

## OSU Center for Health Sciences - FY 2007 Research Abstracts

### BIOMEDICAL SCIENCES

#### **Allosteric Modulation of AMPA Receptors**

The ionotropic glutamate receptors that mediate fast excitatory synaptic transmission are critical for the normal development and function of the nervous system and for the processes underlying learning and memory. These receptors have also been implicated in the etiology of neurological disorders, including Alzheimer's, Huntington's and Parkinson's diseases, ALS, epilepsy, and brain damage following stroke. Effective new therapies for treatment of the disorders may result from development of drugs that bind to allosteric sites on the AMPA subtype of glutamate receptor.

**Sponsor:** OCAST

**PI:** Doris K. Patneau

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**Sponsor:** OCAST, Intramural funding

**PI:** Doris K. Patneau

#### **Alterations in Glutamate Metabolism in Sensory Neurons During Chronic Inflammation**

In chronic inflammation, elevated release of glutamate from sensory nerves augments pain signals sent to the brain. This is due to an increase in glutaminase, the enzyme for glutamate synthesis in sensory neurons. Two mechanisms are being explored for increased production of glutaminase: nerve growth factor from the inflamed field, and stabilization of glutaminase mRNA.

**Sponsor:** National Institutes of Health

**PI:** Kenneth E. Miller

#### **AMPA Receptor Expression and Selective Neuronal Death**

This project examines why certain types of neurons, including motor neurons and cerebellar Purkinje cells, are particularly vulnerable to excitotoxicity mediated by AMPA receptors. Experiments will determine whether these cells possess AMPA receptors with unique functional properties and/or molecular compositions that make them selectively vulnerable.

**Sponsor:** National Institutes of Health

**PIs:** Doris K. Patneau

University of Chicago: James Brorson

#### **Analgesia Research Laboratory (ARL)**

The overall mission of the ARL is to understand the detailed molecular mechanism that leads from the administration of an opioid analgesic like morphine to the end result of analgesia. Currently, studies are centered on the cloning of opioid receptors from different vertebrate species in order to investigate the molecular evolution of opioid receptor proteins. Using comparative bioinformatics, opioid receptor datasets are being investigated with respect to particular receptor domains that confer opioid-type selectivity. The overall goal is to better understand how opioid analgesics produce their pain-killing actions with the hope of designing better and safer opioid drugs.

**Sponsors:** NIH-NIDA, OCAST, ACLAM Foundation, Whitehall Foundation

**PI:** Craig W. Stevens

### **Cardiovascular Control Mechanisms**

This research program is currently focused on two areas: autonomic control of heart rate variability, and cardiac control of renal sodium excretion. The goal of these studies is to get a better understanding of blood pressure and cardiovascular regulation in health and disease. Heart rate and blood pressure variability in supine and passive head-up tilt positions is used to study autonomic control in humans. Our current emphasis is on diabetic autonomic neuropathy. Renal sodium excretion is studied by cellular and intact animal experiments. Computer simulations are used to address theoretical issues concerning transepithelial sodium transport.

**Sponsor:** OCAST, American Heart Association, Intramural funding.

**PI:** Bruce A. Benjamin

### **Developing Diagnostic Assays to Baboon Cytomegalovirus**

Baboons represent an invaluable source of xenogeneic organ donors for human patients and are needed to relieve the great lack of human donor organs. However, the risk of transmitting or allowing the establishment of a zoonotic virus in humans is a real and frightening consideration. This proposed study will focus on cytomegalovirus (CMV), since this is the most commonly transmitted virus in human transplantation procedures and is a major cause of many problems in immunosuppressed transplant recipients. This project will identify the indigenous CMV of baboons (BaCMV) and develop sensitive diagnostic assays. These tests will be capable of detecting BaCMV-infected potential organ donors and will be useful in screening baboons for the establishment of specific pathogen free (SPF) breeding colonies.

**Sponsor:** Intramural Funding

**PI:** Earl L. Blewett

### **Dietary Protein and the Kidney**

Is too much protein bad for the kidney? This is just one question we are exploring using techniques of physiology, anatomy, and genetic analysis on kidneys from mice that consume high and low protein diets. We recently demonstrated that kidney size increases with higher amounts of dietary protein and are now examining the molecular signals that cause the kidneys to enlarge. We study both male and female mice and interestingly, there may be important differences between the two sexes.

