 co-chaperone, which also plays a general role in regulating the ATPase activity of Hsp90. This dogma was developed by the initial findings, which demonstrated that in Hsp90 defective yeast, over expression of Aha1 was able to maintain the activity of the Hsp90 client v-Src, a tyrosine protein kinase. However, our laboratory has been unable to detect any direct interaction between Aha1 and v-Src, and over-expression of Aha1 was found to have no effect on v-Src activity expressed in vitro in reticulocyte lysate. In light of these findings the following question was posed: In mammalian cells does over expression or inhibition of Aha1 affect phospho-tyrosine levels.

To test this hypothesis, human K562 cells were transfected with plasmids, which over express Aha1 and/or reduce Aha1 expression via silencing RNA (siRNA). Western blot analysis confirmed the over-expression of Aha1 and its knock-down by siRNA. Phospho-tyrosine levels were then analyzed by western blotting. Results showed that while phospho-tyrosine levels were not enhanced by the over-expression of Aha1, suppression of Aha1 expression appeared to markedly suppress the phosphorylation of a specific protein band . Thus, while Aha1 has not been observed to be present in Hsp90 complexes containing bound client proteins, it appears to have an as yet uncharacterized activity that has an effect on the tyrosine-phosphorylation of an unidentified protein in mammalian K562 cells

P28

AZOREDUCTASE ACTIVITY IN SACCHAROMYCES CEREVISIAE. Tiffany Reynolds and Dr. K.J. Abraham, Department. of Biology, Langston University, Langston, OK 73050

In the last several years, it has been shown that several microorganisms are involved in biotransformation of azo dyes to noncolored products. Azoreductase enzymes catalyze the reductive cleavage of azo dyes to produce aromatic amines. Azo dyes are generally considered to be compounds that are man made or of natural origin. Lot of attention on this field is towards microorganisms from the human intestine that are involved in the metabolism of azo dyes ingested as food additives. The focus of this research work was to screen for the presence of azoreductase enzyme in *Saccharomyces cerevisiae* and isolate the azoreductase gene coding for the enzyme. Cultures of *S. cerevisiae*, tested with different concentrations of the Direct Blue 15 dye showed decolorization. This result specifies that the azoreductase enzyme was responsible for the decolorization of the azo dye. Genomic DNA was prepared from small cultures. The resulting DNA was screened by agarose gel electrophoresis. Using the isolated DNA as a template, PCR analysis was employed. Further work of cloning, DNA sequencing and nucleotide analysis of the azoreductase gene will be followed for isolating the gene.

P29

ISOLATION AND CHARACTERIZATION OF AZOREDUCTASE GENE IN A SPECIES OF PSEUDOMONAS.
Kariel Ross and Dr. K.J. Abraham, Department. of Biology, Langston University, Langston, OK 73050

Azo dyes are man made and are widely used in the food, printing and textile industries. Azoreductase enzymes catalyze the reductive cleavage of azo (N=N) linkages to produce aromatic amines, some of which are carcinogens. Since these dyes and some of their N-substituted aromatic biotransformation products are toxic, the dyes are considered important as environmental pollutants. Therefore, it is necessary to understand the process of biotransformation and isolate the gene coding for the azoreductase enzyme. Very few attempts have been made to analyze aerobic azoreductase on the genetic level. The aim of this research work was to isolate and characterize the azoreductase gene in a species of *Pseudomonas*. Decolorization of Blue 15 dye (10mM) by the species of *pseudomonas* indicated the presence of azoreductase enzyme. Genomic DNA was extracted from small bacterial cultures. The resulting DNA was screened by agarose gel electrophoresis. PCR analysis was followed. Additional PCR analysis with different primers, cloning, and DNA sequencing of the azoreductase gene will be followed for characterizing the gene.

P30

GLOBAL GENE EXPRESSION ANALYSIS TO DEFINE THE HIGH LIGHT RESPONSES IN THEPHOTOSYNTHETIC MODEL CYANOBACTERIUM, SYNECHOCYSTIS SP. PCC6803. *Christal R.Carpenter, Langston University; R. Nambudiri, and R. L. Burnap, Ph.D., Department. of Microbiology and Molecular Genetics, Oklahoma State University, Stillwater, OK 74078 USA*

DNA microarray technology is used for recognizing and analyzing patterns of gene expression on the genomic scale. Full-genome DNA microarrays (~3200 genes spotted in triplicate) were used to analyze global differential transcriptional responses to the high light (HL) stress in *Synechocystis* PCC6803 (S6803), a widely used photosynthetic model prokaryote that has a photosynthetic mechanism with many similarities to higher plants and algae. Total RNA was extracted from wild type S6803 cells grown at under continuous culture under low light (LL) conditions then subjected to HL. Cells were rapidly harvested at several time points to compare levels of mRNA as a function of time after the transition from LL to HL. mRNA levels were tracked by using DNA microarrays to probe fluorescently labeled cDNA obtained from total RNA extracted at the specific time points. To obtain pure RNA, an RNA isolation protocol involving hot phenol extraction followed by LiCl precipitation and DNase treatment, was used. The RNA served as template for the synthesis of aminoallyl-containing cDNA in a reverse transcription reaction primed with random DNA 6/8-oligomers. The aminoallyl groups incorporated into the cDNA allowed chemical coupling of fluorescent Alexa dyes to the cDNA populations. To allow us to see the differentially expressed genes in the LL reference and HL time points, the cDNA from each sample is being hybridized to the DNA microarrays and then subjected to image and data analysis. In conclusion, the gene expression in S6803 can be comprehensively analyzed by DNA microarrays technology. *[Supported by NSF grant: MCB 0448567 and the NIH INBRE program].*

P31

MUTAGENESIS ANALYSIS OF NON-LETHAL ALLELES OF HOLIN T. Makda Gebrehiwote[a], Tram Anh T. Tran[b], and Ry Young, [a] Department of Chemistry, Langston University, [b] Department of Biochemistry & Biophysics, Texas A&M University, College Station, TX.

