

FRONTIERS IN RESEARCH

SELECTED NEW PROJECTS FUNDED BY MAJOR GRANTS AND AWARDS



SCHOOL OF MEDICINE

■ Department of Family and Preventive Medicine

Kurt T. Hegmann, M.D., M.P.H.

Research Associate Professor; Director, Rocky Mountain Center for Occupational and Environmental Health (RMCOEH)

PROJECT: "Occupational Disease Study"

FUNDING AGENCY: Utah Labor Commission

AMOUNT OF GRANT: \$500,000 over 2 years

The Utah Labor Commission has received several applications for workers' compensation benefits for drug enforcement officers or their families who claim illnesses or deaths were a result of on-the-job exposure to environments where methamphetamine was produced. Investigators at RMCOEH will study death and illness rates related to these occupational exposures among firefighters and drug enforcement officers. Results will help the commission and the Utah State Legislature make educated policy decisions as to whether or not the law should allow claimants workers' compensation benefits in methamphetamine-exposure cases.

■ Program in Human Molecular Biology and Genetics

Anne Moon, M.D., Ph.D.

Associate Professor of Pediatrics

PROJECT: "A Novel and Required Role for Fgf8 in Pulmonary Development"

FUNDING AGENCY: American Lung Association

AMOUNT OF GRANT: \$150,000 over 2 years

This American Lung Association Career Investigator Award focuses on molecular mechanisms that lead to birth defects in the alveoli, lung structures that are critical for oxygen uptake and elimination of carbon dioxide. Using genetic and molecular approaches, Moon identified a significant player in the formation of alveoli: Fibroblast Growth Factor 8 (Fgf8). Also a key regulator of organ development and growth, Fgf8 plays a previously unrecognized role in the lung. This project will explore mechanisms involved in alveolar development, which may lead to new approaches to therapy for infants with malformed alveolar structures that cause impairment in lung function and gas exchange.

■ Huntsman Cancer Institute (HCI)

Stephen Lessnick, M.D., Ph.D.

Assistant Professor, Division of Pediatric Hematology/Oncology; Adjunct Assistant Professor, Department of Oncological Sciences; HCI Investigator

PROJECT: "Ewing's Sarcoma"

FUNDING AGENCY: Liddy Shriver Sarcoma Initiative

AMOUNT OF GRANT: Two \$25,000 grants over 1 year

Ewing's Sarcoma is a rare but deadly cancer that often affects children. The first grant, "New Approaches to EWS/ETS Detection in Ewing's Sarcoma," focuses on providing more accurate diagnostic and prognostic techniques, and a new noninvasive assay to measure treatment response. The second grant, "Analysis of NROB1 in Ewing's Sarcoma," aims to help characterize the molecular mechanisms involved in the disease's development.

■ Department of Obstetrics and Gynecology

Robert M. Silver, M.D.

Professor and Division Chief, Maternal-Fetal Medicine

PROJECT: "The Effects of Aspirin in Gestation and Reproduction (EAGER)"

FUNDING AGENCY: National Institute of Child Health and Human Development, National Institutes of Health

AMOUNT OF GRANT: \$5,854,081 over 5 years

A unifying feature in some cases of infertility, implantation failure, miscarriage, fetal death, and pregnancy complications is a decrease in uterine, ovarian, and placental blood flow. Low-dose aspirin has the potential to favorably impact several of these. The University of Utah is one of two national sites conducting a prospective, blinded, placebo-controlled randomized trial to assess the effect of low-dose aspirin on reproduction. Co-investigators are: Harry H. Hatasaka, M.D., associate clinical professor, Division of Reproductive Endocrinology and Infertility; and Joseph B. Stanford, M.D., M.S.P.H., adjunct associate professor of obstetrics and gynecology, and associate professor of family and preventive medicine.

■ Department of Oncological Sciences

Don E. Ayer, Ph.D.

