

***UNIVERSITY OF MASSACHUSETTS
MEDICAL SCHOOL
OFFICE OF MEDICAL EDUCATION***



***MEDICAL STUDENT
SUMMER RESEARCH FELLOWSHIPS***

***CATALOGUE
2005***

Directors:

Michael Godkin, PhD

Family and Community Medicine

Anthony Poteete, PhD

Molecular Genetics and Microbiology

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Office of Medical Education

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March, 2005

1. Cancer

TITLE: Assessing BACH1 Activity in Cancer

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University of Massachusetts Medical School
Department of Cancer Biology
Lazare Research Building
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Project Description: Two genes are associated with hereditary cancer, BRCA1 and BRCA2. Mutations in these genes predispose women to early onset breast and ovarian cancer. My research efforts have focused on gaining mechanistic insights into the BRCA1-mediated DNA repair and tumor suppression. We found that the ability of BRCA1 to effectively mediate repair of DNA damage depends on the ability of BRCA1 to directly associate with a novel protein we identified and called BACH1 (BRCA1 Associated C-terminal Helicase). BACH1 is an enzyme that can unwind the strands of DNA in an energy-dependent reaction. This activity is critical for its role in DNA repair. Human genetic studies resulted in the identification of two early-onset breast cancer patients with germline sequence changes in the BACH1 coding region that we recently showed disrupt BACH1 helicase activity. This data provides a biochemical link to human disease-predisposing mutations in BACH1 and suggest that BACH1 helicase activity is critical for biological function. We are actively pursuing these studies on BACH1 in order to more clearly define its biological role in normal cell physiology and ultimately determine why mutations in BACH1 and BRCA1 lead to breast and ovarian cancers. The specific project to be done by a summer research student will be to evaluate the requirement of BACH1 for BRCA1 function(s).

The research questions are the following:

- 1) Does BACH1 activity fluctuate in a cell cycle regulated manner?
- 2) Does BACH1 activity fluctuate in a cell cycle regulated manner after DNA damage?

To address the first question, cells will be synchronized and monitored by FACs analysis. BACH1 will be immunoprecipitated from cells at different cell cycle phases and equal amounts of BACH1 will be tested for helicase activity. We have developed stable cell lines expressing tagged versions of either wild-type or helicase dead BACH1. Thus, the helicase dead version will serve as the negative control in these experiments. To address whether DNA damage effects BACH1 helicase activity in a cell phase specific manner, we will synchronize cells and treat them with DNA damage inducing agents and evaluate whether BACH1 activity is altered.

These experiments will help clarify whether BACH1 activity fluctuates in a cell cycle dependent manner and whether BACH1 helicase activity responds to DNA damage. Insight into BACH1 helicase function will ideally allow us to better understand what role BACH1 plays in the cell and why this function is critical to tumor suppression.

- Student's Role:** Learn and develop skills for general lab procedures including making buffers, preparing reagents and outlining experiments.
- Student's Skills:** Perform tissue culture operations including splitting, transfecting and collecting cells. Perform immunoprecipitations and helicase assays.
- Interview:** Required
- Location:** **Lazare Research Building
Room 470**

2. Cancer

TITLE: Participation in the Development of a DicomRT Review Tool

TJ Fitzgerald, MD
(401) 454-4301 Contact Fran Laurie
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Quality Assurance Review Center
272 West Exchange Street, Suite 101
Providence, RI 02903

Project Description: The proposed project entails making software modifications and additions to a Matlab based application for viewing radiation therapy treatment plans in DicomRT or RTOG Data Exchange format. The work will be performed at the Quality Assurance Review Center (www.QARC.org), an organization funded by the National Cancer Institute (NCI) to review the radiation therapy of patients enrolled on NCI funded clinical trials. The QARC grant is a program within the Department of Radiation Oncology at the University of Massachusetts Medical School.

Historically institutions have submitted paper and film documentation of radiation therapy treatments for review. The RTOG Data Exchange format and the more recent DicomRT standard were developed to provide a standard for digital exchange of radiation therapy data, similar to the Dicom standard for diagnostic imaging. Acquiring and storing the data in digital format will facilitate retrospective analyses that can correlate tumor control and normal tissue complications with radiation dose. QARC has made preliminary progress in acquiring and viewing digital radiation therapy data, and is seeking to develop an application that can be easily integrated into QARC's review process.

The CERR application (<http://radium.wustl.edu/CERR/about.php>) is open source software written in the Matlab programming language. It is designed to import and display treatment plans transferred in either RTOG or Dicom RT formats. The goal of the proposed project at QARC is to make modifications and additions to the viewing portion of CERR that will help reviewers more easily assess and extract required information. Programming experience and familiarity with the Matlab programming environment is required for this project.

The Medical Student will be based primarily at the QARC offices in Providence, RI. On-site resources include an extensive computer network, a Varian Eclipse treatment planning system, and additional applications for viewing Dicom and Dicom RT files, including the Image Guided Therapy Center's Linux-based Remote Review Tool (<http://itc.wustl.edu/>). QARC staff includes three MD's, two Ph.D. physicists, four on-site dosimetrists (and several off-site dosimetrists), and IS, data management and administrative support staffs that play an integral role in QARC's mission.

The treatment plans of patients on various Cooperative Group and Industry protocols are reviewed daily at QARC. In addition, Oncologists, Radiation Oncologists and Radiologists visit QARC frequently for review sessions where some or all of the

cases on a particular protocol are reviewed. The medical student working on this summer project at QARC will also have the opportunity to participate in these protocol review sessions.

Interview: Required

Location: **Quality Assurance Review Center**
272 West Exchange Street, Suite 101
Providence, RI 02903

3. Cancer

TITLE: Opportunity to Perform Cancer Clinical Trials Research

TJ Fitzgerald, MD
(401) 454-4301 Contact Fran Laurie
Flaurie@QARC.org

Quality Assurance Review Center
272 West Exchange Street, Suite 101
Providence, RI 02903

Project Description: The Quality Assurance Review Center (QARC) (www.QARC.org) is an organization funded by the National Cancer Institute (NCI) to collect, manage and review diagnostic imaging and radiation therapy data of patients enrolled on NCI and industry funded cancer clinical trials. The QARC grant is a program within the Department of Radiation Oncology at the University of Massachusetts Medical School.

The summer project we are proposing will expose the medical student to the field of Radiation Oncology. They will have an opportunity to learn how radiation therapy is prescribed and delivered to patients. They will have the opportunity to participate in the review of the radiation therapy of patients being treated on clinical trials.

The proposed project entails making measurements from CT scans. It has been noted that the distance between the top of the skull and the top of the tentorium independent of age appears not to change pre and post op in spite of surgery. Examination of several CT's from the QARC database to confirm this will be done. A technical note will be written and submitted for publication.

The Medical Student will be based primarily at the QARC offices in Providence, RI. On-site resources include an extensive computer network, a Varian Eclipse treatment planning system, and additional applications for viewing Dicom and Dicom RT files, including the Image Guided Therapy Center's Linux-based Remote Review Tool (<http://itc.wustl.edu/>). QARC staff includes three MD's, two Ph.D. physicists, four on-site dosimetrists (and several off-site dosimetrists), and IS, data management and administrative support staffs that play an integral role in QARC's mission.

The treatment plans of patients on various Cooperative Group and Industry protocols are reviewed daily at QARC. In addition, Oncologists, Radiation Oncologists and Radiologists visit QARC frequently for review sessions where some or all of the cases on a particular protocol are reviewed. The medical student working on this summer project at QARC will also have the opportunity to participate in these protocol review sessions.

Interview: Required

Location: Quality Assurance Review Center

**272 West Exchange Street, Suite 101
Providence, RI 02903**

4. Cardiovascular

TITLE: Worcester Heart Failure Project

Robert J. Goldberg, PhD
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UMass Medical Center
Department of Medicine/ Cardiovascular Medicine
Room S3-861
55 Lake Avenue, North
Worcester, MA 01655

Project Description: This is an ongoing NIH funded research project that is designed to examine changes over time in the magnitude, hospital and post-discharge outcomes, and management practices in hospitalized and outpatient populations of greater Worcester residents with independently confirmed heart failure. As part of this population-based study of greater Worcester residents, we will also examine changes over time in out-of-hospital deaths attributed to heart failure. This clinical/epidemiological research project will examine these and additional study related endpoints over the 2 study years of 1995 and 2000.

Student's Role: The student will assist in the review of death certificates for greater Worcester residents dying from heart failure as an immediate, underlying, or contributory cause of death between the 2 study years of 1995 and 2000.

Required Skills: No special skills are required

Interview: Required

Location: **The student will work in the 3rd floor of Cardiology and on the 3rd floor of Biotech IV. The student will travel to Worcester City Hall and the 25 surrounding towns to assist in the review of the death certificates of greater Worcester residents dying from possible heart failure during selected study years.**

5. Cardiovascular

TITLE: Noninvasive Measurement of Muscle PO₂ and Muscle pH in a Human Model of Acute Hemorrhagic Shock

**Babs R. Soller, PhD
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**University of Massachusetts Medical School
Anesthesiology, Surgery and Biomedical Engineering
Department of Anesthesiology, S2-725
Worcester, MA 01655**

Project Description: My laboratory has developed a unique clinical monitor to noninvasively measure muscle oxygen tension (PO₂) and muscle pH. Based on previous animal studies we hypothesize that muscle PO₂ will be a very early indicator of the onset of hemorrhagic shock and muscle pH and can be used to triage multiple casualties. Dr. Victor Convertino, at the US Army Institute of Surgical Research (USAISR) in San Antonio, TX, has developed a conscious, human model of hemorrhagic shock based on lower body negative pressure (LBNP). A vacuum is pulled on the lower torso, removing blood volume from the upper body, lowering cardiac output. This method generates a hemodynamically accurate model of hemorrhagic shock in humans. Our project will evaluate and characterize the metabolic response (muscle pH and PO₂) to LBNP and compare it to a suite of standard and experimental methods of evaluating hemodynamics.