T4 is a double stranded DNA bacteriophage that infects *E. coli*. It uses endolysin-holin system to lyse the host at the end of its life cycle. Endolysin E is cytoplasmic protein that degrades the host's cell wall, but it is sequestered in the cytoplasm and has no secretary pathway. Holin T is a membrane protein that causes membrane lesion at a genetically programmed time that allows the endolysin to gain access and degrades the cell wall of the host. Bacteriophage lambda uses the same strategy as T4 to lyse the host. To make the lession in the membrane, S105 holin of lambda goes from monomer to dimer to tetramer to oligomer and finally the hole. However, it is not known how holin T forms the lesion in the membrane. PCR mutagenesis was used to generate mutation in gene *t* and cloned into an IPTG inducible plasmid. Induction of pooled transformants and plating for survivors showed that ~ 75% of cells in the induced culture survived. Plasmids from ten survivors were sequenced; only two candidates have single mutation, and the other eight has multiple mutations. This result indicated that under the condition used, gene *t* was over mutagenized Therefore, the mutagenesis condition should be adjusted so that more single mutation is obtained.
(Acknowledgement: I acknowledge National Science Foundation and OK-LSAMP for the opportunity extended to me).

P32

EFFECT OF PEANUT PLANT TISSUE AND ORGAN TYPES ON TOTAL RNA ISOLATION USING "CARTAGEN METHOD". Kimberly Jones*[1], Kanyand Matand[1,2], Adrian Sherman[3], Ning Wu[2], and George Acquaah[3] Department of Biology[1], School of Arts and Sciences; Departments of Agricultural Research and Extension[2] and Agriculture and Natural Resources[3], School of Agriculture & Applied Sciences; Langston University; Langston, OK 73050.

Peanut is one of few popular legumes for which fewer genomic research tools have been developed. In effort to contribute to the bridging of the related gap, Langston University had developed a strong program for peanut genomics studies aimed at isolating and sequencing all the peanut plant genes expressed at different developmental stages. Because of the result variations potentially associated with tissue and organ types, which had been obtained, we designed the current studies to investigate the effect of such differences on quantity and quality of peanut total RNA. To achieve this, three samples of tissues from leaf, stem, and root each were collected from a young peanut plant. The three samples consisted of 250, 500, and 1000 mg of fresh tissues. Tissues were processed according to the "Cartagen Protocol". Partial results showed that the greatest quantity and best quality of total RNA were obtained from leaf tissues. The increase of tissue quantity resulted generally in a poor quality of RNA.
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P33

PEANUT MAY HOLD THE KEY FOR THE IDENTIFICATION OF PLANT REGENERATION GENES. Atabong Mbelem*[1], Kanyand Matand[2,3], Ning Wu[3], and George Acquaah[4] Departments of Nursing[1] and Biology[2], School of Arts and Sciences; Departments of Agricultural Research and Extension[3] and Agriculture and Natural Resources[4], School of Agriculture & Applied Sciences; Langston University; Langston, OK 73050.

Current advances in biotechnology have made possible and easier to transfer exogenous genes between unrelated plant species. However, one of the prerequisites for exogenous gene transfer is *in vitro* plant regeneration. Because of differential responses, which primarily depend on genetic differences, many crop species are recalcitrant for *in vitro* plant regeneration. Accordingly, several studies had been initiated on

different plants to isolate genes which are associated with plant regeneration, but with limited success. Except *Arabidopsis*, most related studies have been cancelled, primarily because of the lack of the right plant materials to research on and/or their availability year-round. In other cases associated with *Arabidopsis*, suitable plant materials had been developed after the mutations had been induced. This partial report focuses on innovative and efficient method developed at Langston University to selectively induce *in vitro* plant regeneration from trichome-like structures, which are located on peanut plants. The efficacy of this method had led to the production of new peanut plants from such special structures year-round, with the subsequent isolation of all genes expressed in the peanut plant, while targeting those associated with *in vitro* plant formation.

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P34

PROTONATION STUDIES OF (^{5}-C_5H_5)Fe(CO)$_2$S(C_6H_4-p-I) and (^{5}-C_5H_5)CH_2CH_2SFe(CO)$_2$, Valerie Toodle, Dr. Danny McGuire, Cameron University.

Iron-sulfur chemistry has been extensively studied with respect to its biological relevance (e.g. cytochrome P450, ferrodoxins, etc.). The redox potentials of certain iron-sulfur proteins are not only affected by hydrogen bonding but also by protonation. This work involves the synthesis of two organometallic compounds containing Fe(II)-S bonds. The compound (^{5}-C_5H_5)Fe(CO)$_2$S(C_6H_4-*p*-I) was successfully synthesized and reacted with one equivalent of the Br nsted acid , HBF_4. Infrared spectroscopy results indicate incomplete protonation occurring at the sulfur site as determined by the shifts in the carbonyl stretching frequencies. The other compound (^{5}-C_5H_5)CH_2CH_2SFe(CO)$_2$ involves a carbon chain tether from the cyclopentadienyl ring to the sulfur which is coordinated to the iron. The synthesis of this compound is still underway.


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