IUPUI Life-Health Sciences Internships

Spring 2008 Poster Session

Friday, April 11, 2008
3:30 PM—5:30 PM
VanNuys Medical Science Building Atrium
Vision

The Life-Health Sciences Internships Program seeks to connect talented IUPUI undergraduate students in the life and health sciences with enriching experiences in laboratories, research projects, and other professional experiences on the IUPUI campus and in campus-affiliated locations.

Mission

To educate, engage, and enlighten IUPUI life and health sciences undergraduates through on-campus internship experiences. We seek to achieve this through the following means:

1. Seeking out and arranging high quality internship opportunities in relevant fields.
2. Nurturing mentor and intern relationships through structured meetings and gatherings.
3. Providing opportunities and support to present work.

IUPUI Life-Health Sciences Internships is funded by the Indiana University Commitment to Excellence Grant.
Welcome to the IUPUI Life-Health Sciences Internships Spring 2008 Poster Session.

The Life-Health Sciences Internships program connects IUPUI life and health sciences undergraduates with research internships on and near the IUPUI campus. This program allows students to explore their career objectives and future career pathways, while also fostering valuable professional connections between students and faculty and staff. The students belong to a community of interns and mentors who support one another throughout the research experience and beyond. This program is funded by an IUPUI Commitment to Excellence grant to Dr. Doug Lees, Chair of IUPUI Department of Biology and Dr. Simon Rhodes, IU School of Medicine Associate Dean for Graduate Studies.

Life-Health Sciences Internships students represent thirteen different majors and minors on the IUPUI campus. Many of these undergraduates have career goals involving medicine, dentistry, physical therapy, pharmacy, and optometry. These internships are an excellent stepping stone for future research and graduate study. Mentors represent the Indiana University School of Medicine, the Indiana University School of Dentistry, the Indiana University School of Health and Rehabilitation Sciences, the Indiana University School of Nursing, the Indiana University School of Optometry clinics in Indianapolis and Carmel, and the pharmacy department of Indiana University hospital (Clarian Health). These professionals are providing invaluable experiences for undergraduate students and mentoring the next generation of scientists, researchers, and health professionals.

This program includes summaries of the posters presented and work completed by our interns. Thank you for joining us today!
Thank you to our 2007-2008 participants:

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Jennifer Behzadi

We sought out to determine if patients with new onset Type 1 Diabetes Mellitus who received their initial diabetes mellitus education at Riley Hospital had better long term glycemic control than those initially educated and treated at non-tertiary care centers.

A retrospective chart review using records from the Section of Pediatric Endocrinology at Riley Hospital for Children was performed. Children who transferred their care to the Riley Diabetes program after receiving their initial education at outside care centers were compared to a control group who had received their initial education at Riley Hospital. Both groups received the same follow-up and were compared based on HgbA1C levels (a measurement of glycemic control) at two, three, and five years after diagnosis.

It was found that the type of initial education provided did not seem to affect long-term glycemic control. Children who had received their initial education at Riley had better glycemic control at three years after diagnosis. However, subjects who had received their initial education at non-tertiary hospitals had better five year glycemic control. Thus this data suggests that ongoing diabetes education may be more important than initial educational efforts and a need to explore ways to improve traditional educational efforts is essential.

Neha Bhargava

1st Project “The Fluorine-18 Module”
Summary: $^{18}$F is produced with the help of the cyclotron and is then used to label the molecules with the help of $^{18}$F module. Several valves control the outlet of different chemicals required in the reaction. The machine controls the reaction, labeling, purification and formulation, after this the final product obtained is ready to be injected in human body. The LABVIEW program controls the valves as well as write a sequence file of. One of the popular compounds generated by the machine is $^{18}$F-FDG which is used in detecting the location of tumor in patients.