**Sponsor:** Intramural Funding

**PI:** Alexander Rouch

University of Paris: Alain Doucet

### **Effects of Dietary Protein Content on Kidney Structure and Function**

Consuming high or low protein diets produces dramatic changes in kidney function. Serial analysis of gene expression will be used to identify, via global expression of gene transcripts, the molecular events that cause these changes. Results will inform the public of the consequences of ingesting high or low protein diets.

**Sponsor:** Intramural Funding

**PI:** Alexander J. Rouch

University of Paris: Alain Doucet

### **Effects of Stargazin on AMPA Receptor Channel Function**

Stargazin is a transmembrane protein that is known to act as a molecular chaperone in trafficking of the AMPA subtype of glutamate receptor to the cell surface. We recently discovered that stargazin and other members of this class of proteins, known as TARPs, also affects AMPA receptor channel function and is as an auxiliary subunit of the receptor. Studies focus on identification of the specific effects of TARPs on gating and desensitization of the AMPA channel, regions of interaction between stargazin and the AMPA receptor, and the underlying mechanism for TARP modulation.

**Sponsor:** National Institutes of Health

**PI:** Doris K. Patneau

**Co-investigator:** Dorothy Turetsky

### **Effects of Trace Heavy Metal Exposure on CNS Activity**

These studies examine the effects of low-level manganese and mercury exposure on the dopaminergic function in cell culture and whole animal. Low-level exposure to heavy metals may not cause overt CNS effects until much later. These studies have implications in forensic analysis and determining the potential cause of CNS damage.

**Sponsor:** Intramural Funding

**PI:** David R. Wallace

### **Ethanol Effects on Human Astroglial Chemokine Expression**

Chronic abusive alcohol consumption causes brain pathologies and may compromise immune responsiveness in the brain. Chemokines released by astroglial cells in the brain are necessary for normal brain function and are involved in the response to injury and infection. We hypothesize that alcohol inhibits chemokine expression in human astroglia, thereby, contributing to alcohol-induced brain pathologies. Information gained in this project will lend significant insight into the effects of alcohol on astroglial chemokine expression and function.

**Sponsor:** National Institutes of Health

**PI:** Randall L. Davis

### **HIV/Cocaine Neurotoxicity in Females**

This program examines the interaction between gp120/Tat (HIV proteins associated with neurotoxicity), estrogen, and cocaine in female rats. Ultimately, the goal of this research is to provide insight into gender-related differences in AIDS-related central nervous system disorders leading to potential gender-specific treatment strategies for HIV and cocaine addiction.

**Sponsor:** National Institutes of Health

**PI:** David R. Wallace

### **Hormonal Linked Etiology of *E.coli* Urinary Tract Infections (UTI)**

Estrogen alters the susceptibility to infections at various stages of the menstrual cycle. Hypoestrogenemia may predispose post-menopausal women to urinary tract infections. *Escherichia coli* is the leading cause of urinary tract infections. Invasive *E. coli* with Dr adhesins have the capacity to invade epithelial cells and cause chronic urinary tract infections in humans. Recent data from our laboratory directly indicates a protective role of estrogen involving estrogen receptors during *E.coli* bacterial invasion on hepatoma cells and also in our *in vivo* UTI model. Studies are on the way to study hormonal linkage to UTI pathogenesis and design novel therapies.

**Sponsor:** Intramural Funding, NKF

**PI:** Rashmi Kaul

### **Hormonal Modulation of Hepatitis C Related Carcinogenesis**

The hepatitis C virus (HCV) infects more than 100 million people and causes acute and chronic hepatitis and hepatocellular carcinoma (HCC). HCC is the third most common cause of cancer death associated with chronic liver disease and cirrhosis. There is no vaccine available for HCV and 40%-50% of patients are unresponsive to standard treatment. Predominance of HCC in males highlights the significance of estrogens in HCC development. We are studying the interactive role of estrogen and HCV proteins on HCV-related HCC using *in vivo* and *in vitro* models. Studies on estrogen involvement in HCC pathogenesis may open new avenues to therapeutic modalities against HCC.