Student's Role: The student will first train in our laboratory to learn to use our noninvasive shock (pH and PO₂) monitor and analyze the data. The student will then locate to San Antonio, TX where they will work in Dr. Convertino's lab for approximately 6 weeks, as part of a Graduate Student Fellowship program at USAISR. The student will collect data with the noninvasive shock monitor on several research subjects undergoing LBNP. The student will be responsible for analyzing the data from each experiment to compare the metabolic response to the hemodynamic response to LBNP. They will return to UMMS to summarize their results and present a poster.

Required Skills: Self-starter with good communications skills. Excellent computer skills; comfortable with mathematics. Strong interest in Emergency Medicine or Anesthesiology and physiology.

Interview: Required

Location: **Beginning and end in the Department of Anesthesiology, UMMS. Approximately 6 weeks at USAISR, San Antonio, TX (housing will be provided).**

6. Cardiovascular

TITLE: Laser Acupuncture

**Peter Whittaker, PhD
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**University of Massachusetts Medical School
Department of Emergency Medicine
Room S2-714
55 Lake Avenue, North
Worcester, MA 01655**

Project Description: Aim: To examine the efficacy of laser acupuncture in an animal model of acute myocardial infarction. Specifically, can acupuncture treatment reduce the amount of injury caused by a heart attack?

Student's Role: To assist in the collection and analysis of data from the experiments. Also, the student will assist in the writing of a review article.

Required Skills: None – the student will receive the necessary instruction required to perform the assigned tasks.

Interview: Required

Location: In a Laboratory in the Medical School

7. Diabetes/Endocrinology

TITLE: Moving on Diabetes

Lucy M. Candib, MD
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candibFHCW@umassmed.edu

Family Health Center
Family Medicine and Community Health
26 Queen Street
Worcester, MA 01610

Project Description: This pilot will provide accessible exercise options to patients and assess the impact of open access to exercise among patients with diabetes followed by the Disease Management program at the Family Health Center of Worcester. Patients at FHCW who are followed by the disease-state management specialists receive intensive counseling on lifestyle changes, health education and nutritional planning. The addition of an exercise component to the disease management services enhances the entire program since exercise is a central intervention for management of diabetes. Providing access to a neighborhood exercise facility by partnership with the YWCA has the potential to establish better self-care habits of consistent physical activity along with improved glycemic control, improved medication adherence and reduction in medication requirements. The fundamental question is posed: Will open access to exercise facilities result in enhanced utilization and will this make a measurable difference in self-management strategies or diabetic control among underserved, low-income English and Spanish speaking patients in the Worcester community? We expect that exercise will indirectly improve glycemic control and medication adherence first by improving depression in the community.

Primary Objective

This pilot will allow us to quantify utilization (frequency) of exercise facilities in this open access model. Identifying utilization patterns will help us to understand issues pertaining to exercise in the underserved local population. This population-specific approach will help to better direct more specific, future interventions directed at lifestyle modification.

Secondary Objectives

We will measure the following parameters among patients who will choose to exercise alone or in groups at baseline and 16 weeks after initiation (conclusion).

Hba1c

Fasting Glucose

Blood Pressure

Weight

Fasting lipid panel (complete)
SF12
PHQ9
CMA (Continuous Medication Adherence)

Student's Role: The student will have an opportunity to individually interview and work with patients to facilitate self management strategies. Patient centered activities including as group visits and site visits to the YWCA will be used to follow patients and observe patient participation in exercise programs. The student will interview and assist patients in completing the SF12 and PHQ9 instruments and work with the PI to collect and interpret usage statistics and relevant patient data from the YWCA staff. Other data sources including Meditech, patient charts and local pharmacies may be used to gather relevant information. Data will then be recorded in a disease management registry (PECS) and the student will contribute to data analysis and the creation of graphics and tabulated charts. Students will have an opportunity to observe and participate in patient-centered activity such as group visits or YWCA visits during this time at the FH

Required Skills: Good interpersonal skills are required to establish patient relationships and facilitate patient-directed self care plans. Familiarity with MS-WORD, Access, Excel or other relational database software is necessary for any data collection or analysis.

Interview: Required

Location: **Family Health Center**
26 Queen Street
Worcester, MA 01610

8. Diabetes/Endocrinology

TITLE: Lawrence Latino Diabetes Prevention Project

**Ira S. Ockene, MD; Barbara Olendzki, RD MPH, LDN; and Phil Merriam, MSPH
(508) 856-3907**

Philip.merriam@umassmed.edu

**University of Massachusetts Medical School
Preventive & Behavioral Medicine
55 Lake Avenue, North
Shaw Building
Worcester, MA 01655**

Project Description: The student project will be part of the Lawrence Latino Diabetes Project (LLDPP). The LLDPP is a four-year study supported by NIDDK in which 400 Latino participants at high risk for the development of diabetes will be randomized to one of two conditions. Participants in the intervention condition will participate in a theory-based intervention for diet and physical activity modification/maintenance that will be primarily group-based, but will also include individual counseling sessions. Educational materials will be adapted or newly developed, literacy-tailored and culturally specific, and will include an educational drama, large visuals, provision of pedometers, cooking demonstrations and other hands-on experiences.

Student's Role: Assist with continued development of the lifestyle intervention focused on metabolic syndrome and weight loss. This includes culturally appropriate materials to assist with nutritional change, and additional development of the physical activity component. The student may choose to assist with the intervention classes, and take part in generation and possible publication of a cookbook targeting prevention of diabetes.

Required Skills: Good writing skills; interest in learning about metabolic syndrome, Latino cuisine & physical activity; Spanish speaking a plus

Interview: Required

Location: **UMMS Shaw Bldg, 2nd floor and the Senior Center in Lawrence, MA**

9. Diabetes/Endocrinology

TITLE: Role of FSTL3 in Metabolic Syndrome

Alan Schneyer, PhD

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Massachusetts General Hospital

Reproductive Endocrine Unit

70 Blossom Street

Boston, MA 02114

Project Description: Analyze phenotype of FSTL3 knockout mice that acquire insulin resistance and fat disorders

Student's Role: Administer glucose and insulin tolerance tests to diabetic mice

Required Skills: Animal handling, PCR, electrophoresis

Location: **Mass General Hospital**

10. Education

TITLE: EKG Learning in Residency – Developing Competency-based Standards, Ann Electronic Database, and Software Teaching Program

Jeremy Golding, MD
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University of Massachusetts School of Medicine
UMass-Memorial Health Care System
Department of Family Medicine and Community Health
55 Lake Avenue, North
Worcester, MA 01655

Project Description: Although there is an increasing emphasis across medical schools and residency programs on competency-based education, standards have been relatively slow to follow. EKG interpretation is a core medical skill for many specialties, including family medicine. The interested student will work with Jeremy Golding, MD, the Dep't of Family Medicine's Inpatient Director (and long-time EKG and ACLS teacher) to establish what literature-based competency standards exist, and will adapt these as appropriate to residency education. The research assistant will then scan in selected EKG's, creating a library of .pdf (Adobe Acrobat) images for storage in a database searchable by various EKG characteristics. Finally, using standard educational authoring software, a teaching program will be developed for use in the residency to ascertain EKG interpretation competence in 1st and 2nd year residents. Our Department and collaborators in cardiology have a large EKG collection with useful, illustrative electrocardiograms. The research student will learn basic (or even advanced) EKG interpretation, and will have the opportunity to work with a cardiologist as well as with Dr. Golding.

Student's Role: As described above. Publication and presentation opportunities arise naturally from this work.

Required Skills: Literature searching. Interest in learning EKG interpretation. Scanning EKG's & working with Adobe Acrobat to create, and then to manipulate image files. Interest in working with computers (database, teaching software). Database skills a plus (Excel or Access).

Interview: Required

Location: **Memorial Hospital. Some of the work on this project can occur at home using the internet.**

11. Education

TITLE: Development of a Digital Radiologic Image Library for the Medical Student

Young H. Kim, MD
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UMass/Memorial
University Campus
Department of Radiology
55 Lake Avenue, North
Worcester, MA 01655

Project Description: Radiologic Images are an essential part of medical education and practice. The development of a digital radiologic image library in a dedicated computer environment will provide easy and rapid access to radiology teaching files. We will create a digital radiology teaching file from an existing analog (film) teaching file and from dedicated PACS for research within the Department of Radiology. We will store these digital teaching files on a dedicated computer workstation for the medical student.

Goal

Our goal is to develop a digital radiology teaching file on a dedicated computer workstation for the medical student, allowing easy and rapid access to the radiology teaching files. It will also facilitate easy update of daily interesting cases from a rapidly growing PACS system. Medical students would become acquainted with radiologic normal anatomy, variation, and diseases through various imaging modalities (X-ray, Ultrasound, Computed Tomography, Magnetic Resonance Imaging, Angiography, and Nuclear Medicine) stored in digital radiologic library systems.

Benefit

At the end of this project the medical student is expected to learn radiologic findings of various diseases on different imaging modalities through manipulation of a dedicated computer workstation, which they would have access to the radiology library within the department.

Student's Role: Medical student will assist Dr. Young Kim to build up digital radiologic image teaching file. Medical Student will assist selection and collection of teaching file cases from PACS workstations and conventional teaching file in the enrolled UMass Memorial.