2nd Project “Template based cardiac based imaging”
Summary: The method involves taking a PET scan of a normal heart, threshold it to separate the part of the heart we want to focus on, then orient it in the short axis view and segment thin slices of it, followed by the volumetric analysis of each slice to find the total volume of the normal heart so that on comparison with the diseased heart we can diagnose a disease better. This task is performed with the help of a code written in IDL software.
Tiffany Blackgrove

There has been a lot of media attention lately focusing on mixed martial arts (MMA) competitions. However, because little research has been done in this area, not much is known about the incidence of injury at these competitions. This research could help the ringside physicians, referees, and trainers prevent or treat these injuries. Throughout the duration of this project, the outcomes of 145 fights, for a total of 294 athlete exposures, were recorded by the ringside physician and later analyzed using SPSS and Microstat. There were a total of 32 fighters injured (11.0% of all fighters), with 34 total injuries (11.7% overall). Two of the fighters injured required immediate transportation to the emergency room because of mental status changes. The majority of fights (42.7%) were stopped due to submission, and 2.07% were ended due to medical stoppage. Thirty-two of the 34 injuries occurred in those fighters with 10 or fewer previous experiences. The overall injury rate of MMA competitions is similar to that reported in other full-contact sports, with boxing and karate having slightly higher rates of injury, and tae kwon do having lower rates.

Michael Burk

The Indiana University General Clinical Research Center (GCRC), located on the fifth floor of the University Hospital, is funded by a competitive grant from the National Center for Research Resources of the National Institutes of Health. The GCRC is the Indiana University School of Medicine’s and Clarian Health’s major resource for supporting faculty who have Public Health Service funding for patient research. Throughout this year I have learned and interacted with many departments within the GCRC to gain a more complete view of what occurs within the center. I have gained a better understanding of the process of research within an institution from writing grants or negotiating with a drug company to hold a study to selecting participants to analyzing the data that the study produces. This experience has been invaluable to shaping my education and appreciation of the work and processes that go into making a research facility operate.
Jessica DeWitt

In my poster, I am explaining what I did during the first semester as a LHS Intern. I worked on abstracting data from a study that was going on. The study was the SCAMP study, Stepped Care for Affective Disorders and Musculoskeletal Pain. Under the abstract title the information includes what the SCAMP study actually is, and it includes the intervention and outcome assessments. The work I performed was quantitative analysis, which included coding the patient's antidepressants they took during the study, any antidepressants prior to the study, reasons of antidepressant change, and mental health referrals. In order to perform this quantitative analysis many methods were used. On important method used in this project, was the specific coding rules. There were many different types of coding rules; therefore, I have a table of the coding rules used in the quantitative analysis. There are four different tables included in this section that show the codes. Along with the coding rules, I have included what the final product looks like when all of the patient's information has been coded. The final product table is listed under the Results and Discussion tab. Lastly, I discuss many of the limitations encountered while performing the quantitative analysis.

Amanda Denny

During the 2007-2008 school year at IUPUI, I had the opportunity to be an intern to Dr. Javier Sevilla. Dr. Sevilla is with the Indiana University Department of Family Medicine and also works to educate others on underserved populations. During the internship, I had the opportunity to shadow Dr. Sevilla at the IU-Methodist Family Medicine Clinic. I also had the opportunity to work with Dr. Sevilla and other Hispanic/Latino leaders in Indianapolis on the first Hispanic/Latino Health Directory in Central Indiana.

The experience that I had while at the Family Medicine Clinic was amazing. I was able to speak Spanish with members of the local Hispanic/Latino community, and listen to the patients' problems. I was able to speak with people who spoke in dialects that I had never heard in person before. I thoroughly enjoyed this, because I met wonderful people and it helped add to my knowledge of the Spanish language.

For the Hispanic/Latino Health Directory portion of my internship I worked closely with members of the Indiana Minority Health Coalition, and will continue to do so until the internship is over. I am excited to see the finished directory; especially knowing I was able to help create it.
Sarah Dolan

HIV-1 vectors are capable of infecting dividing and non-dividing cells. This makes them good candidates for clinical applications in gene therapy. The quality of vector supernatant may be affected by defective particles or aggregation. Experiments were performed to access if aggregation could be induced in the HIV-1 vectors using polybrene and if so how this aggregation affects vector titer. Dynamic light scatter (DLS), which measures particles of various sizes, was used to analyze the vector. Vector pseudotyped with envelope proteins VSVG and RD114 were analyzed. Our results show that vector aggregation can be induced using polybrene and that the two envelopes behave similarly. The results also indicate that DLS is an effective method for analyzing aggregation of HIV-1 vector particles.

Jimmy DuPriest

The HSR&D (Health Sciences and Research & Development) team has a compilation of both M.D.s and Nurses working alongside Sociologists, Engineers, and micromanagement interwoven throughout their infrastructure, making them a very strong, yet diversified team. This diversification grew when LHSI became a part of the many research teams currently in progress, helping both the progress and even preparation of research projects getting ready for presentation. The staff had a need for Research Assistants (RA) and was very welcoming to the student interns coming in this past year.