Associate Professor; HCI Investigator

PROJECT: "Transcriptional Control in the Development of Pancreatic Intraepithelial Neoplasia"

FUNDING AGENCY: National Cancer Institute, National Institutes of Health

AMOUNT OF GRANT: \$329,900 over 2 years

Pancreatic cancer is a devastating disease with a five-year survival rate under 5 percent. Understanding the molecular events that trigger initiation and progression of pancreatic cancer will identify targets for new therapeutics designed to treat this disease. Pancreatic intraepithelial neoplasias (PanINs) are the earliest known lesions in pancreatic cancer and may progress to adenocarcinoma. Recent data suggests that upregulation of the transcription factor MondoA may contribute to changes in normal epithelial cells that drive their conversion to PanINs. Ayer will determine whether MondoA is required for the genesis of PanINs, identify target genes regulated by MondoA, and determine the expression of these targets in normal epithelium and in PanINs.

■ Department of Ophthalmology and Visual Sciences

Wolfgang Baehr, Ph.D.

Ralph and Mary Tuck Professor of Ophthalmology and Visual Sciences; Director, Foundation Fighting Blindness Center at the John A. Moran Eye Center; Adjunct Professor, Neurobiology and Anatomy, Biology

PROJECT: "Mammalian Phototransduction: Role of cGMP and Calcium"

FUNDING AGENCY: National Eye Institute, National Institutes of Health

AMOUNT OF GRANT: \$1.25 million over 5 years

Mammalian phototransduction is a cascade of events that starts with reception of light by the photoreceptor molecule—rhodopsin—and ends with hyperpolarization of the photoreceptor cell. Essentially, this is an electrical signal sent to the brain to assemble a "picture" from zillions of individual such signals. Cyclic guanosine monophosphate (cGMP) is a cyclic nucleotide that serves as an internal messenger in the phototransduction cascade. Calcium is another internal messenger whose concentration is linked to cGMP in a negative feedback loop. This grant uses transgenic and knockout mouse models to identify mechanisms related to these internal messengers and how they contribute to diseases of the retina, such as diabetic retinopathy and macular degeneration. The goal is to further understand how a particular genetic mutation causes a disease, so researchers can explore ways to delay or prevent retinal diseases.

■ Department of Pediatrics

L. LuAnn Minich, M.D.

Professor, Division of Pediatric Cardiology

PROJECT: "Intermountain Pediatric Heart Disease Research Center"

FUNDING AGENCY: National Heart, Lung, and Blood Institute, National Institutes of Health

AMOUNT OF GRANT: \$490,399 over 5 years

Heart disease is a leading cause of morbidity and mortality in children. The Intermountain Pediatric Heart Disease Research Center—one of eight clinical centers in the nation that comprise the Pediatric Heart Network—collaborates in prospective, randomized, multi-institutional trials. Enrollment is near completion for a study of the variability of echocardiographic measurements of left-ventricular function in children with cardiomyopathy. Three other clinical trials focus on: 1) Evaluation of the effectiveness of angiotensin-converting enzyme inhibition therapy for infants with a single ventricle; 2) Determination of the best type of shunt for initial palliation of hypoplastic left-heart syndrome; and 3) Evaluation of the effectiveness of angiotensin receptor blockade on aortic root dilation in patients with Marfan syndrome. Data from these studies should help advance knowledge of pediatric heart disease and promote evidence-based pediatric medicine.

■ Department of Psychiatry

Gilbert A. Preston, M.D.

Assistant Professor

Lisa M. Ord, L.C.S.W.