Required Skills: None

Interview: Not Required but preferred

Location: **3D lab within the Radiology Department**

12. Education

TITLE: Integration of Second Year Course Websites

John Leong, MD, PhD

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University of Massachusetts Medical School

Department of Molecular Genetics and Microbiology

Room S6-214

55 Lake Avenue, North

Worcester, MA 01655

Project Description: Lyn Riza and Andrea Barrett (IS Dept), Susan Pasquale (OME) and I (MedMicro Course Coordinator) have developed a website for the Medical Microbiology course. The site contains course information, lecture notes, practice exams, summary tables and a few links to outside sites. The lecture notes often include links to slides that are shown in class, so that lectures can be reviewed in their entirety by computer. In addition, the website contains two practice exams that can be taken by students on the computer.

A medical student is currently adding summary tables to one of the Med Micro blocks and linking Medical Microbiology material to the Pharmacology course website, in particular to the section on Antimicrobial Agents. I am now seeking a medical student to work this coming summer to link the practice exam questions to the appropriate places in the lecture material. No particular background in microbiology, pharmacology, or programming is required. The student would work closely with IS and me, and would have access to all of the hardware and software required.

The benefits to the course are immense: the links placed by the student would facilitate efficient review of course material. The website is evolving to promote the formation of intellectual connections between different blocks of the same course and between different courses entirely. The student should also benefit by learning state-of-the-art web programming, and by reviewing and previewing first and second year course material. I anticipate that student input into design will be significant. I believe this is a great way to solidify the vast amount of material that med students are asked to incorporate. Furthermore, it is possible that a role for the student in the evolution of the website may extend beyond the summer.

Student's Role: Student(s) will work closely with Lyn Riza to acquire expertise in web programming and generate links within and between websites. John Leong (Coordinator of Medical Microbiology) and John McCullough (Coordinator of Pharmacology) will provide support for the material covered. The student(s) will also be heavily relied

upon to make the site user friendly and an efficient tool for learning course material. Ideally, if the links between to MedMicro and Pharm websites can be finished in time, the student would help identify useful links between the websites of different courses.

Required Skills: None required. Some computing background useful.

Interview: Required

Location: **IS Department**

13. Education

TITLE: Survey of Promising Practices in Medical Education for Working with Persons with Disabilities

**Linda Long-Bellil
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linda.long@umassmed.edu**

**Center for Health Policy and Research
222 Maple Avenue
Shrewsbury, MA 01545**

Project Description: People with disabilities need access to appropriate and compassionate medical care to assure that they are able to participate fully in society. Yet, there is little emphasis in the medical school curriculum on working with this population. The project's purpose would be to conduct a survey of all U.S. medical schools on the extent to which their curricula contain disability content. It would also seek to obtain information regarding methods used for educating medical students on this topic and to identify promising practices for such work. The student would be involved in the initial stages of the project and would assist in conducting a literature review and both designing and implementing the survey instrument. There is also potential for inclusion in publication.

Student's Role:

- 1) Assist in conducting a literature review
- 2) Assist in designing the survey instrument
- 3) Assist in implementing the survey instrument
- 4) Potential for inclusion in publication

Required Skills:

- 1) Basic research skills or the willingness to learn them
- 2) Basic writing skills
- 2) Familiarity with or interest in issues pertaining to people with disabilities

Interview Required

Location Center for Health Policy and Research

14. Genetics

TITLE: Exon Dosage in Gaucher Disease

Marzena Galdzicka Ph.D

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University of Massachusetts Medical School

Department of Pediatrics

55 Lake Avenue, North

Worcester, MA 01655

Project Description: In this project, we are going to study rearrangements, deletions and insertions of glucocerebrosidase gene exons of patients with Gaucher disease. Gaucher disease is a sphingolipidosis caused by a deficiency of lysosomal hydrolase, glucocerebrosidase, which results in accumulation of the substrates, glucocerebroside, in the reticuloendothelial system. Advances in studies on molecular genetics of Gaucher disease has revealed that clinical phenotypes are a result of mutations in the glucocerebrosidase gene. However, the considerable heterogeneities in the clinical presentations can not be always explained by patient's mutations. We will quantify each of 11 exons glucocerebrosidase gene in patients, with known mutations and for whom the mutations were not found.

We will use quantitative multiplex PCR method using a MassARRAY system (Sequenom.Inc) as the platform for measurements. The fragment of each exon will be amplified by PCR. Each reaction will include an internal standard from another gene. PCR will be followed by an extension reaction, and the mass of the extended products will be analyzed on the mass spectrophotometer. The ratios of the area under the peaks and the standard for every patient in a given reaction will be calculated and compared with the ratios measured for normal subjects. New data should facilitate better diagnosis of Gaucher disease at the molecular level. We hope that gene dosage might give additional information that would allow better correlation of phenotype with gene structure and mutations.

Student's Role: Student will learn a new method for measuring exon dosage and understand the genetics of Gaucher disease.

Student's Skills: Basic laboratory skills as pipetting, computer literate, possible some automation, PCR.

Interview: Required

Location: **Molecular Diagnostics Laboratory**

15. Genetics

TITLE: Development of A Novel Orally Administered Gene Therapy for Lysosomal Diseases

Edward Ginns, MD, PhD
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University of Massachusetts Medical School
Biotech 1, Suite 190
365 Plantation Street
Worcester, MA 01655

Project Description: A novel, orally administered gene therapy is being developed as a next generation therapeutic to restore normal cell and tissue functional enzymatic activity in f Gaucher disease, the most common lysosomal storage disorder. This approach uses yeast microspheres to deliver human glucocerebrosidase DNA to macrophages to produce normal enzyme in-vivo in Gaucher mice. In both normal and Gaucher mice this treatment results in high levels of normal human glucocerebrosidase within macrophages in many tissues including spleen, liver, lung and other tissues. The student will participate in all aspects of the project including acquiring relevant background information, design and performance of experiments and analysis and presentation of data. This "hands-on" experience includes the opportunity to learn recombinant DNA procedures such as DNA/RNA isolation, PCR analysis, DNA cloning, sequencing, enzyme assays, immunocytochemical studies and Western blot analysis.

Student's Role: Enzyme assays; pcr assays; immunohistochemical analyses; construct generation

Student's Skills: Laboratory experience in at least some of the relevant areas

Interview: Required

Location: **Biotech 1**

16. Genetics

TITLE: Bacterial Recombination Pathways

Anthony R. Poteete, PhD
(508) 856-3708

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University of Massachusetts Medical School
Molecular Genetics & Microbiology, Room S6-119
55 Lake Avenue North
Worcester, MA 01655

Project Description: My lab is engaged in a study of genetic recombination. The bacteriophage Lambda homologous recombination system, known as Red, normally promotes highly efficient double strand break repair/recombination transiently, in Lambda-infected *Escherichia coli*. The Red-induced "hyper-rec" state of *E. coli* can be made permanent if the Lambda recombination proteins are expressed in the cell in the absence of infecting phage. In addition to proceeding at high efficiency, Red-mediated recombination between a short linear DNA molecule and a circular homologue may represent a simpler recombination pathway than any of the previously characterized pathways for conjugational or transductional recombination. These properties of efficiency and (relative) simplicity recommend the hybrid phage-bacterial recombination system for research on general recombination mechanisms.

Our understanding of the molecular mechanism of the Red recombination pathway would benefit from comparison with the properties of the classical bacterial pathways. Such comparisons have been made complicated by the genetic diversity of bacterial strains in which these pathways have been studied. In this project, the student will work directly with the PI in constructing strains of *E. coli* which differ only in which recombination pathway is functional. Testing of the strains in a variety of recombination/DNA repair assays will follow.

Techniques to be employed include general bacteriology procedures, plasmid construction and testing, polymerase chain reaction, transduction, conjugation, transformation, and analysis of genetic crosses. Prior experience with any of these techniques would be helpful, but is not necessary.

Student's Role: In this project the student will work directly with the PI in constructing strains of *E. coli* which differ only in which recombination pathway is functional. Testing of the strains in a variety of recombination/ DNA repair assays will follow.

Required Skills: Techniques to be employed include general bacteriology procedures, plasmid construction and testing, polymerase chain

reaction, transduction, conjugation, transformation, and analysis of genetic crosses. Prior experience with any of these techniques would be helpful, but is not necessary.

Interview: Required

Location: S6-110

17. Genetics

TITLE: Characterization of the Human OXR Genes

Michael Volkert, PhD
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University of Massachusetts Medical School
Department of Molecular Genetics and Microbiology
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Project Description: Oxidative DNA damage and the mutations it causes have been implicated in a number of human diseases, including cancer and neurodegenerative diseases, and is a contributing factor to aging. Thus, a thorough understanding of genes involved in the prevention and repair of oxidative DNA damage and its mutagenic consequences is important to our understanding of the mechanisms mitigating these diseases and exacerbating normal degenerative processes associated with aging. We discovered the human OXR1 gene as a gene that functions to prevent oxidative DNA damage. This was demonstrated by several results: the human OXR1 gene can suppress the oxidative mutator phenotype of an *E. coli* strain engineered to respond to oxidative DNA damage, yeast mutants lacking their OXR1 homolog are sensitive to hydrogen peroxide and are spontaneous and peroxide induced hypermutator strains, and human OXR1 expression in the yeast mutant can restore resistance to oxidative DNA damaging agents. Further studies indicate that OXR1 of humans and yeast localizes to mitochondria, the site of reactive oxygen species production. OXR1 expression is induced by oxidative and heat stress. We are currently localizing the critical regions of the human OXR1 protein by deletion analysis. It will next be useful to determine by site directed mutagenesis, the active site residues of OXR1 required for oxidation resistance identified by the deletion analysis. This will be done by modifying highly conserved amino acids using oligonucleotides that will alter the specific amino acid coding sequences and testing the protein for antioxidant function. If time permits, the student will also modify similar regions of the human OXR2 gene and test them in a functional assay. This gene is a paralog of human OXR1. It is related to OXR1 both functionally and sequence homology, but differs from OXR1 in two respects: OXR2 localizes to the nucleus of cells, rather than the mitochondria and is not induced by stress.