Some of the projects available were Pain Research studies involving veterans from Operations Iraqi and Enduring Freedom, inner-hospital revising of systematic processes, and even the option to observe in the Operating rooms. Personally, there were two large projects that I focused on during my internship, one observing and later providing input to improve the Escort service at the VA. The other involved a series of interviews with Primary care physicians and the effects from dealing with patients and prescribing opioids.

One of the greatest experiences, however, was my interaction with both doctors and nursing staff and having the opportunity to ask them for advice and receive not only that, but the freedom to help make the most of this internship by participating in research that interested me.
Matthew Galley

Periostin is a novel protein expressed in osteoblasts localized on periosteal (outer) bone surfaces. This study aimed to determine the role of periostin in cortical bone architecture and strength using a genetically-modified mouse that lacks the protein. We hypothesized that mice deficient in periostin (peri-/-) would have reduced bone size and strength when compared to wild-type controls (peri+/+). Ten mice per gender (male and female) and genotype (peri-/- and peri+/+) were used. In vivo whole body bone mineral density (BMD; g/cm²) was assessed by dual energy x-ray absorptiometry (DXA) at quad-weekly intervals up to 16 weeks. Upon euthanasia, the femur was excised and analyzed by DXA, micro-computed tomography, and mechanical testing to determine BMD, cortical bone area, and bone strength, respectively. Peri-/- mice showed significantly reduced whole body BMD at 4, 8, 12, and 16 weeks of age. At 16 weeks femurs from peri-/- mice had significantly reduced cortical bone area, resistance to strain, and breaking strength. Length of the femur (mm) was not different between peri+/+ and peri-/- mice, and there were no effects of gender. The results of this study indicate that periostin functions to regulate bone size and strength, and that it may be a novel target for the treatment of bone disease.

Mariam Hanna

As a Life-Health Sciences intern, I participated in an ongoing study with Dr. Kathleen Russell at Indiana University School of Nursing. Her funded study, Project MOCHA (Mammography Outreach and Community Health Awareness) involves increasing mammography screening in African American women. Two hundred women, ages 41-75 years old and <250% of poverty, who have not had a mammogram within the last 15 months and have no history of breast cancer, are randomly assigned to one of two groups: (1) a computer instruction program tailored on health beliefs about screening and lay health advisor (LHA) counseling group and (2) a usual care group. Group 1 receives monthly barriers counseling and assistance with a mammography appointment from a LHA. Group 2 receives a culturally relevant pamphlet about breast cancer screening and referral to the clinic nurse for scheduling mammography appointments and monthly health education mailings. Research assistants read a structured interview to participants prior to group assignment and again at 2 and 24 weeks. Participants receive a $25 gift certificate for each interview. To date, both groups have identified barriers to screening at baseline and Group 1 has rated the intervention positively. Personal experiences of my involvement in this project will be presented.
TPIT (Tbox19) is a T-box transcription factor that has essential roles in pituitary cell-line differentiation. Through various types of experimentation, possible mechanisms have been proposed for the role(s) of TPIT in pituitary development. It is only expressed in the proopiomelanocortin (POMC) expressing cells in the pituitary. In mice, it has been shown that Tpit is not required for initial POMC cell line differentiation, but it is required for further differentiation into specific POMC-expressing cell types (corticotroph and melanotroph). Studies of mutant Tpit mice have shown that they have a normal-sized pituitary, however they have an increased number of gonadotrophs and almost no corticotrophs. Without corticotrophs their blood plasma levels of ACTH are low. In addition these mutant mice have hypoplastic adrenal glands, which lead to poor regulation of blood glucose levels. In collaboration with Riley Hospital for Children, we have been screening a patient for a TPIT mutation. Patients with mutations in different parts of the TPIT gene present with neonatal hypoglycemia. This leads to a diagnosis of isolated ACTH (adrenocorticotropic hormone) deficiency (IAD). Some TPIT patients present with additional features, including prolonged neonatal cholestatic jaundice. Thus far, twelve mutations have been discovered within the coding regions of TPIT. They are all inherited in a recessive manner, however they have varying degrees of protein function ranging from moderate to extreme protein impairment. Future analyses of novel homozygous TPIT mutations would include investigating the DNA binding ability and target protein activation.

