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The Human Immunodeficiency Virus, HIV remains a major health problem worldwide. I investigated the HIV Rev protein and its ability to bind to RNA. Using biophysical techniques, I characterized this interaction. My results revealed important new information that can lead to new therapeutics to treat HIV.
Proteins carry out many of the activities of the cell and promote cell survival. In order to function they must fold into a precise three dimensional shape. I found that a protein called sacsin, which is abnormal in a specific neurological disease, is a molecular “chaperone” that helps other proteins fold properly.
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One in five people in tropical villages are disabled due to poor wound care. This study introduced a new research method to overcome cultural barriers. Seventy-five villagers from all over Ghana described their wound care by completing stories of typical wound patients. Results can help the researcher create educational programs.
Epstein-Barr virus (EBV) reactivates in astronauts during spaceflight. The overarching hypothesis is that microgravity and radiation in the spaceflight environment influence reactivation. This research found that radiation and modeled microgravity appear to increase EBV reactivation and affect cellular function in spaceflight, though stress is also a factor.
Burn injury is a severe form of trauma that causes changes in glucose metabolism. Glucose metabolism is tightly controlled soon after burn injury and can lead to stress-induced diabetes. We have shown that these effects result from the insulin signaling pathway in the liver.
Worldwide, tuberculosis (TB) is one of the most common infectious diseases. Prevention and control of TB includes properly identifying and treating patients. Ultimately, efforts by organizations in the United States and worldwide are needed to ensure that prevention and control measures are put into place and followed to eventually eliminate TB. My capstone reviews the currently recommended prevention and control measures in the United States.
Environmental conditions determine whether *Staphylococcus aureus* aggressively attacks humans. In low-fluid-shear environments, which are found in microgravity and in a human host, *S. aureus* changes properties associated with infection and slows its growth. It also forms a protective layer that helps in colonizing tissues.
As science and society share significant relationships, practicing science well includes reflecting upon its social and moral contexts. Virtue ethics can help illuminate some of science’s moral features, namely the importance of scientists’ character for developing a contextualized science. Examining images of the scientist in history and literature can help scientists explore their work’s contexts.
Some medical researchers have seen and treated human subjects as mere objects. This conduct has led to violations of human dignity. This dissertation aims to help medical researchers show respect for research subjects by teaching them to consider subjects as people with unique minds, bodies, and lives of their own.
The teamwork and communication between nurses in their care of patients can mean the difference between life and death. This study examined nurse to nurse behaviors referred to as indirect aggression. These involve lying or deliberate miscommunication which impact nurses own health as well as the care of their patients.
When our cells outgrow their usefulness, they undergo programmed cell death. We studied how this process relates to heart disease and cancer. We found the fortilin protein which regulates cell death interacts with prohibitin – a cancer-associated protein. My studies shed new light on how these two proteins interact and affect cancer cell death.
This interdisciplinary dissertation provides ethical and historical analysis of the moral complexities of military medicine. As both a physician and a soldier, military medical practitioners are members of two professions, making possible ethical dilemmas known as ‘the problem of dual loyalties.’ This work explores this experience on the individual and programmatic level.
Debility is generalized weakness associated with hospitalization. I examined risk factors for discharge to acute care and readmission to acute care after discharge to community in a national sample of patients who received rehabilitation for debility. One-third of patients who went home after rehabilitation were rehospitalized within 90 days. Functional independence, congestive heart failure, renal failure, and chronic pulmonary disease were important factors for discharge setting and rehospitalization.
Dengue virus causes dengue fever and is spread by mosquitoes in the tropics. Infection can escalate to a fatal dengue shock syndrome. Currently, no drugs or vaccines are available. We have discovered molecules that strongly interact with proteins on the Dengue virus surface, that can neutralize the virus and prevent further infection.
My work investigated a family of viruses called pestiviruses that cause debilitating disease. A viral protein called Npro interferes with the immune system. I have determined a form of this protein which leads to disease in animals and studied its behavior in its natural state.