**Sponsor:** Intramural Funding, Cancer Sucks Foundation

**PI:** Rashmi Kaul

### **Human Identity Laboratory**

Standards under which forensic DNA-typing laboratories operate mandate that the amount of human DNA recovered from forensic samples be determined. Currently, methods used for quantification of human DNA in extracts, rely on technology that is completely different from that used normally in the crime laboratory to develop DNA profiles. Over the past two years, we have undertaken to develop and validate a DNA quantification method relying upon quantitative PCR amplification of the human amelogenin locus. The amelogenin gene in human DNA is six base pairs longer in males than in females and serves as a way to determine the sex of a DNA sample. In previous studies from the laboratory, the validity of the quantitative PCR method was established. Current work aims to identify a threshold amount of DNA in mixed male and female samples from sexual assault cases at which an Analyst can decide to either perform traditional DNA typing, or choose one of the more specialized types of DNA analysis suitable for trace amounts of DNA.

**Sponsor:** Intramural Funding

**PIs:** Robert W. Allen

Graduate Student: Gifty Benson

### **Human Identity Laboratory**

One of the newest acknowledged threats to the U.S. is the threat to our agricultural productivity. The threat of agriterrorism is real and the federal government is taking steps to develop a response capability to the release of plant pathogens that could threaten crops. Research just beginning in the laboratory aims to develop and refine DNA typing methods devoted to developing a forensic response capability to trace the source of infectious agents affecting wheat and cucurbit crops. Viral (wheat streak mosaic virus) and bacterial (*Serratia*) organisms will serve as model plant pathogens in this research.

**Sponsor:** Intramural funding

**PI:** Robert W. Allen

Graduate Students: Jesse Carver, Charlene Beaumann

### **Immune Modulation**

Our knowledge of the complexity of endogenous and exogenous control agents and mechanisms that influence the immune system continues to grow. This laboratory develops new methodologies and applies them to study the action of agents on the immune system, applications of immune modulation, and immunopathology

**Sponsor:** Intramural Funding

**PI:** Joseph A. Price

### **Intermediate Filaments in Mitosis**

The role of intermediate filaments in mitosis is currently being investigated. Immunoelectron-microscopy, immunohistochemistry, immunofluorescence, mammalian cell culture, and high voltage electron microscopy are used to study cells as they progress through mitosis. The interaction of the intermediate filament system with other cytoskeletal components (microtubules and microfilaments) is also being explored. The status of the cytoskeleton in transformed or cancerous cells is a topic of interest with emphasis on the transfer of information between the cell membrane and the nuclear membrane. The function of cyclic AMP in this mechanism is being studied.

**Sponsor:** Intramural Funding

**PI:** William D. Meek

### **Interaction of Antibodies with Toxins**

This project studies the interaction of monoclonal and polyclonal antibodies with various toxins using high performance liquid chromatography (HPLC). Methods are being developed to determine binding constants in complex mixtures.

**Sponsor:** Intramural Funding

**PI:** Charles G. Sanny

### **Isolation and Characterization of Novel CNS-Acting Compounds from Natural Sources**

This program investigates the use of naturally occurring compounds as centrally acting agents. One series of studies has been examining the effects of Native American plants indigenous to Oklahoma and their potential analgesic effects. A second series is investigating the estrogenic effects of flavonoids found in soy and flaxseed.

**Sponsor:** Intramural Funding

**PI:** David R. Wallace

### **Microbial Contamination of Hockey Players' Protective Mouth-Guards: An *In Vivo* Study**

The purpose of this study is to determine the extent of contamination by microorganisms of protective athletic mouth-guards worn by hockey players. Protective athletic mouth-guards routinely harbor pathogenic and opportunistic microorganisms that may be potentially harmful to the wearer's oral and systemic health by harboring and transmitting oral and systemic pathogens to the wearer. The finding of mold in the mouth-guard suggests a possible correlation between mouth-guard use and exercise-induced asthma. These findings support limiting the length of wear of protective athletic mouth-guards and/or the possibility of single-use protective athletic mouth-guards.