Visiting Instructor

PROJECT: "Family-based Identification of Susceptibility Genes in Schizophrenia and Spectrum Disorders"

FUNDING AGENCY: Genes, Cognition, and Psychosis Program, National Institute of Mental Health, National Institutes of Health

AMOUNT OF GRANT: Renewable ongoing satellite study

In the Utah satellite of the national TRIOS project—so named because it recruits a genetic trio: an affected family member and a combination of parents and/or siblings—researchers are working to identify genes that may increase the risk for developing schizophrenia. They will use this family-based association design in conjunction with cognitive intermediate phenotypes that are altered in both participants with schizophrenia and their “unaffected” family members to identify genes of risk. Identifying genes that increase susceptibility to schizophrenia may lead to the future development of more effective treatments based on the neurobiology of the illness.

■ **Center for Advanced Imaging Research (UCAIR), Department of Radiology**

Matthias Schabel, Ph.D.

Research Assistant Professor

PROJECT: “Computer-aided Detection for MRI Breast Screening”

FUNDING AGENCY: National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health

AMOUNT OF GRANT: \$658,000 over 5 years

Dynamic contrast-enhanced MRI not only images breast tumors, but highlights them in anatomic settings. After the patient is injected with a “dye” (contrast agent), MRI is used to produce a movie-like series of images of the dye’s movement into and out of the breast and tumor tissues. A computer analyzes the movement in every “pixel” of every image and, based on these data, can distinguish and highlight tumors. This screening technique promises to be more sensitive and informative than standard mammography and, in some cases, may be able to distinguish malignant from benign tumors, eliminating the need for biopsies.

COLLEGE OF PHARMACY

■ **Department of Pharmacotherapy**

Qayyin Said, Ph.D.

Research Assistant Professor

PROJECT: “The Cost of Non-adherence to Asthma Treatment Guidelines: An Analysis among a Low-Income Cohort in Utah”

FUNDING AGENCY: Department of Pediatrics and Primary Care Research Center, University of Utah

AMOUNT OF GRANT: \$10,000 over 2 years

Lack of adherence to asthma treatment guidelines remains a significant problem and likely affects sequelae and costs of asthma. Understanding the economic implications of adherence or non-adherence is critical for those who develop guidelines and interventions in primary care settings. The aim of this study is to investigate the effects of non-adherence to National Asthma Education and Prevention Program Treatment Guidelines on the costs of care for children and adults diagnosed with asthma in a Utah Medicaid population. Preliminary results indicate that inappropriate use of asthma medications leads to significantly higher medical care costs. High use of albuterol inhalers is associated with increased medical care costs for both children and adults, showing a mean yearly increase of 117.5 percent and 21.1 percent, respectively.

COLLEGE OF NURSING

■ **Susan Beck, Ph.D., A.P.R.N.**

Professor and Associate Dean for Academic Programs

PROJECT: “Targeted, Tailored, and Timely (T3) Symptom Management for Prostate Cancer”

FUNDING AGENCY: National Cancer Institute, National Institutes of Health

AMOUNT OF GRANT: \$200,000 over 2 years

One in six men will develop prostate cancer and experience symptoms that may include: fatigue, insomnia, pain, urinary and bowel problems, hot flashes, depression, and anxiety. Many of these go undetected, because there is not a systematic and regular assessment of symptoms. This exploratory study addresses the lack of symptom management in men receiving radiation therapy for prostate cancer. T3 symptom management is targeted to the symptoms experienced by men with prostate cancer, tailored to the man’s preferred learning method, and timed to when the symptoms are most likely to occur. The long-term goal is to develop effective ways of improving quality of life for cancer survivors. Other investigators are: Lee Ellington, Ph.D., associate professor; William Dudley, Ph.D., associate professor and director of applied statistics; Michael Caserta, Ph.D., professor; and Gail Towsley, M.S., doctoral candidate, project facilitator, College of Nursing; and Dennis Shrieve, M.D., Ph.D., professor and chair, Department of Radiation Oncology, School of Medicine, and leader, Brain Tumor Program, Huntsman Cancer Institute. Site investigators are Distance Ph.D. students Norissa Honea, R.N., M.S., and Terry Thomas, M.S.