Student's Role: The student will have primary responsibility for subcloning the human OXR1 mutants genes into appropriate expression vectors, testing them for antimutagenic activity.

Required Skills: We will train the student to carry out all aspects of this project

Interview: Required

Location:

The research will be conducted at UMass Medical School, primarily in rooms S6-110/117 in the Department of Molecular Genetics and Microbiology

18. Genetics

TITLE: Genetic Modification of Hamster Embryos

David R. Weaver, PhD
(508) 856-2495

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UMass Medical School
Department of Neurobiology
LRB-723

Project Description: Seasonal alterations in physiology occur in many mammalian species. Seasonal changes in body weight, seasonal molting, and seasonal cessation of reproduction are widespread phenomenon. These seasonal changes are driven by alterations in the secretory profile of melatonin, a hormone whose levels are elevated at night.

Recent advances in two areas will allow direct assessment of the role of melatonin receptor subtypes in seasonal reproduction. First, methods have been developed to introduce foreign genes into virtually any species (using a special carrier vector called a lentivirus) (Baltimore, Verma). Second, recent advances in RNA interference methods allow disruption of expression of specific genes, regardless of species. The proposed work will draw on these two rapidly evolving areas and will generate genetically modified hamsters with disruption of the Mel1a receptor. We predict these hamsters will be insensitive to melatonin, and thus will not show the "usual" changes in neuroendocrine and reproductive function when placed into winter-like short day lengths.

A lentiviral vector to disrupt expression of the Mel1a melatonin receptor has been generated. The objective of this summer project is to introduce this vector into hamsters, leading to lines of transgenic hamsters with reduced/absent melatonin receptor expression. After generating the desired transgenic lines (which will likely take longer than the summer), we will characterize the physiological responses to changes in daylength and assess the abundance of melatonin receptors using established procedures.

Student's Role: The student will be responsible for hormone priming and breeding hamsters, isolating pre-implantation blastocysts for in vitro manipulation, preparation of specialized culture media, culturing the blastocysts during introduction of transgenic material, and surgical re-implantation of the blastocysts into the uterus of recipient females. Follow-up care after surgery. The objective for the summer will be to work out the procedures for embryo culture and transfer, and generate founders of the transgenic lines.

Required Skills: Experience with animal husbandry and surgery of rodents is required. Familiarity with neuroendocrine function strongly recommended.

Interview: Required

Location: **LRB and School buildings, Worcester campus.**
My lab is located on LRB-7

19. Infectious Disease/Immunology

TITLE: Heterologous Immunity Between Mycobacteria and Poxviruses

Hardy Kornfeld, MD

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University of Massachusetts Medical School

Department of Medicine

Division of Pulmonary, Allergy, and Critical Care Medicine

Lazare Research Building, 303

55 Lake Ave North

Worcester, MA 01655

Project Description: Heterologous immunity refers the influence of immunity to infection with a particular microbe on the response to subsequent infection with an unrelated microbe. This has been most extensively studied in mice using sequential infection with different viruses. In recent collaborative studies with Dr. Raymond Welsh (Dept. of Pathology), we discovered that mice inoculated with the live attenuated tuberculosis vaccine strain *M. bovis* BCG receive a significant degree of protection from subsequent challenge with vaccinia virus (a live attenuated smallpox vaccine). This finding has important implications for basic science as well as translational medicine. We plan to investigate the immunological basis for this protective response that is likely due to cross-reactive immunogenic epitopes shared by BCG and vaccinia. We will identify the specific immunocytes conferring resistance (most likely CD8+ T cells). Finally, we will use information generated by these studies to develop a biodefense vaccine based on recombinant BCG engineered to express non-cross-reactive vaccinia epitopes.

Student's Role: Depending on progress over the winter, the student may be primarily involved in using bioinformatics techniques to identify potentially cross-reactive epitopes based on the genome sequences of *M. bovis* and vaccinia. Other roles may be subcloning vaccinia antigen expressing plasmids for transformation of BCG, and assisting with phenotypic and functional analysis of cells and tissues from BCG-immune mice challenged with vaccinia virus. This analysis relies heavily on flow cytometry.

Required Skills: Basic laboratory experience and computer skills are desirable

Interview: Required

Location: **LRB-303**

20. Infectious Disease/Immunology

TITLE: Immunostaining of Autopsy Lung Tissue From SARS Coronavirus Infected Patients

Daniel Libraty, MD
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UMass Medical School
Center for Infectious Disease and Vaccine Research
Room S6-751
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Worcester, MA 01655

Project Description: The SARS human coronavirus (SARS-HuCoV) is a newly identified human coronavirus that causes severe acute respiratory syndrome (SARS), is transmitted person-to-person, and spread in a world-wide epidemic last year. The clinical and virologic course of SARS suggests that lung pathology and respiratory compromise may be immune mediated and is generally not due to uncontrolled viral replication and cytotoxicity. Characterization of the local immune responses in the lung following infection with the SARS-HuCoV will elucidate the potential immunopathological mechanisms of disease. These findings will play an important role in the development of therapeutic interventions and vaccine development for SARS.

Our goal is to characterize local immune responses at the site of disease (lung) in autopsy tissue from 2 fatal cases of SARS. These activities will begin to identify the immunopathological mechanisms of disease. The techniques used included immunohistochemistry, immunofluorescent staining, and proteomic profiling of cells and tissue. Specific objectives are to characterize the location of SARS-HuCoV and immune effector cell subtypes in the lung, and to identify the cytokine/chemokine patterns at the site of disease (lung) following SARS-HuCoV infection.

Student's Role: The student will perform immunohistochemistry and immunofluorescent staining of formalin-fixed, paraffin-embedded lung tissue from 2 fatal cases of SARS. The student will continue ongoing work using 2-color and 3-color staining techniques to characterize cytokine and chemokine patterns in the lung tissue

Required Skills: Prior experience with microscopy, pipetting and making solutions helpful but not required.

Interview: Required

Location: **UMMS Lab- S6-746 and fluorescent microscopy core facility,
Biotech II**

21. Infectious Disease/Immunology

TITLE: Induction of Central Tolerance for Transplantation

Aldo Rossini, MD
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UMassMemorial Medical School
Diabetes Division
373 Plantation Street
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Worcester, MA 01605

Project Description: Our laboratory has developed a transplantation tolerance induction protocol that uses a donor specific transfusion (DST) and anti-CD154 antibody. This protocol leads to prolonged skin and permanent islet allograft survival in normal mice. To investigate the mechanisms underlying tolerance induction, we have developed a model in which we can trace antigen-specific CD8⁺ T cells and determine their fate after tolerance induction. We have found that alloreactive CD8⁺ T cells in normal mice are deleted after treatment with DST and anti-CD154 antibody and that this deletion is inversely associated with graft survival. Failure to delete these alloreactive CD8⁺ T cells leads to short graft survival, deletion leads to long graft survival. We have also documented that regulatory CD4 cells (Tregs) are required for graft survival. We have recently extended the DST and anti-CD154 mAb peripheral tolerance induction model to show that this protocol can also be used to generate hematopoietic chimerism in the absence of host myeloablative conditioning. This chimerism leads to the establishment of donor-specific central tolerance in mice. However, the mechanisms that control the generation of hematopoietic chimerism or the induction and maintenance of donor-specific central tolerance in this model system are unknown. The available project for the summer will be to use the established existing model systems for peripheral tolerance in the laboratory to investigate the role of CD8 cell deletion and Tregs in the generation of bone marrow chimerism and the induction and maintenance of donor-specific central tolerance. The ability to extend peripheral tolerance induction protocols for the generation of hematopoietic chimerism and the induction of central tolerance for transplantation tolerance would make this therapeutic approach a more robust system of tolerance.

Student's Role: To develop an expertise in generating bone marrow chimeras and to become familiar with immunological jargon.

Required Skills: Non required – will be trained

Interview: Not required but preferred

Location:

**Biotech 2
Rossini Lab
Suite 218**

22. Infectious Disease/Immunology

TITLE: Dendritic Cells in Chronic Hepatitis C Infection

**Gyongyi Szabo, MD, PhD
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**University of Massachusetts Medical School
Department of Medicine
LRB 215
55 Lake Ave N
Worcester, MA 01655**

Project Description: Hepatitis C virus (HCV) is able to escape elimination by the immune system and often establishes a chronic infection. Dendritic cells (DCs) play a key role in immune responses through antigen presentation and cytokine secretion. We had previously shown that myeloid dendritic cells of HCV-infected patients are functionally impaired and have a marked imbalance in cytokine production. Our more recent data indicate that patients have reduced frequency of plasmacytoid dendritic cells in circulation. Furthermore, PDCs of patients are apoptotic and produce low IFN α upon in vitro stimulation. Here we hypothesize that dendritic cells may be trapped at the site of antigenic stimulation, in the liver. The purpose of current study is to investigate the frequency of dendritic cells in the liver of controls and HCV-infected patients using immunohistochemistry (IHC). Liver biopsies from HCV-infected and non-HCV patients will be analyzed for the expression of dendritic cells markers: CD80, CD83, CD86, HLA-DR, CD123, BDCA-2. If DCs will be far more frequent in livers of HCV-infected patients compared to controls, we will stain the samples for apoptosis. The study will reveal potential HCV-driven accumulation of dendritic cells in the liver, will indicate the residence site of DCs and potential contact with different cells populations in the liver: hepatocytes, endothelial cells, lymphocytes. The study will contribute to further understanding of HCV infection pathobiology.