**Sponsor:** Intramural Funding

**PIs:** R. Stanley Conrad, R. Thomas Glass, Jay W. Bullard

### **Mid-Brain Modulation of Social Attachment**

These studies use behavioral, pharmacological, neuroanatomical, and immunocytochemical methods to examine the neural processes that underlie the formation and maintenance of monogamous pair bonds.

**Sponsor:** NIH-NICHD

**PI:** J. Thomas Curtis

### **NaCl Taste Responses: Bases for Sex Differences in Rat**

These studies use behavioral, electrophysiological, neuroanatomical, and immunocytochemical methods to examine the peripheral and central neural mechanisms that underlie sex differences in preference for the taste of salt.

**Sponsor:** NIH-NIDCD

**PI:** Kathleen S. Curtis

### **Renal Control of Sodium Excretion**

This research program is currently focused on two areas: renal vascular and epithelial actions of gastrointestinal hormones and mechanism of regulation of transepithelial NaCl transport.

Experiments are conducted in the following areas: 1) cellular techniques to study renal tubular function (isolated perfused tubules, primary cultures, and renal cell lines); 2) *in vivo* preparations (rat) to study renal vascular and epithelial function; and 3) advanced simulation experiments to study the cellular mechanisms of transepithelial NaCl transport and how it is regulated in epithelial cells.

**Sponsor:** Intramural Funding

**PI:** Bruce A. Benjamin

### **Sequencing the Genome of Drill Cytomegalovirus**

This project will sequence the genome of this virus, which resides in monkeys and is similar to human viruses, allowing comparative studies.

**Sponsors:** Niblack Scholar Program, Intramural Funding

**PIs:** Earl L. Blewett,

Undergraduate Niblack Scholarship Recipient: Kristen Ketchum

### **Spinal Cord Injury--Astrocytosis and Neural Plasticity**

After spinal injury, astrocytes undergo reactive astrocytosis, producing a glial scar that inhibits neural regeneration. Little is known concerning alterations of metabolism or altered phenotype in reactive astrocytes. We are evaluating reactive astrocytosis following chronic injury with and without methylprednisolone, the major treatment for spinal injury. Our long-term goal is to reduce or eliminate the harmful parts of glial scarring in order to promote nerve regrowth or recovery of function in injured patients.

**Sponsor:** Intramural Funding

**PI:** Kenneth E. Miller

### **Trafficking and Targeting of Muscarinic Receptors**

Muscarinic acetylcholine receptors belong to the G protein-coupled receptor superfamily and five distinct subtypes ( $M_1$ - $M_5$ ) have been identified thus far. Interestingly, subtypes of muscarinic receptor can be differentially localized in polarized cells. The primary goal of our research is to learn more about the molecular mechanisms responsible for subtype-specific differences in muscarinic receptor localization in neurons (i.e., presynaptic versus postsynaptic) of the central nervous system.

**Sponsor:** Intramural Funding

**PI:** Gregory W. Sawyer

### **Vision Research Program**

This program conducts interdisciplinary investigations into the neurobiology of vision and methods to restore sight to the diseased eye. The goal of this study is to develop, fabricate, and implant a neuro-prosthetic device to restore or improve vision in an eye with a damaged or diseased retina. An artificial vision system is under development in a collaborative effort of neuroscientists, electrical engineers, medical geneticists, and retinal surgeons. Several animal models and computer simulations are used to develop the components of the retinal implant and its micro-technology. Electrophysiological, neuronal tissue culture, retinal blood flow, and semiconductor and laser technology are utilized. The Electrical Engineering Department at the University of Tulsa provides engineering collaboration. Current studies concern the design of an implantable retinal prosthesis with the capability of detecting motion in the visual field.

**Sponsor:** Intramural Funding

**PI:** Warren E. Finn

## **CLINICAL SCIENCES**

### **Area Prevention Resource Centers**

The Department of Psychiatry administers three Area Prevention Resource Centers (APRCs). These centers organize individuals into task forces that assess the mental health needs within their community and, with the assistance of APRC staff members, develop and implement programming to reduce the incidence of high-risk behaviors. APRC community-based programs provide information and education, increase community awareness and citizen involvement, present life skills development training, organize alternative activities, examine social policy, and refer individuals for intervention services as needed.

