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Foreword: The wide reach of funded research topics that span many areas in Urology. For example, in the basic science area of our institute are investigating molecular advances in renal avascular necrosis, exploring strategies of targeting sodium-dependent transport proteins in the urine which predict progression of disease in bladder cancer patients. Utilizing our large tumor tissue bank combined with our patient data base, we have developed new molecular profiles to better assess the outcome of patients with prostate cancer. Our large database enables us to constantly reexamine our experience in prostate and bladder cancer, and improve our patient management strategies. We also have an extensive clinical research program involving radiofrequency ablation of retinal tumors—a methodology developed at MGH—outcomes research in laparoscopic and open prostatectomy, new techniques of treating stone disease and BPH and advances in the surgical management of penile and bladder cancer, to mention but a few. Our NIH and DoD funded laboratories are led by Dr. Aria Orum and Dr. Chin-Lee Wu. As director of urologic research Dr. Olumi plays an integral role in guiding the residents toward meaningful research projects.

The research endeavor in the Department is strong and continues to grow as new faculty members with committed academic interests are recruited. Although all faculty members are involved in research activities, we have highlighted those most active.
Prostate cancer is the second leading cause of cancer death in men in the United States, accounting for 30,350 deaths per year. Although early stage prostate cancer is appropriately treated by surgery, radiotherapy or in selected cases, surveillance, advanced prostate cancer is not effectively treated. Usually, progression of advanced hormone-dependent prostate cancer can be controlled with ablative hormonal therapy; however, effective therapies are lacking for hormone-independent prostate cancer. Since aberrant apoptotic pathways contribute to initiation and progression of neoplasia, including prostate cancer, pro-apoptotic agents are attractive for treatment of advanced prostate cancer. While many apoptotic stimuli are associated with severe systemic cytotoxicity, limiting their clinical utility, TRAIL (Tumor necrosis factor Related Apoptosis Inducing Ligand) has the unique feature of inducing apoptosis in cancer cells, with minimal cytotoxicity. One focus of my lab is differentiating between sensitive and resistant cancers to TRAIL-induced apoptosis with hopes of improving the efficacy of this agent.

Another project in the lab focuses on stromal-epithelial interactions in benign and malignant prostate tissue. We have demonstrated that expression of the gene, c-Jun, in the prostate stroma can induce paracrine signals that can be critical to proliferation of prostate epithelial cells. Grants from National Institutes of Health, Department of Defense-Prostate Cancer Program and the Department have been instrumental in my laboratory’s endeavor to investigate the mechanisms of normal and abnormal prostatic growth.

Dr. Douglas M. Dahl

My research focuses on outcomes after minimally invasive surgeries, most notably laparoscopic prostatectomy. Our database contains over 1,000 patients, which we have used to analyze and improve our surgical outcomes. In addition, I participate in national oncology clinical trials, and serve as the urology chair for the RTOG national bladder cancer projects. I also serve as co-principal investigator for the NCRI sponsored Renal SIFORS project. Our project is focused on assessing molecular changes in renal cell carcinoma.

Dr. Aria F. Olumi

Director of Urology Research

Research Highlights

Dr. Adam S. Feldman

My primary translational research interests lie in the utilization of biomarkers for the diagnosis and prognosis of genitourinary cancer. In prostate and bladder cancers, I am currently investigating the use of novel urine-based proteomic assays for the detection of new and recurrent disease as well as the prediction of future disease progression. I was the recipient of a research award from the American Society of Clinical Oncology for my research on the cystatin B protein, which we are utilizing as a urine and bladder cancer tissue marker.

One of my research endeavors involves a collaborative effort through the Taplan Biological Mass Spectrometry lab, under Dr. Steven Gygi at Harvard Medical School. This exciting collaboration has recently resulted in a new research project using mass spectrometry to quantitatively assess kinase activity in renal cell carcinoma. We are currently designing a study to utilize this technology to analyze specimens from our prospectively collected GU Oncology Tumor Bank.

In addition to translational research, I am actively involved in clinical research projects. In renal cell carcinoma, I am currently evaluating our center’s experience with the use of neophrin opening approaches to small renal masses. The key goals of this investigation are to compare laparoscopic and open partial nephrectomy with radiofrequency ablation and to identify complications, risk factors for complications, and disease outcomes. My chief aim is to identify which patients and tumors are most appropriate for either of these treatment choices and to create an algorithm by which practitioners can advise their patients. In bladder cancer, I am collaborating with Dr. Elise Park of the Behavioral Medicine Service at MGH in order to optimize smoking cessation strategies in patients with bladder cancer.

Dr. Joseph A. Gnocca

My background is in mechanical engineering and fluid dynamics. I have a strong interest in medical devices related to urinary incontinence treatment and diagnosis, as well as urology in general. To date, I hold five medical device patents, which are particularly focused on simple, low-cost devices that can be used widely. Some examples include a device for an office pubovaginal sling procedure, laser resection of the prostate, and a non-urology device for the treatment of snoring and sleep apnea.

My other interest is focused on developing a validated medical questionnaire for non-urodynamic assessment of female urinary incontinence. In another project, I designed and completed a randomized blinded study on a catheter valve designed to prevent urinary tract infections.

Dr. Dianne Sacco

My research focuses on bladder cancer and the impact of early detection and treatment of superficial cancers on overall outcome. We are establishing a comprehensive bladder cancer database that is going to be instrumental in our outcome studies. We are also investigating the use of laser energy in treating superficial bladder cancer.

I am also interested in device development, particularly in the field of BPH therapy. Our laser therapy for the BPH program, which was started four years ago, has successfully treated hundreds of patients with symptomatic enlargement of prostate.

My focus is to improve upon the current technology in order to deliver the energy less invasively and improve the patients’ recovery.

Dr. Shahin Tabatabaei

Dr. Chin-Lee Wu

Director of Urology Research Laboratory

My laboratory, which is jointly supported by the department of urology and pathology at MGH, is focused on studies of molecular biomarkers in urologic tumors including cancers of the prostate, bladder and kidney. The long-term goal of our studies is to develop new diagnostic methods and therapeutic regimens. A major focus of the lab is to identify gene expression profiles associated with development, diagnosis and prognosis of prostate cancer. We have used laser capture micro-dissection techniques and DNA microarray technology to identify a group of genes whose expression can be used to predict the outcome of patients diagnosed with prostate cancer. We are in the process of developing a new gene-based diagnostic test to guide clinical management of prostate cancer.

Another project in the laboratory is aimed at improving imaging techniques in prostate cancer. Dr. McDougal and I have identified a dynamic metabolic signature of prostate cancer. We are applying this signature to develop an in-vivo imaging technique for patients with prostate cancer. With this new imaging technology, we hope to be able to better stage localized prostate cancer and quantify the volume of prostate cancer in-vivo.

Dr. Shahin Tabatabaei

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