Student's Role: To perform and coordinate immunohistochemistry studies in stored biopsy samples and to perform real-time PCR analysis of selected genes in lymphocytes and monocytes isolated from controls and HCV infected patients.

Required Skills: Previous laboratory experience is a plus but not required

Interview: Required

Location: Szabo lab in LRB 2nd floor, University Campus

23. Infectious Disease/Immunology

TITLE: Homing of T Lymphocytes to Specific Regions of the CNS

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NYU School of Medicine
Skirball Institute for Biomolecular Medicine
550 First Avenue
New York, NY 10016

Project Description: Our laboratory recently reported the observation that originally identical MBP-specific T cells, when primed in different ways, can cause two clinically different forms of encephalomyelitis, referred to in this application as classical and non-classical EAE. The classical EAE is the ascending paralyzing disease studied by many laboratories, whereas the non-classical EAE is a rotary or spinning form that involves little or no tail limpness or hind leg paralysis. We have posted movies of classical <http://saturn.med.nyu.edu/-lafaille/classical.mov>, and non-classical disease <http://saturn.med.nyu.edu/-lafaille/nonclassical.mov>.

The rules that govern T cell migration into one part of the CNS or another remain unknown. We wish to take advantage of this unique experimental system to address this issue, which is very important for the pathogenesis of encephalomyelitis such as EAE or MS. Thus, we seek to understand the factors that predispose specific CNS regions to autoimmune attack, and protect other regions.

Student's experiments will be to determine MRNS expression profiles in T cells that adoptively transfer classical versus non-classical forms of EAE. Technically, it will involve microarray and real time PCR experiments. Once potential targets are identified, time permitting we will initiate functional experiments of gain or loss of function in order to re-direct lymphocyte migration onto different parts of the CNS. Student will also determine differential expression patterns in the endothelia of spinal cord and brainstem.

Student's Role: Carry out microarray analysis of isolated T lymphocytes capable of invading either the spinal cord or the brainstem and cerebellum.
Carry out microarray analysis of the vasculature of both regions.

Required Skills: Student will be trained by postdocs performing different analysis involving microarray technology. He does not need any skills that he does not currently possess.

Interview: Required

Location: **Skirball Institute for Biomolecular Medicine**

Program of Molecular Pathogenesis, 2nd Floor, Lab 7
550 First Avenue
New York, NY

24. Neurology/Psychiatry

TITLE: Clinical Genetics and Autism Spectrum Disorders in Children Under Six

Robin Adair, MD
(Co-PIs: Beverly Hay, MD and Catherine Nowak, MD)
AdairR@ummhc.org

UMMC
Division, Developmental-Behavioral Pediatrics
Benedict Building
Room A2-174
55 Lake Avenue, North
Worcester, MA 01655

Project Description: This project will entail reviewing charts of a patient population seen in the past two years in the Infant-Toddler and Preschool Clinics (children up to age six with question of, or known, developmental delays and disabilities). Referrals to Genetics Clinic for children given Autism Spectrum Disorders diagnoses, as well as other diagnoses, will be identified and the resulting Genetics evaluations, work-ups and diagnoses tracked. Analyses of the differences between subgroups of patients, particularly those diagnosed with Autism Spectrum Disorders and those who are not, will be conducted. Estimated number of charts initially: 300; estimated Genetics referrals: 100.

Student's Role: Review charts, collect data and enter it into a database, run analyses, review related literature, write up results. Supervision will be provided.

Required Skills: Able to work well independently, comfortable with detail-oriented work, facile with Microsoft programs, competent at researching literature, possesses good writing skills. Familiarity with Microsoft Excel or Access a plus, training available.

Interview: Required

Location: **Hahnemann Family Health Center**

25. Neurology/Psychiatry

TITLE: Hippocampal Neurogenesis and Accutane Induced Depression

Peter McCaffery, PhD

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UMMS/EK

Shriver Center

200 Trapelo Road

Waltham, MA, 02452

Project Description: Numerous clinical reports have associated the use of the acne drug Accutane (Isotretinoin, 13-*cis* retinoic acid, RA) with depression. However, the precise effects of RA are unknown because few studies have investigated its effects on the adult brain. RA enters the central nervous system and is a potent transcriptional activator and thus it is highly likely that RA will influence brain function. One of the few areas of the adult brain in which RA function has been investigated is the hippocampus where RA is required for learning and memory. These processes probably require new neuronal birth in the hippocampus and RA may be linked via its influence as a powerful inducer of neural stem cell differentiation. One hypothesis for the underlying cause of human depression is a decline in the birth of new neurons in the hippocampus. Chronic exposure to RA would be expected to cause exactly that by persistently inducing neuronal differentiation and eventually depleting the neural stem cells that generate neurons. The goal will be to test this hypothesis by investigating the influence of RA on cell division in the hippocampus as measured by 5-bromo deoxy-uridine (BrdU) incorporation into cells. The short-term effects (1 day) of RA on hippocampal BrdU labeling will be first determined. This will confirm whether RA induces differentiation and hence suppresses proliferation of hippocampal cells and will also identify the optimal concentration and duration of RA treatment that influences BrdU labeling. The long-term effects of RA on hippocampal cell differentiation will also be investigated. By treating animals with RA over 7-21 days and pulse labeling dividing cells with BrdU we will determine the effects of RA on the number of neurons and glial cells born from hippocampal progenitors by double labeling with appropriate cell specific markers.

Student's Role: The student will assist in the animal preparation and immunohistochemical experiments required for labeling of BrdU and neuronal and glial markers. This will involve injecting mice with RA, sectioning of perfused brain, immunolabeling and analysis using immunofluorescent and confocal microscopy.

Required Skills: Familiarity with general laboratory technique

Interview: Required

Location: UMMS/E. K. Shriver Center

26. Neurology/Psychiatry

TITLE: The Impact of Contralateral Acoustic Stimulation on Electric Hearing

Sarah F. Poissant, PhD (PI)

Daniel J. Lee, MD (CO-PI)

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UMMHC

Department of Otolaryngology

55 Lake Avenue North

Worcester, MA 01655

Project Description: The objective of this study is to determine the benefits of contralateral acoustic hearing provided through a hearing aid in addition to electric hearing provided by a cochlear implant. Potential benefits will be examined in the following domains: speech understanding, localization, talker/gender recognition, melody recognition, and subjective impressions (i.e., questionnaire data). Results obtained from subjects using both acoustic and electric hearing (i.e., a hearing aid in one ear and a cochlear implant in the other ear) will be compared to results obtained from a small group of subjects who utilize a cochlear implant in both ears. The purpose of including the group of bilateral cochlear implant recipients is to determine if the use of two cochlear implants provides similar benefits to the use of a hearing aid and a cochlear implant or, as predicted, there are additional benefits to having access to some of the acoustic components of speech and music. This study is a non-significant risk study in which the results may lead to improvements in the above domains through recommendations for the use of a hearing aid on the ear contralateral to a cochlear implant in cochlear implant recipients who may not currently utilize both devices simultaneously.

Student's Role: The medical student assigned to this project will be responsible for assisting the investigators in a review of the literature, subject enrollment, data collection, data analysis, and paper preparation.

Required Skills: As this research involves human subjects with significant hearing loss, students must be patient communicators.

Interview: Required, phone interview acceptable.

Location: **UMass Memorial Rehab Group**
15 Belmont Street
Worcester, MA

27. Neurology/Psychiatry

TITLE: Analysis of amnesiac in Drosophila Reward Learning

Scott Waddell, PhD

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University of Massachusetts Medical School

Department of Neurobiology

Lazare Research Building

Room 725

55 Lake Avenue, North

Worcester, MA 01655

Project Description: We study the molecular and cellular basis of learning and memory. We use the fruit fly *Drosophila* as our model system because it has a simple brain and is easy to genetically manipulate. Flies can be taught to associate an odor with electric shock punishment. When later given a choice between that odor and another, they run away from the previously shock-paired odor. Memory can persist for days.

A number of single gene mutations have been identified that make flies learn poorly or forget quickly. One of these memory mutants is *amnesiac* (*amn*) which encodes a homolog of the mammalian neuropeptide Pituitary Adenylate Cyclase Activating Peptide (PACAP). Our recent data tells us that the *amn* gene product is involved in memory consolidation.

Flies can also be taught with sugar reward rather than shock punishment. The summer student will analyze the behavior of *amn* mutant flies in sugar reward learning to test if the molecular mechanisms of consolidation in the fly are the same for negative and positive-reinforced learning.

The student will run all the experiments and will have the opportunity to learn basic *Drosophila* genetics, olfactory learning assays and statistical analysis software.

Student's Role: Running the project, from fly preparation to assay to data collection and analysis.

Required Skills: Enthusiasm and intellect

Interview: Required

Location: University of Massachusetts Medical School
Lazare Research Building
Room 770 J-K

28. Neurology/Psychiatry

TITLE: A Look at the Near Side of the Synapse. Calling all Potential Scientists

John Walsh, MD

(508) 856-3360

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University of Massachusetts Medical School

Room S4-117

Department of Physiology and Neuroscience Program

55 Lake Ave N

Worcester, MA 01655

Project Description: There is no area of science today (except perhaps cosmology) which is attracting more interest than the basic machinery of the brain. This really boils down to two areas – neurogenesis and synaptic function. The latter is divided into presynaptic and postsynaptic function, and we are interested in the former. The key to the study of much of presynaptic function is the use of microscopy to see single exocytotic events and Ca²⁺ movements in the neuron terminal. We have been doing this for the past several years, and we have two advantages in this area. First, we have the world's fastest, lowest noise and highest sensitivity imaging system for single-cell imaging. Second, we have an outstanding group of optical engineers, computer scientists and savvy biologists. So we have the instruments and we know how to use them. (We are not afraid to use them either.) This constitutes a great advantage and bestows upon us a great responsibility to use our resources in the best way to advance the understanding of synaptic function.