**Sponsor:** Oklahoma Department of Mental Health and Substance Abuse Services

**PI:** Bruce A. Singer

### **African American Specialty Center**

The goal of the Center is the development of healthy, responsible, productive citizens who will be unlikely to experience alcohol or drug-related problems in their lives. This is accomplished through the delivery of culturally-specific prevention services that identify individual and environmental factors that place African Americans at increased risk and address these conditions.

**Sponsor:** Oklahoma Department of Mental Health and Substance Abuse Services

**PI:** Bruce A. Singer

### **Assessing Empathic Communication in Medical Students**

Some research links empathic communication by physicians to better medical outcomes and to higher ratings of clinical competence. This research attempts to rate medical students on their performance of empathic behaviors during standardized patient interviews and examines the association of these behaviors with ratings of clinical competence in clinical clerkship rotations and with scores on scales assessing empathic attitudes.

**Sponsor:** Intramural Funding

**PIs:** Michael H. Pollak, Susan K. Redwood-

### **Cognitive Rehabilitation Following Brain Injury**

Injury of brain tissue occurs in many diseases and traumatic incidents. Impaired perceptual abilities, cognitive functions, and emotional distress secondary to these injuries often prevent patients from returning to productive work and family life. Rehabilitation therapies have been widely available for only the past twenty years; research into their effectiveness is in its infancy. Current investigation involves examining the efficacy, clinical utility, and cost effectiveness of on-line computerized cognitive/perceptual rehabilitation and Cognitive Behavior Therapy systems. In addition, web-based tools for evaluating the statistical significance of clinical changes in individual patients are being developed. This research involves collaboration among OSU-CHS faculty and staff, as well as faculty from other institutions.

**Sponsor:** Intramural Funding

**PI:** Richard H. Bost

### **Comparative Evaluation of Denture Decontamination Using the MicroWave™ Dental Sanitizing and Cleaning System, Polident with PoliShield™, and Tap Water: An *In vivo* Study**

A wide range of microorganisms must be considered when treating either oral or systemic diseases in denture wearers. Denture hygiene and decontamination are critical to prevent both oral and systemic disease transmission. The dentures in ill patients must be considered as possible sources of pathogenic microorganisms. Previous studies (*in vitro*) have demonstrated that methyl-methacrylate can be contaminated with microorganisms and that a variety of decontamination methods have been ineffective. The purpose of this complete denture study was to test the effectiveness of decontamination methods against a wide range of microorganisms. Comparative studies were completed on three decontamination methods: MicroWave™ Dental Sanitizing and Cleaning System, Polident with PoliShield™, and tap water. The study showed that MicroWave™ Dental Sanitizing and Cleaning System was the only modality found consistently to decontaminate or to sanitize dentures worn by patients when compared to Polident with PoliShield™ and tap water.

**Sponsor:** Intramural Funding

**PIs:** R. Thomas Glass

Adjunct: Leigh B. Goodson

Microbiology: James W. Bullard, Robert S. Conrad

### **Dog Bite Prevention Skills for Children**

The primary objective of this project is to teach Dog Bite Prevention skills to young children. Dog bites are the second most common injury to young children behind bicycle accidents. This program uses trained therapy dogs in an interactive workshop to teach skills to the children. The children then practice their newly learned skills on the dogs. After successful demonstration of the newly learned skills, they are given a coloring book provided by State Farm Insurance Company.

**Sponsor:** State Farm Insurance Company

**PI:** Sherril M. Stone

### **The Effect of Cephalo Pelvic Disproportion on Otitis Media**

Otitis Media is a frequently occurring, yet rather perplexing condition causing inflammation of the middle ear. It is perplexing because numerous conditions fall under the umbrella of 'Otitis Media,' including viral infections, bacterial infections, and the presence of various fluids, which can be categorized as either acute or chronic depending on the duration of fluid build-up. There is no distinct determination of the cause(s) of Otitis Media. Some postulate that allergies, whether resulting from environmental conditions or digestion of particular foods, trigger Otitis Media. Unfortunately, many experts do not believe an allergen triggers Otitis Media. The purpose of this study is to examine the effect of Cephalo Pelvic Disproportion on Otitis Media.