Ray Hopkins

Life Health Sciences Intern, Ray Hopkins works with Dr. Joe Burrage in the Indiana University School of Nursing. Dr. Burrage’s research focuses on psychosocial aspects of the decisions to get HIV tested and, if positive, enter care. The qualitative research methods are introduced with an overview of lit review, data collection, and data entry methods. Further work beyond current research is touched upon. An overview of instruments used is provided including: Coopersmith's Self-Esteem Inventory, Interpersonal Support Evaluation List-12, Attitudes Towards People with HIV, Perceived Risk for AIDS, AIDS Knowledge, Risky Drug and Sexual Behavior, and MOS Emotion-Focused and Problem-Focused Coping Strategies. Reliability and validity was examined within the confines of Dr. Burrage’s research. A final report of reliability was run by the intern using data from the questionnaires and is provided within the discussion of individual instruments.
Ryan Jenkinson

I participated in a year-long internship with the pharmacy department of the Clarian Health Hospitals, mainly within the IU Hospital. Due to the wide variety of positions in this area of pharmacy we created two phases for me to participate in. During the first semester I was trained in pharmacy technician duties such as filling prescription orders, operating the robotic dispensing unit, making intravenous medications in the clean room, and delivering medicine throughout the hospital. During the second semester I was able to learn more about the variety of roles that different pharmacists perform. I worked in the compounding pharmacy and in the satellite pharmacy for the operating rooms. I was also able to observe the roles of different clinical pharmacists in the areas of oncology, nutrition, and psychiatry.

Through this internship I was able to learn about the varied opportunities available in hospital pharmacy. This experience has been a great help in discovering what areas of pharmacy I am most passionate about and has allowed me to build an understanding of the teamwork involved in working towards the common goal of providing the best medical care for our patients.

Holly Kloss

Metabolic syndrome is linked to a prevalence of human metabolic and cardiovascular disorders, including coronary artery disease and type 2 diabetes. The Ossabaw swine provide a remarkable large animal model that mimics the manifestations of the metabolic syndrome in humans, including obesity, impaired glucose tolerance, insulin resistance, increased LDL/HDL, increased triglycerides, and hypertension. The goal of this project was to obtain and analyze previously taken MR and CT images of our Ossabaws, to compare the validity of MR and CT at predicting total body fat, to explore the correlation of MR-measured back fat thickness with body weight, and to characterize fat deposition in different diets. Pigs fed excess kcal atherogenic high fat/cholesterol/fructose diet developed obesity and dyslipidemia (DMetS). Pigs fed excess kcal high-fructose diet with no added fat or cholesterol developed obesity, but no dyslipidemia (MetS). DMetS had the greatest obesity, dyslipidemia and visceral adiposity, and were found to have the greatest cardiometabolic risk. Compared to lean Ossabaws, MetS were found to have only marginally greater cardiometabolic risk, as they are obese but non-dyslipidemic. Finally, compared to CT, MRI is equally as valid in noninvasive quantification of subcutaneous and intra-abdominal fat deposition, as well as prediction of total body fat.
Kellen Knowles

With the increase in new dental products on the market, dental researchers must ensure that the effects of these products are not detrimental to the health of patients. Luting agents are widely used in restorative dentistry to cement structures together in the mouth. These dental cements are composed of individual units called monomers that react with one another to form a network or chain known as a polymer. As a polymer, the cements are not toxic to cells. The problem arises when polymerization is not complete and these un-reacted monomers leach into the oral cavity and come into contact with living tissues. Human gingival fibroblasts (HGFs) are the main cell type in the gingival tissue. In this study, the effects of monomers that have leached from dental cements on the expression of cytokines and growth factors by HGFs were evaluated. The altered expression of cytokines and growth factors by the HGFs could induce inflammatory effects in the gingival tissue.

Megan Koerner

The Indiana-Ohio Center for Traumatic Amputation Rehabilitation Research was created to assess the rehabilitation needs of Vietnam veterans with amputations to promote an increase in quality of life and rehabilitation for the current veterans of Iraq and Afghanistan. Military personnel who experience a traumatic amputation from conflict have unique rehabilitation needs in terms of their health, health care utilization, economic and psychosocial outcomes over their lifespan. Advancements in medicine and technology since the Vietnam War have provided improved protective armor and life saving medical procedures which have decreased the death tolls of wars. However, this has resulted in a dramatically increase in the amount to soldiers returning from war with traumatic physical and mental disabilities. By communicating with Vietnam veterans we can gain valuable insight on improving patient education, coping skills, pre and post operative therapy and improve gait on various terrains. In addition to sustaining a traumatic amputation, many of these soldiers’ also have endured a traumatic brain injury or are suffering from post-traumatic stress disorder. The study is a three phase retrospective design with an expected duration of five years. The study specifically addresses Vietnam veterans with war-related traumatic amputation with the development of a database to examine the overarching hypothesis through multiple dimensions to include. The study will also include qualitative data collection and analysis to gain a deeper understanding of the veteran’s rehabilitation needs.
Jeannette McIntyre