Here is the proposal. We will sponsor one or more medical students for several months of work in the laboratory this summer. You will learn a lot and hopefully make a contribution to one of the projects, perhaps even a totally new one. It will be fun both because of the work itself and because the people you will work with are capable and inspiring.

What is the catch? There are two requirements. The first is motivation to work in this area of neuroscience and to understand it. The second is an open mind to staying on in the laboratory for an extra year of work – a year off to do research between your first and second year of medical school. (We do not require that you do this, simply that you are open to it.) If you like the work, then we can even arrange for you to stay longer and do a PhD thesis which will make you part the MD-PhD program. (The sole requirement to turn an MD into an MD-PhD is essentially doing a thesis.) It may change your life.

That's the deal. Come look us up.

Interview: Required. Make an appointment (by email) to come talk with me and the fellows in the lab to see whether you are interested.

Location:

**Biotech 2
Biomedical Imaging Group**

29. Orthopedics

TITLE: Joint and Spine Center Registries

David Ayers, MD Chair – Orthopedics

Patrick Connolly, MD – Spine

Contact: Janel Milner (508) 334-2251

milnerJ@ummc.org

UMass Medical Center

Department of Orthopedics

55 Lake Avenue, North

Worcester, MA 01655

Project Description: (1-2 students) - Arthritis and Total Joint Center / Spine Center Clinics: patient registries will be set up in order to collect SF36 data and other important patient data pre & post surgical procedure. The main goal is to set up the infrastructure from which future data will be collected and then begin the collection process. These data will later be analyzed to measure pain and function of patients post surgery and on through the course of physical therapy. There may be other related projects associated with both patient registries as assigned by the chair or PI. (Memorial Campus).

Students' Role: Students will assist the PI's in many phases of these projects.

These duties would include:

- Assisting in the infrastructure implementation (computer set up and data collection techniques)
- Assisting patients with data collection tools
- Processing data collected

Required Skills:

- Organizational & project management skills
- Excellent written and verbal communication skills
- General understanding of computers and their applications in a clinical setting
- Ability to assist patients/staff in understanding research goals and objectives

Interview: Required

Location: Memorial Campus

30. Orthopedics

TITLE: Using Tailored E-mails to Motivate Healthy Behavior; Improving Health Status and Reducing Health Care Costs in Employee Population. (2 students)

David Ayers, MD Chair – Orthopedics
Patrick Connolly, MD – Spine
Contact: Janel Milner (508) 334-2251
milnerJ@ummc.org

UMass Medical Center
Department of Orthopedics
55 Lake Avenue, North
Worcester, MA 01655

Project Description: This initiative is in its second year and is beginning to analyze data. The research is designed to determine whether e-mails designed to educate and inform worksite employees how to practice healthier life styles actually change or affect behavior. The status of employee progress is measured through web-survey technology. Exercise Adherence - (1 student). In June this project will be at the data stage. Patients have been wearing step monitors to collect exact measurements of exercise post total knee replacement. (University Campus).

Students' Role: Students will assist the PI's in many phases of these projects. These duties would include:

- Assist the PI in coordinating and summarizing findings
- Assisting patients with data collection tools
- Processing data collected

Required Skills:

- Organizational & project management skills
- Excellent written and verbal communication skills
- General understanding of computers and their applications in a clinical setting
- Ability to assist patients/staff in understanding research goals and objectives

Interview: Required

Location: Memorial Campus

31. Orthopedics

TITLE: Physical Function Following TKR (total knee replacement)

David Ayers, MD Chair – Orthopedics
Patricia Franklin, MD
Contact: Janel Milner (508) 334-2251
milnerJ@umhc.org

UMass Medical Center
Department of Orthopedics
55 Lake Avenue, North
Worcester, MA 01655

Project Description: (1 student) the research involves the use of a Step Activity Monitor that will give an objective assessment of each patient's activity level both before and after surgery. This is used in conjunction with a self-report physical therapy logbook to gauge each patient's progress through the rehabilitation process and hopeful return/improvement in their overall activity level. The process involves weekly phone calls, entering data from questionnaires and logbooks, and mailing of the Monitor via Fed-Ex. Occasional home visits are not uncommon to assist patients with use of the device.

It is hoped that this information will allow us to understand what is preventing this select group of patients from achieving the full physical benefit of TKR, and to then use the information to develop an intervention that will enable them to overcome this setback.

Students' Role: Students will assist the PI's in many phases of these projects. These duties would include:

- Assist in the infrastructure implementation
- Assisting patients with data collection tools
- Processing data collected

Required Skills:

- Organizational & project management skills
- Excellent written and verbal communication skills
- General understanding of computers and their applications in a clinical setting
- Ability to assist patients/staff in understanding research goals and objectives

Interview: Required

Location: **University Campus**

32. Orthopedics

**TITLE: Mechanical Regulation of Articular Cartilage
Extracellular Matrix Turnover**

Paul Fanning, PhD
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UMass Medical School
Department of Orthopedics and Cell Biology
Room S4-806
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Worcester, MA 01655

Project Description: “Osteoarthritis is one of the most high-impact disorders of all time. Thirty million Americans have osteoarthritis and this number is expected to almost double over the next 30 years as the population of baby boomers approaches old age. Current treatments range from over-the-counter dietary supplements to total joint replacement surgery. However, no treatment yet exists that will effectively prevent or halt the progression of osteoarthritis. The major effectors of osteoarthritis are a class of degradative enzymes termed ‘matrix metalloproteinases’ (MMPs). The expression of these enzymes is controlled by several specific intracellular signaling pathways. We have recently found the activation of these signaling pathways in cartilage tissue subjected to abnormal loading conditions. Since osteoarthritis is defined as a disease of abnormal wear and loading, we anticipate that this finding represents a first step towards understanding the relationship between loading and the tissue destruction of osteoarthritis. It also represents the first time in basic cartilage biology research that a mechanical signal has been found to be turned into a specific biochemical signal. We wish to extend this line of pursuit to the analysis of the genes (MMPs) expressed specifically by these stress-activated pathways and inhibit their appearance through the use of pathway-selective inhibitors. Treatments that interfere with the expression of MMPs are likely to slow the progression or even prevent osteoarthritis, thereby reducing the impact and incidence of this disorder.”

Student’s Role: Student would take active participation in basic science research on above project. 40 hrs week would be required. It is my hope that the student takes a hands-on approach right from the start to make the best of his/her 4 weeks. I will be present and available for the entire 8-week period.

Required Skills: Knowledge of protein sample preparation, protein quant. assays, SDS-PAGE, immunoblot. Note: these skills can be acquired fairly rapidly in my lab.

Interview: Required

Location: **Dept. of Orthopedics**
University Campus UMMS

33. Orthopedics

TITLE: Orthopedics Clinical Outcomes & E-Health Research

Patricia Franklin, MD
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University of Massachusetts Medical School
Department of Orthopedics
Room S4-820
55 Lake Avenue, North
Worcester, MA 01655

Project Description: The student would be involved with a variety of assisting functions for the Department of Orthopedics on many grant initiatives.

Student's Role: Possible job responsibilities include: clinic involvement, patient data monitoring/gathering, assistance with IRB submissions, database management, also possible cataloging patient research slides to DVD.

Required Skills: None

Interview: Required

Location: **University and Memorial Campuses**

34. Orthopedics

TITLE: Bone Mineral Density in Adolescent Girls with Hypothalamic Amenorrhea: A Pilot Study

Leslie Soyka, MD
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Leslie Soyka, MD
UMass Memorial Medical Center
Department of Pediatrics Rom S5-840A
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Project Description: The purpose of this study is to perform a pilot study of female adolescent athletes with hypothalamic amenorrhea (HA) compared with eumenorrheic athletes in order to determine whether bone density, as assessed by ultrasound densitometry, differs between these groups based on their estrogen status. A secondary aim of the study is to determine whether bone metabolism, as assessed by surrogate markers of bone resorption, is abnormal in subjects with HA. We hypothesize that adolescents with HA have reduced bone mineral density and abnormal bone metabolism compared with eumenorrheic athletes.

HA is a common disorder in adolescent girls, particularly athletes who participate in strenuous sports activities. Up to two-thirds of female athletes may be affected by amenorrhea, depending on the type, intensity and duration of exercise, and the athlete's nutritional status. Although osteopenia is a known consequence of amenorrhea, most of our knowledge comes from adult women and therefore little is known about the effects of amenorrhea on bone mineral acquisition during adolescence. This investigation is a first step in examining bone density and bone metabolism in normal and estrogen deficient adolescents, and in planning a larger prospective study in this population.

A total of 50 adolescent female subjects with HA and 50 controls will be enrolled in the study.

Subjects undergo the procedures and tests listed below during a single study visit:

1. A medical history, including menstrual history.
2. Height and weight. Body mass index will be calculated and percentile determined.
3. Skin fold measurements (tricep, subscapular and calf).
4. Habitual exercise and activity will be assessed by a standardized exercise questionnaire
5. 2 hour urine (8 a.m-10 a.m.) for measurement of N- telopeptide, deoxypyridinoline and creatinine.
6. Calcaneum bone density by ultrasound densitometry (Hologic Sahara).

Student's Role: Assist in subject recruitment, study visits, data collection and entry

Required Skills: Good interpersonal skills, ability to work as member of research team, good organizational skills, attention to detail, data entry.