**Sponsor:** Intramural Funding

**PIs:** Kayse Shrum, Jenny Alexopoulos  
Division of Research: Sherril M. Stone

### **The Effect of Osteopathic Manipulative Treatment, as Newborns, on the Health of Children in the First Six Months of Life**

The study was an outpatient chart review of children's first six months, matching 58 who had received OMT as newborns with 58 who had not. Comparison of the clinical variables yielded a few differences between the cohorts in the direction of less of the following symptoms in the intervention patients for at least one month: food intolerance, colic mentioned, chaliasia-associated symptoms, antibiotic usage, spitting, diarrhea, and otitis media.

**Sponsors:** American Osteopathic Association, American Academy of Osteopathy (Robuck Fund)

**PI:** Miriam V. Mills

### **Evaluation of the Sanitization Effectiveness of Medical Tabs on Dentures Contaminated with Known Microbial Flora, an *In vitro* Study**

Dentures contaminated with *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Candida albicans*, and *herpes simplex* virus I were tested to see if they could be decontaminated by using Medical Tabs for Dentures. Viral analyses found that dentures retain large amounts of virus when washed with water, but no virus was recovered from any of the 40 samples treated with Medical Tabs for five minutes. It was determined that a single use of Medical Tabs for Dentures is effective in eliminating certain species of microorganisms, including selected viruses, *in vitro*.

**Sponsor:** Intramural Funding

**PIs:** R. Thomas Glass  
Microbiology: James W. Bullard, Robert S. Conrad, Earl L. Blewett

### **Facilitator Versus Small Group Interaction on Clinical Problem Solving Coursework**

The goal of the project is to examine the method of delivery effectiveness for coursework required in Clinical Problem Solving. Currently, the second year students have four hours of lecture followed by four hours of small group interaction that focuses on problem-based learning. The group is led by a facilitator and involves a hands-on approach. However, technology allows the possibility of teaching the same material to the students using an online approach rather than facilitator approach. The purpose of this study is to examine the effectiveness of both approaches to determine if there is a significant difference between them. The results of the study will allow faculty to utilize the most efficient and effective type of presentation that maximizes the students' learning, thus producing highly qualified health care providers.

**Sponsor:** Intramural Funding

**PIs:** Laurie Clark, Sherril M. Stone

### **Fidgeting During Daily Life**

An imbalance between energy intake and expenditure may lead to weight change which results in obesity. Energy expenditure related to physical activity is an important determinant of such an imbalance. This research focuses on one component of non-exercise daily physical activity (i.e., fidgeting) that may contribute to this energy imbalance. This research attempts to demonstrate that individuals differ characteristically in fidgeting in ways that can be measured during daily life using unobtrusive body-worn monitors.

**Sponsor:** Intramural Funding

**PI:** Michael H. Pollak

### **Human Identity Laboratory**

Standards under which forensic DNA-typing laboratories operate mandate that the amount of human DNA recovered from forensic samples be determined. Currently, methods used for quantification of human DNA in extracts rely on technology that is completely different from that used normally in the crime laboratory to develop DNA profiles. Over the past two years, we have undertaken to develop and validate a DNA quantification method relying upon quantitative PCR amplification of the human amelogenin locus. The amelogenin gene in human DNA is six base pairs longer in males than in females and serves as a way to determine the sex of a DNA sample. In previous studies from the laboratory, the validity of the quantitative PCR method was established. Current work aims to validate its use to quantify male and female contributions of DNA to mixed samples, which are common in sexual assault cases.

**Sponsor:** Intramural Funding

**PIs:** Robert W. Allen

Graduate Student: Denise Juroske

### **Microbial Contamination of Protective Mouth Guards in Hockey Players: An *In Vivo* Study**

Removable dentures harbor a wide range of pathogenic and opportunistic microorganisms that can produce disease in the wearer. Protective mouth guards are of similar construction and have been used in a variety of sports for years. Review of medical/dental literature reveals no studies that investigate whether mouth guards can act as reservoirs of pathogenic and opportunistic microorganisms and be, therefore, potentially harmful to the wearers. A wide array of pathogenic and opportunistic gram-negative and gram-positive cocci and rods and were found in the mouth guards worn by semi-professional hockey players, including one mouth guard yielding *Candida dublinensis*, a yeast commonly found in HIV positive patients. Protective athletic mouth guards do contain pathogenic and opportunistic microorganisms that might be potentially harmful to the wearer. The findings of this study would support the idea of limiting the length of wear of protective athletic mouth guards and the possibility of single-use protective athletic mouth guards.