The effectiveness of radiation therapy is increased when combined with hyperthermia treatment. However, significant challenges have occurred regarding the use of hyperthermia (treatments greater than 42°C) in the clinic. Therefore, it is advisable to seek approaches to sensitize cells to radiation using more physiologically manageable temperatures (41°-42°C). It has been recently discovered that several organic compounds [variations of an N-benzylindole moiety linked at the indolic 3-position to a 2-(1-azabicyclo[2.2.2]octan-3-ol)] have the ability to increase cell death upon administration of radiation under low temperature hyperthermic conditions. Furthermore, these drugs appear to have little or no toxicity in unirradiated cells treated at normal or hyperthermic temperatures (1). We tested the efficacy of 2 novel derivatives of this class of compounds to determine whether an increase in electron affinity leads to an enhancement of heat-radiosensitization.

Jason Moor

Glaucoma is well known as the “Silent Sight Thief” and is the second leading cause of blindness in the world. It has no symptoms until a significant amount of damage has been done because it is often painless and typically loss of peripheral vision first. African-Americans, diabetics, and the elderly have the highest risk of developing glaucoma. There are simple tests that can be performed by eye doctors to determine if glaucoma exists in an individual. Any loss of visual field or sight is permanent and cannot be repaired. But if found at the early stages, it is possible to stop the damaging effects of glaucoma and keep vision from worsening by use of medications or possibly surgery. This is why it’s important for everyone to have an eye exam every few years depending on age and other risk factors. Only an eye care practitioner can properly diagnose this condition. Through my experiences at the Indianapolis Eye Care Center over the past year working along side with Optometry students and doctors, I have decided to apply to Optometry School at Indiana University for class of 2014.
Pankita Pandya

Conditionally immortal cell lines were established from the ventral otocyst of Immortomise at embryonic day 10.5. The VOT-E36 line represents epithelial progenitors with potential to differentiate into sensory and nonsensory epithelial cells. The VOT-N33 line represents migrating neuroblasts. The T-cell leukemia 3 (Tlx3) gene is implicated in specification of glutamatergic sensory neurons. Ectopic expression of Tlx3 is sufficient to suppress GABAergic differentiation and induce a glutamatergic neurons fate in the dorsal horn of the spinal cord. Since Tlx3 is highly expressed in all cranial sensory ganglia including the vestibulocochlear ganglion at early embryonic stages with exception of VOT-E36 and VOT-N33 cell lines, we wanted to test whether Tlx3 effects inner ear genes in otocyst cells. In this study, VOT-E36 and VOT-N33 cell lines were transfected with pBud-eGFP (pG) or pBud-eGFP-cTlx3 (pT) using the lipofectamine 2000 kit. RT-PCR analysis for neural stem cell markers showed that there were no significant difference in the presence or absence of Tlx3. Moreover, expression levels of hair cell markers Pax2, Math1 and sensory neuron markers Neurogenin1, Mash1 in Tlx3-expressing otocyst cells also showed no difference in comparison to cells expressing the control vector. Therefore, we will analyze those markers in Tlx3-expressing otocysts during neural induction.

Elizabeth Patton

For this internship I worked with Dr. Dena Davidson on alcohol research. The purpose of this research is to assess the effects of an FDA approved drug called Naltrexone, also known as ReVia, on cravings for alcohol drinking. Each participant comes into the lab four times. Two of the visits include assessments and paperwork; the other two are testing days. On testing days the participant will have taken either the drug or a placebo, and are given a series of assessments that consist of drinking alcohol and computer questions. These assessments determine the effect of the drug on cravings, motivation, mood, and sip size. Of the many tasks I have completed, my main accomplishment in this research is administering various structured interviews to determine if a participant qualifies for the study. Assessment is a complicated procedure and it takes a lot of practice. It is also something I will use on a daily basis as I further my education in the field of psychology. I feel that this internship has allowed me to become familiar with the research process, and has prepared me for other research requirements and opportunities that may come my way in the future.
Lora E. Perry