The maintenance of skeletal muscle mass is crucial for human health and long term survival. However, the aging process is associated with an involuntary loss of muscle mass and the inability to maximally stimulate muscle growth ultimately leading to sarcopenia. A novel style of exercise utilizing low-load resistance coupled with the compression of the local blood vessels called “blood flow restriction exercise” has emerged as an exercise that stimulates muscle growth for all adults. This research focuses on how this occurs on a molecular level.
The Aryl Hydrocarbon Receptor (AhR) alters specific target genes in liver after its activation by classical environmental contaminants. However, my studies revealed activation of a novel stress response target gene in the absence of such contaminants, indicating a potential role for AHR in normal liver cell function.
Rift Valley fever virus causes hemorrhagic fever, a serious human infectious infection. I investigated the role human dendritic cells play during Rift Valley fever virus infection. Other experiments examined the virulence factor, NSs and its role in the infection process.
The objective of this study was to investigate the impact of diabetes on health outcomes in patients after knee/hip joint replacements. The study used Medicare insurance claims data for 2007-2008. The negative impact of diabetes was more prominent on long-term health outcomes, such as rehospitalization, than on short-term health outcomes.
Charity in health care is a powerful symbol of deep moral significance to Americans and to medical professionals. Our nation has relied on charity to create a sense of well-being and to resolve tensions. A more just health care system would not rely on charity.
West Nile virus is a virus transmitted by mosquitoes. Since its introduction to the US in 1999, the virus has spread across the country and can cause severe disease in humans. As the virus has spread, the virus has continued to change. This work has identified a new variant of the virus originating in the SW US.
Use of stem cells represents a promising therapeutic approach for neurological disorders and traumatic brain injury. My work focused on development of a non-invasive imaging system to track stem cells administered to the brain. This system could facilitate development of clinical cell replacement therapy.
The terms "literature and medicine" and "narrative medicine" are often used interchangeably to describe story-based study in medicine and medical education. I explore distinctions between "literature and medicine" and "narrative medicine" and assert that the terms indicate different projects and that it is inaccurate to employ these terms as direct synonyms.
This dissertation reports the results from a classical grounded theory research project which focused on how the Certified Nurse Midwife perceives her collaborative role with physicians in U.S. hospitals. Study findings indicate that collaboration is a teachable basic social process driven by the theory of getting along.
The purpose of this study was to evaluate the effect of ultrasound examination on the clinical management of illness and injury in personnel stationed at the Amundsen-Scott South Pole Research Station and the McMurdo Research Station. A one-year retrospective analysis of ultrasound examinations and the resulting clinical outcome was conducted.
I studied effects of variations in amino acid sequence of the envelope protein of dengue 2 virus on the ability of antibodies to bind and neutralize the virus. I also determined the properties of antibodies that may be responsible for enhancing dengue virus infection of human monocytes.
I investigated how carbon monoxide produces an anti-inflammatory effect in human airway smooth muscle cells. Human airway smooth muscle contributes to airway inflammation. Previous studies have shown protective effects with low concentrations of carbon monoxide metabolism and oxidative stress were shown to be targets within the cell leading to carbon monoxide's anti-inflammatory effects.
Amino acids must fold into a unique structure for a protein to function properly. We found that the DNA which specifies the amino acid sequence also provides information that determines important ways that proteins fold. My results shed new light on neurodegenerative diseases like Parkinson’s Disease.
Drug use causes sexually risky behavior thus increasing the probability of exposure to a sexually transmitted infection (STI). I studied the effect of methamphetamine (METH) on infection with an herpes simplex virus type 2 in animals. METH accelerated disease development indicating drug effects other than behavior modification may promote sexually transmitted infection.
My research targeted two areas: 1. By synthetically modifying one particular region of a drug affecting opiate receptors, I hope to eliminate its hallucinatory ability while keeping the pain-relieving properties. 2. I have designed a molecule that may be effective against both West Nile and Dengue viruses.
I used cultured cells to investigate toxicity of a new plastic component, bisphenol-s (BPS) alone or together with the potent estrogenic bisphenol-a (BPA) and another well-known environmental contaminant, nonylphenol. Dramatic effects on cell replication and responsiveness were seen.