**Sponsor:** Intramural Funding

**PIs:** R. Thomas Glass

Medical Student II: Sarah E. Martin

Microbiology: James W. Bullard, Robert S. Conrad

### **Microbial Retention in Dentures That Have Been Stored for 1.5 Years and Exposed to Harsh Treatments**

Dentures have long been associated with a concurrent stomatitis. The purpose of this study was to evaluate the effects of an extended period of drying, freezing, and boiling on the microorganisms found in dentures that have been worn from 12 days to 48+ years. Portions of polymethyl-methacrylate dentures that had been used in previous studies were frozen and thawed a minimum of two times and ultimately frozen for approximately 1.5 years. The results of these experiments revealed that subjecting dentures to such harsh treatment does substantially reduce the numbers of microorganisms, but that sufficient numbers of disease-producing microorganisms remain and a more effective means of denture sanitization needs to be found.

**Sponsor:** Intramural Funding

**PIs:** R. Thomas Glass

Microbiology: James W. Bullard, Robert S. Conrad

### **Oklahoma Area Health Education Center Program**

The Oklahoma Area Health Education Center Program (OkAHEC) is a sponsored program of OSU-COM that is conducted through regional AHECs located in Enid, Poteau, Lawton, and Pryor, and a training/health care facility in the Osage Hills Complex in Tulsa. The program combines academic and community resources to improve the supply and distribution of primary care professionals and to increase the accessibility of quality health care services in rural and medically underserved areas. The OkAHEC mission is accomplished through community-based training for health professional students and medical residents with rural and underserved populations; educational interventions that promote disease prevention and improved health through access to primary health care services; continuing education for health practitioners in rural communities; health careers recruitment with a special focus on minority and underserved populations; locally-based initiatives that respond to emerging health care needs; and coordination with other state and federal primary care initiatives.

**Sponsors:** Oklahoma Department of Health, U.S. Department of Health and Human Services

**PI:** Richard Perry

### **Patient Satisfaction Survey for OSU Health Care Center**

Oklahoma State University Department of Family Medicine (DFM) serves a large indigent population in Tulsa and the surrounding areas through the clinic system. In addition, the DFM clinics serve an important but smaller population of patients with private insurance. In the increasingly competitive Tulsa health care market, it is necessary to systematically evaluate the performance of the department in fulfilling its mission to provide efficient and high quality health care to our patients. This survey research was conducted to: 1) obtain patient evaluative data of various aspects of service through the clinic system; 2) improve patient quality of care, facilities, access, and health education; and 3) increase the numbers of patients served by the DFM physicians in the clinic system.

**Sponsor:** Intramural Funding

**PIs:** Danny Thomason, Sherril M. Stone, Jenny Alexopoulos

### **Prevention Resource and Evaluation Center**

The Prevention Resource and Evaluation Center (PREC) provides consultation, material resource support, and a wide range of program evaluation services for the Oklahoma Department of Mental Health and Substance Abuse Services (DMHSAS), the Oklahoma Area Health Education Centers (OkAHEC), and other agencies throughout the state. Originally developed exclusively for drug and alcohol prevention programs, PREC has expanded its scope to include the evaluation of other health-related topics and provides services (i.e., evaluation design, instrument development, and the production of formal evaluation reports) to many other agencies. The collection, input, analysis, and services offered by PREC staff include: survey development and implementation, evaluation site visits, conducting informational or training presentations on evaluation or related topics, and providing consultation or technical assistance.