Interview: Required

Location: UMass. Some evaluations may be done in the local community

35. Obstetrics

TITLE: Safety of Opioid and Non-opioid (NSAIDS) Prescription Analgesics in Pregnancy

Janet Hardy, PhD
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janet.hardy@umassmed.edu

University of Massachusetts Medical School
Division of Preventive and Behavioral Medicine
Room S7-734
55 Lake Avenue North
Worcester, MA 01655

Description: This project involves the study of prescription medication safety in pregnancy in relation to risk of major malformations in babies. Little has been published on the topic of analgesic safety, specifically those analgesics containing opioids, and so this represents an opportunity to address a clinically relevant research question and make a meaningful contribution to the literature. Research involves the use of a large database of computerized primary care medical records (5% of UK population). This data has been used for previous perinatal epidemiological research and a clean dataset exists for a cohort of 82,000 mother-baby pairs. The student interested in obstetrics will have the opportunity to learn about medication use in pregnancy, the underlying indications for which medications are prescribed, and the risk-benefit decisions clinicians are faced with in everyday practice. The student will also learn about fetal development and major malformations resulting from impaired development. Lastly, the student will have the opportunity to learn the basics of study design and analyses, and participate as a co-author in the preparation of a manuscript suitable for publication.

Student's Role: Student will be responsible for: 1) summarizing the relevant literature; 2) researching the medications of interest and, using the British National Formulary Online, prepare a list of specific medications to be studied; 3) researching the primary indications for these medications; 4) working on a framework for classification of major malformations; and 5) using the British diagnostic and procedural codebooks, identifying and justifying inclusion of relevant diagnoses and corrective procedures that relate to each of the major malformation classes.

Required skills: Use of Microsoft Access and Excel software, and diligence with detail.

Interview: Required

Location: **Division of Preventive and Behavioral Medicine**

S7-734 or lab.

36. Public Health/Family Practice

TITLE: Evaluation of Open Access Model and Patient Satisfaction at Hahnemann Family Health Center

**Ron Adler, MD, Medical Director/Assistant Professor
Jeanne McBride, RN, BSN, MM, Quality Project Director
(508) 334-8830**

**Family Medicine and Community Health
Hahnemann Family Health Center
279 Lincoln Street
Worcester, MA 01605**

Project Description and Student's Role: Hahnemann Family Health Center is looking for a medical student to take the lead in evaluating the implementation of the Open Access model of delivering patient care. The aim is to collect information and data to identify opportunities and interventions which lead to significant improvements patient care, outcomes, and staff work life. The student, under supervision of the Medical Director will conduct patient interviews, staff interviews, and analyze open access data collected over the past 12 months including patient visit cycle time, patient satisfaction survey data, 3rd next available appointment, 30 day capacity, daily capacity and demand, and patient flow data. The focus of the evaluation will include identification of ranked patient and staff satisfaction goals and ranked patient flow processes leading to improved outcomes. Based on analysis of this information in conjunction with the Hahnemann Leadership team (Medical Director, Nurse Manager and Office Manager) the student will make recommendations to the leadership team. The student will then develop a strategic plan to meet patient satisfaction, improved staff work life and improved patient outcome goals. As time allows the student will assist the practice in implementing recommendations such as group visits, triage and treatment protocols and a planned care/chronic illness registry.

Required skills: Strong interest in improving patient care outcomes, an ability to work independently, good analytical skills, excellent communication skills, and Excel spreadsheet competency.

Interview: Required

Location: Hahnemann Family Health Center

37. Public Health/Family Practice

TITLE: Improving Adolescents' Comprehension of Research Consent Forms

Diane Blake, MD
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Diane.blake@umassmed.edu

University of Massachusetts Medical School
Pediatrics, Adolescent Medicine Division
Benedict Building A3-109
55 Lake Avenue North
Worcester, MA 01655

Project Description: There is a body of literature documenting that most adults know very little about the research studies that they consent to. It is likely that adolescents comprehend and remember even less. This project will provide preliminary data documenting the problem, and will begin to explore ways in which this problem might be remedied. The student researcher, under the guidance of Dr. Blake, will administer a brief survey to adolescents that tests what they understand and remember from a consent form that they will be given to read. In the latter of half of the project, the student researcher will interview adolescents in order to learn what changes need to be made to the consent process in order to make it more effective. The interview guide will be developed in consultation with Dr. Blake.

Student's Role: Direct contact with adolescents 1) testing their comprehension of what they read in a consent form and 2) interviewing them (using an already developed interview guide) to discover what needs to be done to make the consent process more effective (i.e. the teen knows exactly what s/he has consented to and understands the basic risks and benefits).

Required skills: Comfort talking with adolescents

Interview: Not required but preferred

Location: **Benedict Building,**
Floor 2
Adolescent Clinic

38. Public Health/Family Practice

TITLE: FaCES: Foster Care Clinic Evaluation

Debra Chaison, Acting Director
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Center for Adoption Research
196 Maple Avenue
Shrewsbury, MA 01545

Project Description: In the fall of 2003 FaCES Clinic (Foster Children Evaluation Services) opened at UMass Memorial Health Care. This clinic was a collaborative effort of many interested individuals in agencies and organizations in the city of Worcester, Massachusetts: pediatricians at University of Massachusetts Medical School, Massachusetts Departments of Social Services (DSS) and Medical Assistance (DMA), juvenile court judges, and the United Way.

The initial impetus to develop this project came from alarming statistics provided by DSS: that only 11% of foster children statewide were getting the mandated 7 day health screens or the 30 day comprehensive medical evaluation. Other issues of concern were: medical records of foster children were not available to providers caring for them; access to dental care and mental health treatment was very limited; and opportunities for referrals to services such as Early Intervention were being missed. While there was wide acknowledgment locally (and evidence in the pediatric literature) that these children were among the most vulnerable in the state – and had more chronic illness and mental health issues than other poor children – they were getting infrequent and delayed medical attention.

The goal of the first phase of this project is to provide medical assessments for all children from birth to five years of age who have been placed in foster homes under the auspices of Worcester DSS. The vision of the planning group is to expand to older children and adolescents in Worcester, then throughout central Massachusetts, and finally the entire state.

The purpose of this evaluation is to begin to examine if the program has been successful in meeting its objectives. Are more children in the clinic area receiving mandated screenings than comparable groups? Are the children that visit the clinic more likely to have a medical record available for their ongoing treating physicians? In addition this evaluation will begin to examine if children who have received access to medical screenings at the FaCES clinic are more likely to access ongoing medical services than those that do not have mandated screenings or those that receive screening at other locations. The last component of the evaluation will examine the costs and benefits of providing services to children at the FaCES clinic.

Student's Role: By June, the data collection will be complete for the first phase. The student's role will include data evaluation design, analysis, literature review and writing, assisting in chairing Evaluation Team meetings and other roles associated with the evaluation and with the process of continued funding discussions.

Required Skills: Understanding of statistics useful, but not required

Interview: Required

Location: **Shrewsbury Campus**
Rose Gordon Building

39. Public Health/Family Practice

TITLE: Summer Internship in Patient Education

Frank J. Domino, MD
(508) 856 4814

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Family Medicine and Community Health
A3-228 Benedict Building
55 Lake Ave N
Worcester, MA 01655

Project Description: The American Academy of Family Practice's Patient Education website, www.familydoctor.org, is a store of the academy's informational tools. The website is looking for volunteer students to read and update the content of these patient education tools.

Student's Role: The student would be responsible for identifying the most compelling web pages in need of being updated. They would then need to read a current, evidence based overview of this medical problem. Next, they would update and rewrite, when necessary, the content. Lastly, they would review the final product for literacy appropriateness. Supervision would occur with weekly communications with Dr. Frank Domino.

Required Skills: Skills needed would be the ability to use of a computer and Microsoft Word, and good academic standing within the school.

Interview: Required

Location: Location would be of the student's choice (not necessarily on the school campus).

40. Public Health/Family Practice

TITLE: Family Physician Care of HIV/AIDS – A Ten Year Follow-up Study

**Philip Fournier, MD
(508) 856-2028**

frank.domino@umassmed.edu

**Family Medicine and Community Health
Benedict Building
55 Lake Ave, North
Worcester, MA 01655**

Project Description: In 1994 the members of the Mass Academy of Family Physicians were surveyed to determine their knowledge, attitudes and referral practices related to the care of HIV/AIDS patients. At that time the majority of FP's were caring for these patients either alone or with a consultant. Differences were found between practice location (ie rural vs urban) and teaching vs nonteaching settings. (JFP Vol 44. 1 Jan 1997). Due to the increasing complexity of HIV care a ten year follow-up study is being done observe for changes in care patterns. This offers us the opportunity to understand how care primary care evolves over time for a relatively new illness.

Student's Role: Participate fully in the project by undertaking the follow- up of the first mailing, arranging for the second mailing (along with telephone reminders to complete the survey). Data entry, collating results, undertaking the initial data clean-up and the descriptive analysis of the data – ie basic frequencies and demographics. Completing a literature search review and drafting the initial manuscript of the study and it's results.

Required Skills: Basic database management (ie excel or access) skills.

