The NJMS-UH Cancer Center Receives NCI Training Grant

The National Cancer Institute awarded the New Jersey Medical School-University Hospital Cancer Center nearly $1 million for an interdisciplinary training grant that will focus on translational research. Efforts in recent years to bridge the research laboratory and the clinic have focused on increasing the exposure of clinicians to the research setting. Thus, the interdisciplinary pre- and post-doctoral training program that is funded by this new grant brings together 15 research faculty and 5 clinical preceptors from NJMS, and is designed to combine contemporary training in cancer research with a unique exposure to the culture of the cancer clinic. While the emphasis of the research component is on laboratory training in the molecular mechanisms of malignancy, the clinical exposure occurs through an innovative "Shadowing Program" that was designed specifically for the program. The goal of the shadowing program, which is the first of its kind at NJMS, is to provide a hands-on clinical exposure for trainees through a series of five clinical rotations. In these rotations the trainees will interact directly with patients, and the clinical staff, and thus learn the roles and experiences of each of the members of a clinical team (from the nurses, residents, study coordinators, surgeons and pathologists to support staff).

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It’s difficult to believe, but we are now approaching the 5th year anniversary of the opening of the New Jersey Medical School-University Hospital Cancer Center. As I look back at the past five years I realize they have been filled with successes, changes, and a few disappointments. It is my feeling that our greatest success lies in our vibrant research program. We now have 15 active research labs housed in our facility, which are staffed by over 100 postdocs, technicians, and graduate students. Our grant portfolio continues to grow on an annual basis despite the scarcity of research dollars at the national level. In addition to the research activity, the Cancer Center faculty has designed a graduate level curriculum that is supported by a new NCI-funded T32 Cancer Training Grant. These courses have attracted increasing numbers of students each year providing valuable exposure for our research programs. We have also successfully renewed our R25 summer research program and we expect to be overrun by medical students again this summer. Finally, the Cancer Center is also responsible for the Cancer Clinical Trials Program. This program addresses access to advanced care for underserved populations and is supported by a CCOP grant from the NIH.

With time has also come change. Since opening we have welcomed four new laboratories into the Center (Dr. Maiese, Dr. Azzam, Dr. Howell and Dr. Fritton) and our research efforts have benefitted tremendously from these highly collaborative programs. One faculty member has left us (Dr. Harrison) and we wish him the best of luck in his new position. In July of 2010 our Director, Dr. Harvey Ozer, stepped down. Dr. Ozer had a vision of building a comprehensive cancer clinical research center in Newark. He leaves a tremendous legacy, and I believe it is our shared responsibility to ensure that this vision endures. Finally, I am sure you have all noticed the increased activity on the lower floors, and it appears that the clinical services are finally joining us in the building. The Clinical Research Office is already up and running, and Medical Oncology are unpacking their boxes. These are truly positive developments that should provide numerous opportunities for collaboration and growth.

Finally, a few disappointments. We’ve dealt with water issues, an interesting smell, and a car launched into the side of the building. Most of this of course can be attributed to the growing pains of a new building and hopefully the worst is behind us. Overall it’s been an interesting and exciting time as the Cancer Center has developed into something we can all be proud of. Once again I would like to thank Dr. Ozer for his vision, and the opportunity he has provided us to be part of something new, important, and special.

Sincerely,

Ian P. Whitehead, PhD
Director and Professor
NJMS-UH Cancer Center
Devendra Bajaj, PhD, was recently awarded a 2-year National Space Biomedical Research Institute (NSBRI) Postdoctoral Fellowship.

Dr. Bajaj completed his PhD dissertation in Mechanical Engineering in May of 2010 at the University of Maryland, Baltimore County where he studied hard tissue damage processes in teeth. He is a post-doctoral fellow in the laboratory of Dr. J. Christopher Fritton in the Cancer Center.

