Graduate School of Biomedical Sciences

Commencement 2008-2009
Yersinia pestis is the bacterium that causes plague infections (Black Death). There is no vaccine available in the US against Y. pestis, a possible agent of bioterrorism. We deleted both a gene and a plasmid within Y. pestis and tested how it changed the virulence of the bacteria.
Our work has suggested a molecular mechanism by which both physiological estrogens and xenoestrogens may contribute to dopamine transporter based neuronal cell functions or malfunctions. Therefore, these studies emphasize in yet another estrogenic functioning, and the importance of considering alternative medical treatments for woman with affected diseases based on their female physiology.
PCP ("angel dust") is a powerful psychoactive drug which elicits its actions through blockade of the NMDA receptor. The purpose of this project was to further clarify the actions of PCP at the NMDA receptor in order to gain insight into the mechanisms underlying PCP’s hallucinogenic and psychotomimetic properties.
This study explores the oxygenation index (A: a gradient) and its relationship with oxygenation in infants in respiratory failure. Infants were treated with inhaled nitric oxide in a parent study. Gestational age was evaluated as a response to the treatment. Other factors were also explored as predictors of response to NO therapy.
Over 6 years, we studied the impact of arthritis on 621 older Mexican-Americans, aged 65 and over. We found that arthritis has a sizable impact on their physical function, duality activities, and quality of life.
Respiratory Syncytial Virus (RSV) is the leading cause of respiratory tract illness in children. Pulmonary Inflammation is a key progress in RSV-induced lung disease and exacerbated by cigarette smoke. We report that regulation of reactive oxygen species production by antioxidants and Poly(ADP)-Ribose Polymerase (PARP) inhibition attenuated RSV-induced chemokine expression and subsequent pulmonary inflammation.
Leechuan Andy Chen, MD/Ph.D.
Biochemistry & Molecular Biology
Mentor: Mark Evers, M.D.
Kashyap Choksi, MD/Ph.D.
Biochemistry & Molecular Biology
Mentor:
Native Americans have been labeled alcoholics over the past several decades. This paper will look at the potential reasons why Native Americans drink, and what treatment options work to cure alcoholism.
Napping can improve performance, productivity and safety during night shifts and prolonged working hours. The sleep medicines zaleplon, zolpidem, and ramelteon may be used to induce sleep in circumstances not ideal for rest (shift work, noisy environment, short period available during the day, etc.), but may hinder work quality should sudden return to duty be required. This capstone synthesizes the current literature on performance decrements in the first eight hours after taking these sleep medications and provides recommendations for use during napping in the targeted professional populations.
Venezuelan equine encephalitis virus is an emerging pathogen in tropical America. It is transmitted by mosquitoes and can cause fatal illness in humans and horses. We examined VEEV in southern Mexico and found that pathogenic strains may be maintained by local mosquitoes during inter-outbreak periods.
Gold nanoparticles were functionalized to target breast cancer cells in small animal models. Targeted cancer cells were imaged using optoacoustic tomography; which is a novel imaging modality that combines optical tomography with ultrasound to overcome the limitations of conventional imaging methods.
The focus of my research was to evaluate oxidant stress after burn and smoke inhalation injury. We observed and increased in oxidant production in the lung, up-regulation of pro-inflammatory proteins, increased nuclear damage, cell death and mortality. These observations were counteracted after administration of a hydrogen sulfide donor compound suggesting a novel role of this molecule as an anti-oxidant and anti-inflammatory agent after severe trauma.
Parents of children with autism spectrum disorders (ASD) were interviewed to find out how they searched online for ASD-related information and how they evaluated that information. Parents were dissatisfied with healthcare and educational systems and turned to the Internet for information and support.
Diana Ferrari, Ph.D.