Interview: Required

Location: **Benedict building for meetings, student can work from the library or at home.**

41. Public Health/Family Practice

TITLE: ASQ and Ye Shall Find: Validation of the Advocacy Screening Questionnaire(ASQ) in the Primary Care Setting

David Keller, MD
(508) 943-5224
kellerd@ummhc.org

David Keller, MD
South County Pediatrics
Department of Pediatrics
344 Thompson Road
Webster, MA 01570

Project Description: Family Advocates of Central Massachusetts is a collaborative effort of UMass Medical School and its affiliated primary care practices and the Legal Assistance Corporation of Central Massachusetts (LACCM) to identify children and families whose health could be improved through specific interventions involving focused legal advocacy. The program relies on physician identification of children and families in need of services, and physicians are often too busy to adequately assess the legal needs of patients. We have developed and piloted a 10 item questionnaire to screen families for legal issues that could be addressed by the program. We now plan to compare the responses of parents and physicians to the same questionnaire, as applied to children presenting in their practice. 100 patients in 5 practices currently involved in the project will complete the 10-item survey at the time of a visit to their physician's office for a well child visit. Prior to seeing the patient, the physician will complete the same survey. The results will be compared and the likelihood of referral to the program noted.

Student's Role: The student should be involved in the planning of this study and preparation of the IRB application. He will be involved in data collection, data analysis and preparation of the manuscript for publication.

Required skills: Interviewing, proposal writing, data entry and analysis.

Interview: Required

Location: **UMass, practices in Fitchburg, Milford, Webster and Worcester, and the Legal Assistance Corporation of Central Massachusetts**

42. Public Health/Family Practice

TITLE: Step Ahead-Active Living and Healthy Diet at the Workplace

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Division of Preventive and Behavioral Medicine
University of Massachusetts Medical School
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Worcester, MA 01655

Project Description: This project, “*Step Ahead*” will test the effectiveness of a hospital worksite intervention to reduce overweight and obesity among employees. Developed within an ecological framework, the project promotes physical activity and healthy diet. Interventions targeting change in physical activity and diet to date have largely been ineffective in sustaining change over time because they have emphasized individual change without modifying the larger environmental context. This randomized trial aims to promote weight loss among those who are overweight and obese, and prevent weight gain among those of normal weight through an environmental intervention targeted at all employees. *Step Ahead* consists of a comprehensive set of strategies which simultaneously target changes in the worksite physical, social and policy environments at the organization and work unit levels. In addition, educational and skill development components will be offered that enable and promote active living and healthy diet not only at work, but also in other domains of employees’ lives. Components of the intervention include leadership and policy development, a multi-strategy social marketing campaign, informal and structured activities, tours and training seminars, and physical environment improvements to promote physical activity and increased offerings of healthy foods. The trial will be conducted at 6 hospitals in Central Massachusetts that are affiliated with the UMass Memorial Health Care System. The sites are matched on size, and within each matched pair, randomly assigned to either the intervention or control condition. The *primary* research questions of this trial address the intervention’s impact on employee overweight/obesity as measured by two markers of body composition: body mass index (BMI), and waist-to-hip ratio. *Step Ahead* is in its first year of funding, which is a developmental year. The intervention will begin in Fall 2005, and continue through Fall 2008.

Student’s Role: Assist with intervention development and measurement development, perform literature reviews, assist with data collection.

Required Skills: Proficiency conducting literature reviews; strong interest in public health and population-based research

Interview: Required

Location: UMMHC

43. Public Health/Family Practice

TITLE: Evaluation of Patient Flow and Diabetic Planned Care Model at Barre Family Health Center

Alexandra Schultes, Barre QI Director/Assistant Professor
Jeanne McBride, RN, BSN, MM, Quality Project Director
(978) 355-6321
SchulteA@ummhc.org

Barre Family Health Center
Worcester Road
Barre, MA 01005

Description/Student Role: Barre Family Health Center is looking for a medical student to take the lead in the development of a registry to support a planned care intervention model for chronic disease. The aim is to collect information and data to identify opportunities and interventions which lead to significant improvements patient care, outcomes, and staff work life. The student, under supervision of the Barre Quality Director and Family Medicine Quality Project Manager will assist in the design and implementation of a database registry for diabetic care including a tracking system for HgA1c testing, eye exams, patient education and biannual MD follow up visits. Additional measures for other chronic illnesses may be included as determined by the Barre Quality Leadership Team. The student will provide weekly outcome data for identified measures. The Barre Quality Leadership team (Quality Director, Nurse Manager and Office Manager) and the student will establish quality goals for each measure and report to the Barre leadership team on these outcome measures and trends. The student will work with the Barre Quality Leadership team to establish a system for maintaining the database beyond the summer start up phase.

Required Skills: Strong interest in improving patient care outcomes, an ability to work independently, good analytical skills, excellent communication skills, and Excel spreadsheet and/or Access competency.

Interview: Required

Location: Barre Family Health Center

44. Public Health/Family Practice

TITLE: Correlates of Breastfeeding Initiation and Duration at a Community Health Center

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(508) 860-7762
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Family Health Center of Worcester
Department of Family Medicine and Community Health
26 Queen Street
Worcester, MA

Project Description: This project seeks to learn about breastfeeding in a multi-cultural, low-income population served by family physicians who provide maternity care in a community health center in Worcester. The student will work with the family medicine faculty, the medical records staff at the health center, and the perinatal services program at the health center.

The project will involve a prospective look from the late prenatal period through delivery and the immediate postpartum period and on to the first 2 months of well child care. The project will assess: health center data on breastfeeding rates, intent to breastfeed as addressed in the prenatal record, initial hospital desire to breastfeed, first breastfeeding attempt, nursing data in the hospital about breastfeeding, and discharge breastfeeding status. The project will also assess data from the first early postpartum visit at 5-7 days, and the 1 and 2 month well child visits. The project will include obtaining such demographic data as age, race/ethnicity, language, parity, marital status, father or grandparent involvement, type of delivery, etc. for 50 deliveries over a 2-3 month period this summer.

Student's Role: The student will perform a literature review to fine-tune the pertinent data collection and work with the family medicine faculty to develop an appropriate data collection spreadsheet. The student will collect the prenatal/hospital/postpartum data and assist in the analysis of the data to determine pertinent correlates of breastfeeding.

Required Skills: Some familiarity with reading medical charts, interpreting standard medical abbreviations and using basic database software (Microsoft Excel and Access) will be helpful.

Interview: Required

Location:

The data collection and meetings with the faculty will take place at the Family Health Center and the Memorial Campus of UMass.

45. Public Health/Family Practice

**TITLE: A Study of Recruitment and Retention of Rural Physicians in
Massachusetts**

Joseph Stenger, MD
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Barre Family Health Center
Family Medicine and Community Health
151 Worcester Road
Barre, MA 01005

Project Description: Rural communities everywhere struggle to find and keep physicians. This is true in the small towns and rural areas of Massachusetts.

This research project will be the continuation of a survey of rural Massachusetts physicians to determine how they feel about their work, how satisfied or overworked they are, how likely they are to stay in the community they are now serving, what additional staffing needs they have, and what could be done to encourage them to stay in rural medicine. The student will work closely with Dr. Joe Stenger and Dr. Suzanne Cashman who have a long-standing interest in rural health care delivery issues, and with the state Office of Rural Health.

The student should have an interest in rural health concerns and experience with computers and report writing. Work can be at the Barre Family Health Center or another location of the student's preference, though regular meetings with Dr. Stenger in Barre and/or with Dr. Cashman at UMass will be essential.

This project is a continuation and expansion of work done since 2001 with an initial in-person survey conducted with a small group of rural doctors. Using a database of the state's rural towns and physicians, we have mailed a written survey to all primary care doctors in Massachusetts who practice in rural and small towns.

The student working on this summer project will assist with analysis of results of the written survey and extract key questions. Followup face-to-face semi-structured interviews based on current research will then be conducted with a dozen selected rural docs around the state. The student will collate the collected data and participate in writing up results. The student will have the opportunity to present results at a regional or national rural meeting and/or submit them for publication.

Target areas

Towns of under 7000 in Massachusetts, mostly located in Berkshire County, the north-central area (Orange to Fitchburg), southeast Mass., and the Cape and Islands.

Student's Role: Review the work done to date including database of towns and doctors, literature on rural recruitment and retention, reports of prior research data. Update bibliography. Develop interview

interviews. questions, contact doctors to get permission, conduct
Collate results (data entry and analysis), collaborate in writing up
results. Prepare manuscript for journal publication.

Interview: Required

Location: Barre Family Health Center

46. Surgery

TITLE: Deep Circumflex Iliac Artery Perforator Skin Flap

Mustafa Akyurek, MD
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akyurekM@ummhc.org

UMMC
Department of Plastic Surgery
55 Lake Avenue, North
Worcester, MA 01655

Project Description: Purpose: to describe anatomical basis for a perforator skin flap based on deep circumflex iliac artery.

Background: DCIA liberates a number of Musculocutaneous perforators through the abdominal wall muscles to the groin region above the iliac crest. We are very familiar with the local anatomy since we used iliac crest flap for mandibular reconstruction in many cases. Generally, one of those perforators is sizeable to support a skin island on its own. We have successfully performed a clinical case of DCIA perforator skin flap transfer to a leg defect. Such a perforator flap has not been described previously.

Methodology: Using fresh cadavers, a good anatomic study can be conducted to better delineate the vascular anatomy of the DCIA, particularly the musculocutaneous perforators, in terms of course of vessels, length and diameter. A dye injection study will demonstrate the cutaneous staining pattern as achieved by injection through a single dominant perforator, using latex and India ink.

Advantages: This flap offers the unique advantage of an aesthetically favored donor site and a long vascular pedicle. In this respect, this flap may be a better alternative than the other previously published perforator flaps and the groin flap.

Student's Role: Help with anatomic dissections, injection studies, photographic documentation, writing the abstract/paper, be actively involved with interpretation of data.

Required Skills: Familiarity with basic vascular and muscular anatomy of the iliac region, specifically the deep circumflex iliac artery system and its muscular and cutaneous branches, preparation of fresh and embalmed tissues for dissection and injection studies, basic skills for writing manuscripts

Interview: Required

Location: UMass University Campus