Neuropsychological [NP] testing at baseline and following injury has been supported as an accurate and useful tool in diagnosis and management of concussions. However, children and adolescents can demonstrate prolonged NP deficits without persisting symptoms. This pilot study was conducted to determine if significant NP testing changes can occur during high school football practice in the absence of observable clinical signs/symptoms of concussion. Twenty-nine volunteer high school football players were randomly selected to receive baseline NP testing. During the team’s preseason practices, each player was given an NP test before and after morning practice and after the evening practice on days 6, 8, 9, and 10. 65.5% participants showed NP changes consistent with mild traumatic brain injury [MTBI] though no clinical concussions occurred. Of this group, the self reported symptoms did not correlate with NP scores. In all cases, recovery to baseline was rapid and consistent with current reported research. The lack of correlation between symptoms and NP scores brings up the question of individual concussive load [ICL]. ICL includes clinical and subclinical insult, the aggregated effects of injury to an individual, predisposing them to future injuries. Future research based on this pilot study may help redefine the standards for return to play and improve care for adolescent athletes.

Adriana Rogozea

The Bowen Research Center is one of the three chapters of the Department of Family Medicine, at Indiana University. It is located in Long Hospital, on 1110 West Michigan Street. The mission of this research center is to promote health and prevent disease on the local and national level. It main goals involve: ensuring access to primary care services among rural and underserved populations, and developing methods to control rising healthcare costs and improve the effectiveness, efficiency, humaneness, and appropriateness of health services. The Bowen Center was named after Dr. Otis R. Bowen, who was the Secretary of Health and Human Services for the United States, a former governor of Indiana and faculty member in the Department of Family Medicine. As an intern at the Bowen Center I have worked with Dr. Zollinger and his staff on a wide range of different projects. These projects ranged from literature reviews to data analysis. From these experiences I have learned a lot about the current state of healthcare, and what needs to be done in order to maintain and improve the health our population in the future. As an intern here I also became a certified researcher by passing the “Protection of Human Research Participants Certification Test”.
David Shelton

Background: Hostility, including cynicism, has been found to be an important component of the Type A personality and has been predictive of subsequent all cause morbidity and mortality from cardiovascular disease (CVD) and all cause mortality. We examined associations between the Cook & Medley hostility scale (Ho) with subsequent morbidity and mortality in a sample of older adult male twins.

Methods: The NHLBI Twin Study is a population-based prospective cohort study of adult male twins, aged 42 to 55 when first examined in 1969-73. At the third examination (1986-87) at a mean age of 63.1, 622 subjects completed the Ho scale and three other Ho item subsets were scored. In 1995-97, 443 subjects returned for examination 4 or had died in the intervening period and CVD morbidity and all-cause mortality were determined. The average period of follow-up was 9.0 years (range 3.1-12 years).

Results: All hostility scales were highly correlated with each other. Hostility scores were significantly related to depression at examination 3 and negatively related to years of education. Analyses were performed both including and excluding those with pre-existing disease (CVD or cancer) at exam 3 with no difference in results. Hostility scores were not related to CVD outcome or all cause mortality. Age, not significantly related to hostility scores, was a significant predictor of all-cause mortality in the follow-up period.

Conclusions: Individuals who demonstrate increased hostility have less education and are more depressed. Our twins were older than other studies reporting an association between hostility and subsequent morbidity and mortality, giving support to a suggestion that older survivors with higher hostility may be a hardier group than adults demonstrating hostility at earlier ages.

Waqar Siddiqui

I started my internship at NP labs with some specific and well defined goals. For starters, I wanted to get familiar with the environment of hospitals, and get trained under senior mentors and co-physicians. I also wanted to see how the physicians and surgeons perform their jobs in real life and learn to value the connection between the hospital staff and patients. Furthermore, I looked forward to learn how to use hospital equipment and to discover how important it is to have the right tools to perform a certain job. Last but not least, my final goal was to perform all the tasks given to me in a timely and accurate manner. In the beginning, I helped my mentors and physicians in converting data from a hard copy to an electronic version and to move data from old locations to the new locations as required by the new database. I helped expand the database with more patient records and organize them in a more efficient form. After a while, I got the opportunity to watch physicians taking data (example: ECG, EEG, IOM etc.) of patients and, most importantly, I received the opportunity to go in the surgery rooms with mentors and surgeons to watch surgeries and implantations.
Mayer Soliman