Biochemistry & Molecular Biology

Mentor: J. Regino Perez-Polo, Ph.D.
Steve Fisher, Ph.D.
Preventive Medicine & Community Health
Mentor: Glenn Ostir, Ph.D.
Offspring of mice born to hypercholesterolemic mothers show an increased risk to develop high cholesterol levels and atherosclerosis as adults. This increased risk is not dependent on genetic factors. Exposure to a high-lipid environment in early life may be an important risk factor for atherosclerosis.
Traumatic brain injury (TBI) is an event that can lead to changes in personality, behavior, cognitive abilities and physical movement as a result of damage to brain cells. My project was part of a long-term effort to increase our understanding of the role zinc plays in the cell death processes that occur following a TBI. Increased knowledge in this area will contribute to improved treatments for TBI survivors.
Finding from this qualitative study suggest that advocacy is fundamental to oncology nursing clinical practice, that people dealing with cancer have inherent vulnerabilities, and that oncology nurses think of themselves as lifelines to the individuals and communities they serve. As oncology nurses move through the novice to expert clinical practice pathway, they learn advocacy skills as they are modeled by respected mentors, and the skills and behaviors are enhanced over time. Findings provide direction for further research about how best to teach, facilitate, promote, operationalize, and codify advocacy among nurses.
STAT3 is a protein that regulates the signaling pathway activated by the IL-6 family cytokines. My thesis investigates the interaction between STAT3 and its coactivators and how this interaction modulates the downstream gene expression. This study helps design the inhibitors of STS3 to interfere with the Il-6 signaling pathway and treat the inflammatory disease.
Mental health caregivers shared their perceptions for triggers of aggressive behaviors in mental health clients. They also discussed how their behaviors influenced aggressive behaviors in clients. Categories of recognizing, managing, and processing aggression emerged. Multiple triggers for aggression were identified and included factors attributed to both caregivers and clients.
In our studies, we found that when the phosphoinositide 3-kinase pathway is inhibited, the liver does not grow normally. Inhibition of this pathway also led to the development of significant abnormalities liver structure, and decreased the number of immune cells present in the growing liver.
This study provides information about the structural details of one of the membrane transporter proteins called sodium/dicarboxylate cotransporters. This structural knowledge may lead to the development of therapeutic agents for treatment or prevention of kidney disease.
Jennifer Kelly, Ph.D.
Doctoral Nursing
Mentor: Sheryl Bishop, Ph.D.
This dissertation investigated the relationship between acculturation and the development of disability in older Mexican Americans. The results showed that one measure of acculturation, English proficiency, was related to development of IADL disability. Reducing language barriers may help older Mexican Americans live independently longer in their communities.
Maria Fe LanFranco, Ph.D.
Pharmacology & Toxicology
Mentor: Kathryn Cunningham, Ph.D.
The activity of the brain is medicated by a wide number of proteins in the brain. The present study examines the activity of a naturally occurring marine product and its synthetic structural analogs on a family of receptor proteins in the brain to understand their therapeutic potential in neurological conditions.
The muscarinic acetylcholine receptor subtypes (M1-M5) are expressed on the peripheral vestibular structures, including hair cells, ganglion, and other neural elements. The activation of muscarinic receptors produces either depolarization or hyperpolarization effects on the cell’s membrane potential through the modulation of ionic channels, such as Kir2.1.
Yuan Li, Ph.D.
Preventive Medicine & Community Health
Mentor: Wolfgang Maret, Ph.D.

Zinc is an essential human micronutrient. Perturbation of zinc regulation is among the critical factors in the progression of traumatic brain injury. Results of this dissertation provide new leads to treat brain trauma.
The liver is a phenomenal organ that has remarkable ability to regenerate itself after tissue loss. However, the precise mechanisms of this process are not completely understood. One protein implicated in modulating the regenerative response is the Aryl Hydrocarbon receptor and we characterized this regulation using a mouse model system.
This dissertation tried to find how soluble Flt-1 (sFlt-1) works in pregnancy by mice model. We found that sFlt-1 can induce increased blood pressure of pregnant women and do harm to baby growth. Moreover, it impacts the blood pressure in these babies later in life.
Mycoplasma genitalium, a sexually transmitted pathogen, elicited inflammation from human vaginal and cervical epithelial cells. MG survived long-term inside epithelial cells whereby it was protected from the host immune system. Using a mouse model, we discovered that MG could disseminate to upper reproductive tract and knee tissue to cause inflammation.
Participants’ stories gathered during interviews were analyzed. Findings revealed conscious awareness of prenatal stress as a threat to the health of their unborn babies was the primary source of psychological and cognitive meanings that legitimized the use of MBE during pregnancy and reduced its use post-partum.
Nidal Moukaddam, Ph.D.

Clinical Science

Mentor: Kathryn Cunningham, Ph.D.
“Nursing Students’ Utilization of Personal Digital Assistants” explored how nursing students use personal digital assistants (PDA) and if learning modes affected adoption of innovations. Students reported tasks completed with the PDA, problems, and self assessed skill as well as completing a modified survey. The study found that subjects scoring higher were more likely to use a PDA and have fewer problems.
Amanda Scarbrough, Ph.D.

Medical Humanities

Mentor: William Winslade, Ph.D.
Ehrlichia are bacteria that live within ticks. When a tick bites a human, bacteria may be transmitted. Ehrlichia disease may be mild or fatal. I developed mouse models of both the non-lethal and lethal forms of the disease and used them to determine the factors that lead to fatality.
NEIL 1 is a human protein that recognizes and initiates repair of DNA damage that can lead to mutation, possibly cancer, if left unrepaired. We have extensively characterized the interaction of NEIL 1 with other proteins involved in DNA replication and have shown that they work together to maintain genomic stability.
Shainy Varghese, Ph.D.
Nursing Doctoral
Mentor: Carolyn Phillips, Ph.D., RN
Suwei Wang, Ph.D.

Biochemistry & Molecular Biology

Mentor: Vincent Hilser, Ph.D.
This report illustrates that human lung macrophage cells internalize and destroy spores of the anthrax-causing bacteria, Bacillus anthracis. The microbe responds by producing edema toxin, which hinders macrophages from engulfing spores. Anthrax infection alters expression of multiple host genes in mouse lungs, demonstrating the importance of this organ during infection.
I studied the relationship between lipid metabolism and inflammation. My dissertation project investigated the function of a human protein named Phospholipase A2-Activating Protein (PLAA). My published results suggested that modulation of PLAA production could provide therapeutic interventions for inflammatory diseases (e.g., rheumatoid arthritis and inflammatory bowel disease) and cancer.