■ **Patricia F. Pearch, M.P.H., Ph.D., A.P.R.N.-F.N.P.**

Assistant Professor

PROJECT: “The Children’s Computerized Physical Activity Reporter: Reliability and Validity”

FUNDING AGENCY: National Institute for Nursing Research, National Institutes of Health

AMOUNT OF GRANT: \$275,000 over 2 years

While inactivity is considered a major contributor to childhood obesity and other health problems that originate early, the instruments to assess activity in children have been adapted from instruments for adults and do not have established reliability and validity for children. The Children’s Computerized Activity Reporter (C-CPAR) is a computerized questionnaire designed for 24-hour self-report of physical activity. The purpose of this research is to evaluate reliability (test-retest), concurrent validity (comparison to pedometry), and usability of the C-CPAR. Accurate measurement of activity will form the foundation for research and clinical assessment of children. Other investigators are: Justine Reel, Ph.D., associate professor, exercise and sport science, College of Health; and Jacquelyn Williamson, M.S., associate instructor, College of Nursing.

COLLEGE OF HEALTH

■ **Department of Communication Sciences and Disorders**

Bomjun Kwon, Ph.D.

Assistant Professor

PROJECT: “The Effects of Channel Configurations in Cochlear Implants”

FUNDING AGENCY: National Organization of Hearing Research (NOHR)

AMOUNT OF GRANT: \$20,000 over 1 year

Cochlear implants have successfully restored hearing sensation in deaf individuals, and many users are capable of understanding speech without visual cues. However, the implants are less beneficial in adverse listening situations, such as noisy backgrounds, because only a few spectral channels of speech information are transmitted through a cochlear implant system. This study seeks to increase the number of informational channels by using various electrode configurations together for speech coding, thereby overcoming difficulties in noisy conditions.

■ **Division of Nutrition**

Wayne Askew, Ph.D.

Professor and Division Director

PROJECT: “Consumption of Bison Meat and Cardiovascular and Cancer Risk Biomarkers”

FUNDING AGENCY: National Bison Foundation

AMOUNT OF GRANT: \$52,000 over 1 year

Bison meat is widely believed to be a “more healthful” red meat alternative, since it is lower in fat than comparable beef cuts and has a more favorable polyunsaturated-to-saturated fat ratio. The aim of this study is to determine if the consumption of bison meat leads to a more favorable blood cardiovascular and cancer biomarker risk profile than does beef consumption. Test subjects will subsist upon an assigned diet (3-4 oz. of meat twice a day) for 42 days, undergo a 30-day “washout period,” and then receive the second assigned diet for 42 days. The diets are designed to meet individual energy requirements and vary principally in the source of the meat. Data will be collected on biomarkers related to cardiovascular risk and cancer risk (blood lipid profile, C-reactive protein, peroxidized lipid aldehydes, and peroxidized DNA bases). Stacie Wing-Gaia, Ph.D., R.D., assistant professor, is an associate investigator. Graduate students working on the project are Becky Hurst and Ying-Shen Chen.

■ **Stacie Wing-Gaia, Ph.D., R.D.**

Assistant Professor

Staci Nix, M.S., R.D.

Instructor

PROJECT: “The Effects of Altitude on Appetite and Energy Balance in Sherpas on Mount Everest”

FUNDING AGENCY: Division of Nutrition and College of Health

AMOUNT OF GRANT: \$6,000 over 9 months

Anorexia, negative energy balance, weight loss, and dehydration are frequently experienced by lowlanders exposed to high altitudes, which compromise their physical performance and health. To date, very little is known about the nutritional needs of high-altitude natives, such as Sherpas, and whether they experience the same negative changes observed in other populations when ascending to high altitudes. Researchers will travel to Mount Everest to measure appetite, food intake, body composition, hydration, and energy expenditure in Sherpas participating in the SuperSherpa™ Expedition. Information obtained will contribute to a greater understanding of these unique athletes and their adaptations to high altitude. ▀