Devendra Bajaj's fellowship project entitled "Pharmaceutical Countermeasure Effects on Tissue-Level Quality of Immobilized Bone" will quantify the long-term effects of bisphosphonates on bone tissue fragility in an established animal model for reduced weight bearing. Bisphosphonates are the most common drugs prescribed for the treatment of bone cancers and postmenopausal osteoporosis. They work by slowing the cellular processes responsible for bone tissue turnover, thus decreasing bone loss and are currently under investigation in astronauts. However, their effects have not been well studied in the setting of reduced weight bearing. Therefore, this study is important toward ascertaining the biomechanical safety of bisphosphonates for preventing the rapid bone loss associated with spaceflight and disuse.
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<th>Name</th>
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<th>Research Area</th>
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<tr>
<td>Edouard Azzam, PhD</td>
<td>Professor</td>
<td>My laboratory studies the effects and underlying mechanisms of low dose ionizing radiation in normal human cells, with particular interest in the radiation-induced bystander effect and the radiation-induced adaptive response.</td>
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<tr>
<td>Satnam Banga, PhD</td>
<td>Assistant Professor</td>
<td>We have been studying human diploid fibroblasts (HF) to understand the mechanism of multi-step carcinogenesis (&quot;transformation&quot;) of such cells in culture and its effect on cellular aging.</td>
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<td>Betsy Barnes, PhD</td>
<td>Assistant Professor</td>
<td>The long-term research goal of my laboratory is to characterize the cellular pathways that are regulated by the IRF family of transcription factors.</td>
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<tr>
<td>Christopher Fritton, PhD</td>
<td>Assistant Professor</td>
<td>We study how mechanical (exercise) and hormonal (estrogen) signals affect cellular and tissue repair mechanisms in bone and bone marrow.</td>
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<tr>
<td>Utz Herbig, PhD</td>
<td>Assistant Professor</td>
<td>Our lab is studying whether telomere induced senescence contributes to tumor suppression and organismal aging in mammals.</td>
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<tr>
<td>Roger Howell, PhD</td>
<td>Professor Chief, Division of Radiation Research</td>
<td>The research in my laboratory focuses on the biological effects of radioactive materials as they relate to both radiation protection and radiation therapy.</td>
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<tr>
<td>Sergei Kotenko, PhD</td>
<td>Associate Professor</td>
<td>Research in my lab is aimed to advance our knowledge of the complex role played by various cytokines in the regulation of the immune response to and in the pathogenesis of a number of diseases including cancer</td>
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<tr>
<td>Steven Levison, PhD</td>
<td>Professor, Director, Laboratory for Regenerative Neurobiology</td>
<td>The overall goal of my research program is to better understand the signals that regulate the proliferation and differentiation of the stem cells in the central nervous system.</td>
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Meet Our Faculty

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<tr>
<td>Hong Li, PhD</td>
<td>Associate Professor</td>
<td>One of the goals of my laboratory is to develop and optimize mass spectrometry technologies to study the role of protein post-translational modifications and protein-protein interactions on cell function.</td>
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<tr>
<td>Kenneth Maiese, MD</td>
<td>Professor</td>
<td>We focus on the basic and clinical mechanisms that modulate both neuronal and vascular plasticity as well as inflammatory mechanisms in the body.</td>
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<tr>
<td>Elizabeth Moran, PhD</td>
<td>Professor</td>
<td>We study the molecular mechanisms that regulate the different patterns of gene expression seen in cancer cells compared with their normal counterparts.</td>
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<tr>
<td>Harvey Ozer, MD</td>
<td>Professor</td>
<td>We study how altered cellular gene expression is responsible for immortalization, my lab is assessing differences in cDNA libraries between pre-immortal and immortal cells.</td>
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<tr>
<td>Ian Whitehead, PhD</td>
<td>Professor</td>
<td>Our laboratory conducts research in the field of mammalian signal transduction, with a particular interest in small G proteins and their contribution to human cancer.</td>
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<tr>
<td>Robert Wieder, MD, PhD</td>
<td>Associate Professor</td>
<td>Our laboratory studies the mechanisms of dormancy and resistance to chemotherapy in breast cancer cells that metastasize to the bone marrow.</td>
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<tr>
<td>Teresa Wood, PhD</td>
<td>Professor</td>
<td>A major focus of my laboratory is in determining how hormones and peptide growth factors interact to promote growth, survival and differentiation of breast epithelial cells.</td>
</tr>
<tr>
<td>Lizhao Wu, PhD</td>
<td>Assistant Professor</td>
<td>My laboratory is primarily interested in understanding how the Rb/E2F pathway and other tumor suppressor/oncogenic pathways control normal development and cancer.</td>
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Our Research