Preliminary examinations in an optometry clinic are essential for the optometrist to get a general idea of the patient’s eyes prior to doing the main exams. There are three preliminary tests which are usually done to the patients before the full eye exam. The first exam is the side-vision test in which the Frequency Doubling Technology (FDT) Perimeter is used to detect any loss in the patient’s visual field which can be an early sign for many diseases such as glaucoma and macular degeneration. Secondly, the patient’s prescription is usually estimated using an autorefractor before using the phoroptor to determine the refractive error. Finally, the visual acuity test is performed using Snellen chart which helps the optometrist quantitatively assess the patient’s retinal focus.

Brittney Sordelet

As an intern in the Life Health Sciences Internship Program, I was given the opportunity to work in an Anatomy and Cell Biology laboratory with Dr. Joseph Bidwell. Bidwell’s laboratory is researching the roles of two proteins responsible for producing new bone growth in osteoporosis patients. While working as an intern I set three objectives for the year.

1. Learn bone cell culture techniques such as; feeding, passing, and obtaining cells from rodent bones. An addition to this objective, incorporated subsequently in the program, was to maintain BMSC-derived cell line; M2-10B4, and 7F2.
2. Learn Realtime PCR; isolating RNA, and preparation of cDNA.
3. Be able to perform various aspects of protein analysis, used to characterize osteoclast and osteoblast gene expression; Elisa and Western. An addition to this objective is the transformation of pre bone marrow stromal cells to fat cells by adding an adipogenic cocktail, tranforming bone cells to fat cells.
LIFE-HEALTH SCIENCES INTERNSHIPS

Sandra Stone

I was chosen to participate in the laboratory of Dr. Simon Rhodes in the Department of Cellular and Integrative Physiology and with Dr. Lisa Cushman in the Department of Medical and Molecular Genetics. In Dr. Rhodes’ lab I was involved in a project researching the human TPIT gene. I gathered information, gave a lab presentation, and contacted researchers that work extensively with TPIT so that I could develop an assay in order to amplify the gene for our purposes.

For the second half of my internship I was located in the Department of Medical and Molecular Genetics working with Dr. Lisa Cushman. Here I took part in a project creating a database that kept track of patients’ test results in comparison to other genetic testing as well as their physical characteristics that may be indicative of a genetic condition. I was given the opportunity to observe in several types of clinics such as the Medical Genetics, Neurogenetics, Bone Dysplasia and Fetal Alcohol Syndrome Diagnostic Clinics. During this internship I was able to apply everything I have learned thus-far throughout the course of my biology degree into research and clinical applications that could serve as my chosen career path in the future.

Renuka Sugumar

Rapid prototype printing refers to the technology of printing objects in 3D in a relatively short amount of time. Current research reveals many new uses for this technology such as bioprinting for tissue engineering and assembling organic LEDs. The purpose of this study was to use rapid printing technology to develop anatomically accurate models and phantoms that can be imaged using PET/CT scan machines. Data from the SPL Human Brain Atlas and the PaxWat Rat Brain Atlas was used to create a 3D computer model that can be segmented. A 3D printer, the Z®510 Spectrum was used to print these models and phantoms. This printer builds a 3D model by iterating the process of laying a layer of powder and printing the image of a horizontal segment of the model. The binder is labeled with [18F] FDG to print phantoms and it is then scanned using PET/CT Scanners. Models do not contain radioactive materials and can be printed in parts that can be assembled. The results showed very accurate models and phantoms through scans comparisons. In conclusion, phantoms and models that are anatomically accurate can be developed through rapid prototyping technology.
Patrick Todd

One method for characterizing a cell line’s origin is via isoenzyme analysis. This technique takes advantage of the unique electrophoretic mobility of a species isoenzyme, in our case Adenosine Deaminase (ADA). Although this is a widely used technique, it can be time consuming and the gel may be difficult to read at times. We have thus developed a Quantitative Polymerase Chain Reaction (qPCR) assay that is better able to characterize and identify a cell line’s origin. Utilizing the common APOB gene, a species specific probe and primer set can be designed to target the slight variations in the gene that occur from species to species. In this experiment we will focus on the ability to differentiate between human and mouse cell lines.