**Sponsor:** Oklahoma Department of Mental Health and Substance Abuse Services

**PI:** Bruce A. Singer

### **Roles of a Multidrug Efflux System and Lipopolysaccharide in Antimicrobial Resistance of *Pasteurella haemolytica***

*Pasteurella haemolytica* is a primary etiological agent of bovine respiratory disease (BRD) in cattle resulting in significant economic losses in the cattle industry. The development of antibiotic resistance among feedlot cattle fed prophylactic doses of various antibiotics to prevent BRD is a matter of particular concern. This project begins by determining the minimal inhibitory concentration (MIC) of 13 commonly-used antibiotics among 22 clinical isolates of *P. haemolytica*. Strains with unusual resistance patterns will be grown up in sufficient biomass to allow the extraction of lipopolysaccharides (LPS), which are major components of the bacterial cell wall that determines antimicrobial accessibility. Chemical characterizations of these LPS will be used to determine if antibiotic resistance can be correlated to the specific chemical composition of the outer membrane.

**Sponsor:** Targeted Research Initiative Program

**PIs:** R. Thomas Glass  
Adjunct: Leigh B. Goodson  
Microbiology: James W. Bullard, Robert S. Conrad

### **Rotavirus Vaccine Study**

The Department of Pediatrics is evaluating the safety of a bovine viral vaccine for infants for the prevention of acute gastroenteritis due to Rotavirus. This virus is the most common cause of dehydration, with hospitalization in children less than three years of age. Over 60,000 children will be involved in the study worldwide.

**Sponsor:** Merck  
**PI:** Stanley E. Gross

### **Suicide Among American Indians in New Mexico**

Analysis of quantitative and qualitative data is continuing with Philip May of the University of New Mexico to update epidemiological information regarding completed suicides among the Apache, Navajo, and Pueblo Indians in New Mexico from 1957-1998. Age and gender differences, behavioral interactions prior to the event, and trends in suicide rates are among the issues being explored.

**Sponsor:** Indian Health Service  
**PI:** Nancy Van Winkle

### **Tutorless PBL Groups in a Medical School**

Problem-based learning (PBL) has become a popular teaching method in medical schools because of its emphasis on developing problem solving skills as well as course content. Typically PBL depends on the availability of significant numbers of faculty to function as small group tutors and is therefore very resource intensive. This study compared achievement of content knowledge and student satisfaction in tutorless and physician facilitated small groups in a second year medical school course, and found no significant difference in these areas between the two groups. The one significant difference found was that students in groups with tutors worked longer than those without tutors.

**Sponsor:** Intramural Funding  
**PIs:** Laurie C. Clark, W. Stephen Eddy, Sherril M. Stone, Danny E. Thomason, Christopher C. Thurman

### **The Use of Osteopathic Manipulative Treatment and Adjuvant Therapy in Children with Recurrent Acute Otitis Media**

Patients with recurrent earaches (otitis) were followed for six months, with 32 patients receiving routine pediatric care and 25 receiving routine care plus adjuvant manipulation. Clinical status was monitored by review of medical records, audiograms, parent behavior rating, and tympanograms. The treatment group experienced a greater decrease in average monthly episodes of average monthly antibiotics prescribed, fewer surgical interventions, and more normal tympanograms.

**Sponsors:** American Osteopathic Association, American Academy of Osteopathy (Robuck Fund)  
**PIs:** Miriam V. Mills  
Family Medicine: Charles E. Henley  
Educational Studies: Laura L.B. Barnes  
University of New England College of Osteopathic Medicine: Jane E. Carreiro  
Kirksville Osteopathic College: Brian F. Degenhardt

### **The Value of Animals in Vacation Preferences**

Tourism is a vast, ever growing industry and competition for tourist dollars has increased significantly. Amusement parks, cultural facilities, and recreational activities are promoted to potential tourists in an effort to attract them. Increasingly, animal centered activities are touted as destinations for tourists. However, little is known about the role animal activities play in vacation preferences of tourists. This study examined the lure of animal related activities on the preferences of vacationers when presented with a choice between two trips; one with animal

interaction and another without animal interaction. The results indicated that tourists choose more vacation packages that offer animal interaction activities than packages without animals.

**Sponsor:** Intramural Funding

**PIs:** Sherril M. Stone; Patrick Tucker

Central Connecticut State University: D'Arcy Dornan

### **Clinical Drug Trials**

Several of our faculty have contracts with different pharmaceutical companies to test new drugs. Ongoing trials are testing drugs for the treatment of HIV/AIDS, cardiovascular disease, asthma, and other diseases.