Prevention of Breast Cancer Recurrence

Breast cancer cells metastasize to the bone marrow very early in the disease, frequently before a diagnosis is made. Many of these micrometastases resist the adjuvant chemotherapy specifically administered to eliminate them and have the capacity to remain dormant in the bone marrow microenvironment for many years. These cells are intimately associated with the bone marrow stromal cells that normally serve to protect hematopoietic stem cells from injury and depletion for the lifetime of the individual. The cancer cells bind proteins in the stroma and initiate survival signaling. They enter a state of dormancy as a consequence of this interaction. Under DOD and NCI supported grants, the Wieder lab is investigating the signaling that keeps these cells dormant as well as potential mechanisms responsible for awakening them. They are testing the hypothesis that injury to the stroma through oxidative or hypoxic stress as well as the lack of postmenopausal estrogen induces an inflammatory state in the stroma, which results in secretion of growth factors that stimulate the dormant breast cancer cells to reawaken. Their goal is to characterize this inflammatory process, demonstrate that it induces reawakening of breast cancer micrometastases and to study ways of suppressing it to prevent recurrence.

Investigations of Breast Cancer Origins

The cause of breast tumor diversity is of current interest in the breast cancer field. Recent and emerging data suggest that breast tumor characteristics result from both the mutation that gives rise to the tumor as well as the cell of origin in which the mutation occurs. It is clear from recent studies that different subtypes of immature cells, e.g. stem cells and progenitor cells, versus mature, differentiated cells have differential susceptibilities to tumor development and can give rise to distinct tumor subtypes. Studies in Dr. Teresa Wood’s laboratory, funded by the National Institutes of Health and the New Jersey Commission on Cancer Research, are focused on determining how immature breast stem/progenitor cells are formed and how alterations in the numbers of these cells influence breast cancer susceptibility and tumor diversity.

The Wood laboratory is particularly interested in how growth regulators such as insulin and insulin-like growth factors (IGFs) regulate breast stem/progenitor cell lineage populations and tumor susceptibility. A number of studies have implicated this signaling system in breast cancer susceptibility. The Wood laboratory has recently demonstrated that disruption of IGF and/or insulin receptor signaling in breast epithelial cells in mice alters the populations of stem/progenitor cells resulting in a specific increase in luminal progenitor cells. The luminal progenitor cell population has received recent attention as the cell of origin for specific breast cancer subtypes including the more aggressive basal-like tumors resulting from BRCA1 mutations. The Wood laboratory is investigating how IGF/insulin receptor regulation of these progenitor cells alters susceptibility to specific oncogenes or tumor-promoting agents in order to better understand the causes of breast cancer diversity and to identify novel prevention and treatment strategies. In addition, these growth regulatory pathways also are likely involved in determining the number of tumor initiating cells, the cells capable of reforming tumors following chemotherapy.

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staff). It is expected that this exposure will allow for a better understanding of the work flow in a cancer clinic, and provide a context for their laboratory research. This should facilitate their future careers as translational researchers through their understanding of the team approach that is required to shepherd laboratory discoveries to the bench and back.
Cancer Summer Student Research Program

The Cancer Summer Student Research Program has been in existence at NJMS since 1969 and is supported through an NCI Cancer Education Program Grant (P.I.s Harvey Ozer, MD and Gwendolyn Mahon, PhD). In 2010, it was renewed at an expanded level for an additional 5 years. Its purpose is to provide a mentored, short-term research experience and inspire and motivate New Jersey medical students to pursue an investigative career in oncology, as well as to appreciate the value and importance of biomedical research.