Samantha Townsley

Background: Renal failure represents a medical issue; rats are used as models for acute ischemic injury. Previous work has shown that different strains of rats have different sensitivities to renal failure. These strains can be used to address biochemical changes in the injury process. Brown Norway rats are resistant to ischemia and mitochondria possibly contribute to their protection. The biochemical composition of mitochondria is not explored and may convey the mechanism of protection. Our hypothesis is that stress response proteins such as Hsp-60 and Heme-Oxygenase-1 are more abundant in Brown Norway rats, a model resistant to acute ischemic injury, than in Sprague Dawley which are not resistant.

Materials and Methods: The mitochondria of Sprague Dawley and Brown Norway rats were fractionated after renal ischemia/reperfusion injury. The expression of Hsp-60 and Heme-Oxygenase-1 was compared using western blot analysis.

Results: Results of the western blots show that Brown Norway mitochondria contain more Hsp-60 and Heme-Oxygenase-1 than Sprague Dawley rats.

Conclusions: The molecular mechanism responsible for the protective qualities of Brown Norway rats may involve Hsp-60 and Heme-Oxygenase-1.
Amelia Waninger

During my internship I have been part of the development of the IU cancer TRAIN (The Resources, Answers, and Information Network). The objective of this project is to establish a web portal for Indiana University Simon Cancer Center patients and families to serve as a platform for translation of evidence-based cancer control behavioral interventions and information dissemination. The project has two different parts to the network. The first part is a public network, for us by anyone. The picture below shows a mock of what the public website should look like when the website is launched. The categories for the side bar for the Cancer TRAIN, where chosen because those were the categories the members of the focus groups wanted to be informed about. The second part is a secure network. In this the secure part of the network in where the symptom management monitoring system will be located. I have been the most involved with assessing the current online cancer resources, along with Sara Standrige. There were several links on the current website for the one part of the network that needed to be examined for evidence based information, reading level, navigation, and usability. Information was organized into a binder so there was a hard copy of the information we examined.

Allison Wernke

Pain and depression are two of the most prevalent and treatable cancer-related symptoms, which are present in many cancer patients. Both symptoms, however, frequently go either unrecognized or under treated. Four common barriers include under detection, inadequate initial treatment, failure to monitor adherence and symptom response, and failure to adjust treatment in patients not responding or intolerant of initial therapy. Nurse-delivered care management models have been successful for depression in primary care and have significant potential for both depression and pain care in cancer patients. This intervention has the potential for improving symptoms of pain and depression in cancer patients across a wide range of practices that may be in varying locations, and many other characteristics. The Indiana Cancer Pain and Depression (INCPAD) study is being conducted in a statewide network of community based cancer clinics that are located in both urban and rural settings. INCPAD will enroll 480 subjects who will then be divided into depression (n=240) and pain (n=240). From that point the subjects will be divided into the intervention or usual care group. The intervention will be based upon the Three-Component Group (TCM) which involves the collaboration between the oncology practice, a centralized nurse care manager, and a pain psychiatrist. The intervention has the potential for improving symptoms in cancer patients, and even being expanded to other cancer related symptoms.
Christina Wolfe

I have completed many activities throughout this school year; all activities involved researching kidney stones. I have learned new computer software, programs, and equipment. I have increased my knowledge of kidney stones by reading journal articles and gaining hands on experience. I have read some publications from Dr. Williams and many other authors. The most important thing I have learned during this internship experience is the different type of kidney stones and how unique each stone structure is. I also learned how the stone attenuation values from the Micro-computed tomography (Micro CT) correlates with the composition of the stone. I have gained knowledge on what must be done in research projects. Everything that I have learned while during this internship will be very helpful for while doing a research project in my program (Nuclear Medicine).

Yeonjoo Yoo

Treatment of diseases strain people financially, emotionally and socially thus in order to prevent the occurrence of disease it is essential to discover genetic interactions of proteins that create genetic foundations of diseases. Analytical software (computational biology) is used to analyze proteins or genes and visualize their interaction or pathways so that it facilitates researchers to see the relationship between genes or proteins to develop diseases or mutation. Two primary applications used in analyzing proteins or gene interactions, are Cytoscape and Ingenuity Pathway Analysis (IPA). Cytoscape visualizes molecular interaction and integrates the networks of genes or proteins, while IPA integrates data to find out regulatory relationship, functions, relevant diseases caused by molecular pathway or the interactions of the genes or proteins. By finding common factors between breast cancer gene analysis and each inherited disease gene analysis, we are able to discover how breast cancer is genetically inherited.
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