To ensure that medical students receive the best research experience, the program advisory committee continues to develop new aspects to the program. Not only do students present their research at the end of the program at our annual symposium and submit an abstract which is published in our Abstract Booklet but they also attend interdisciplinary tumor conferences where patient cases and clinical trials are discussed. Students also attend mandatory weekly seminars which help broaden their understanding of cancer research beyond that provided by the project in which they are engaged. The seminar topics range from “The Biology of Cancer” to “Design and Management of Clinical Trials”. Students are also encouraged to be interactive during the seminars.

The 2011 program begins June 7th and ends July 29th. The project directory is currently available on our website at http://njmsuhcc.umdnj.edu/home. Interested students should contact the faculty mentor and submit a completed student application form, only after they have been accepted, to Lorie-Anne Phillips at the Cancer Center Research Support Office on H level room H1202.

NJMS-UH Cancer Center researchers chosen to present their work at the American Association of Cancer Research 2011 National Meeting

Dr. Ru Chen and Dr. Sri Harikrishna Vellanki, postdoctoral researchers in the NJMS-UH Cancer Center, were asked to present their work at the 2011 Annual Meeting of the American Association of Cancer Research. Dr. Chen’s work was selected from hundreds of submitted abstracts for an oral presentation at a special symposium on chromatin structure and transcription factors. Her studies have focused on understanding the molecular mechanisms of Chronic Myelogenous Leukemia (CML). Using a novel animal model she has identified a unique molecular signature that can be targeted in the treatment of patients with CML. Targeted therapies have been highly successful in the treatment of patients with CML, and Dr. Chen’s work may lead to improved therapies for patients with more advanced disease. Dr. Vellanki’s work was selected for presentation in a poster session, and described the development of a microfluidic device that can be used to interrogate individual tumor cells. This new technology allows for the identification of multiple surface proteins on tumor cells, even when only a few cells are available, and thus overcomes a serious limitation in the diagnostic analysis of malignancies. Dr. Chen performed her work in the laboratory of Dr. Ian Whitehead, Director of NJMS-UH Cancer Center, while Dr. Vellanki works in the laboratory of Dr. Robert Wieder, the Associate Director for Clinical and Translational Research.

Graduate Students Win Awards at the 3rd Annual Inter-School Technology Symposium

Ms. Dan Li and Ms. Rivka Stone won second and third place, respectively, at the Third Annual Inter-School Technology Symposium held at Robert Wood Johnson Medical School on April 12th. Their work highlighted the use of innovative and cutting edge technologies in the areas of imaging, next generation genomics and diagnostics. Ms. Li established a non-invasive prostate cancer monitoring system by combining a living imaging system (IVIS) with a luciferase reporter allele, while Ms Stone’s work described the use of next-generation sequencing technologies to characterize expression and alternative splicing of IRF5 in patients with systemic lupus erythematosus (SLE).

Both students received awards in the form of mini-grants to cover costs of services rendered at one of UMDNJ’s research core research facilities.
About Us

The NJMS-UH Cancer Center, which opened in October of 2006, provides the opportunity to integrate the delivery of the highest quality clinical care and the application of innovative basic and translational research.

The 9-story, 220,000 square foot building is physically connected to University Hospital on levels A, B and C, which accommodates clinical services, clinical research, screening and education programs and administrative offices. Besides having over 70,000 square feet of laboratory space, the Cancer Center is the home to five NJ Medical School Core Research Facilities which are located on levels F, G and H Level. The Digital Imaging Core houses 2 confocal microscopes, a PALM laser capture scope, tissue processing services and a host of support resources. The Center for Advanced Proteomics Research offers a variety of equipment and services for the design, process, acquisition and analysis of proteomics-based research. The Cancer Center also contains satellite facilities of the Flow Cytometry and Comparative Medicine Cores, and is home to the Clinical Research Group.

I level serves as an NIH funded comparative animal facility and the remaining two levels are shell space for future expansion and a mechanical floor.

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