CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
R1107

Project Title:
Recruitment of Missing Links

Award Mechanism:
Recruitment of Missing Links

Principal Investigator:
Lenkinski, Robert

Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

I was trained as a chemist and performed my doctoral work at the University of Houston focusing on the use of lanthanide shift reagents in Nuclear Magnetic Resonance (NMR). As part of this work, I determined the mechanism of how the paramagnetic lanthanides produced so-called lanthanide induced shifts in organic solution. During a post-doctoral fellowship at the Weizmann Institute of Science, I continued to study of the effects that lanthanide ions had in aqueous solution. Part of this work involved determining the mechanisms by which these lanthanides shortened NMR relaxation times of water and other ligands. Although this work was carried out between 1970 and 1975, the approaches and results are relevant to understanding the behavior of Gadolinium based contrast agents in MRI and the potential utility of PARACEST agents that are currently being developed in collaboration with Dean Sherry at UTSW. I continued to work on lanthanides at the University of Alabama in Birmingham and at the University of Guelph in Canada.

In 1986, I was recruited to the MRI section in the Department of Radiology at the University of Pennsylvania, despite have no formal training in MRI. While the notion of me working in a Radiology Department seemed a bit odd a first, I recognized the potential to have impact through my science on a different level. Charged with a primary goal to create and implement in vivo MR spectroscopy of clinical whole body scanners, I developed a clinical MR neuro-spectroscopy program that resulted in a number of grants and publications in HIV, schizophrenia, head trauma, brain tumors, lead exposure and MS. My group was one of the first to apply proton MRS to the characterization of breast lesions. While the majority of this work was carried out at 1.5T, studies were also pursued at 4T, offering theoretical advantages for MRS studies, but requiring intense efforts for its optimization. As we were one of the first to receive a whole body GE 4T scanner my team also carried out early studies on Na-23 MR imaging in clinically relevant time scales. While at the University of Pennsylvania I was also fortunate to also participate in the development of several organ specific MR coils including an endo-rectal coil for imaging of the prostate, a multi-coil array for imaging of the shoulder, and a bilateral array for imaging breasts. This work lead to an ability to image organs and structures with degrees of resolution that were previously impossible in reasonable scan times. In these pursuits I worked closely with many clinicians in establishing translational programs that applied technical advances in MRI and MRS to study human disease. In this respect, I have served as a program builder who can provide expertise in the context of interdisciplinary teams, and, in the appropriate cases, lead these efforts.

In 1999, I was recruited to the Department of Radiology at the Beth Israel Deaconess Medical Center. I assumed the position of Director of Experimental Radiology and the Director of a 3T MRI/MRS program. I worked closely with GE on the development of a 3T scanner that had one of the first commercial RF body coils at this field strength. I recruited a team of technical investigators who demonstrated that improved image quality could be obtained at 3T. This team in collaboration with GE scientists collected the clinical data used in an FDA submission for approval of body imaging at 3T. In 2000, Dr. Rofsky was recruited to the position of Director of MRI at the BIDMC with a key part of his mission to facilitate making 3T imaging a clinical reality. I worked closely with Dr. Rofsky to accomplish that mission and during the 10 years working together we built an MRI division that spanned technical development, translational research, and first-rate clinical body MRI. Perhaps the best example of this effort is the interdisciplinary program in prostate MRI. Major accomplishments included developing an endo-rectal coil at 3T, implementing and assessing DCEMRI at 3T for the prostate, correlation of MRI/MRS with a whole mount pathology program and beginning a program for determining the relationship between gene-expression profiles and MR features of prostate cancer. In addition to these clinical/translational programs, I, together with Dr. John V. Frangioni, established a small animal imaging facility (http://www.longwoodsaif.org/) and a molecular imaging program (http://www.frangionilab.org/, http://www.lenkinskilab.org/) In building these three programs, I involved investigators from many diverse disciplines and departments.

At UTSW I can bring my experiences to benefit a range of programs, providing a link between the Department of Radiology, the AIRC and researchers and clinicians at UTSW. In addition to working on and enabling specific projects, I intend to foster and strengthen the role of imaging at the institution in clinical and translational studies. There are already many first-rate programs involving imaging at UTSW that will benefit from either implementing or strengthening translational studies. I will build on my track record of successfully mentoring faculty at many levels, targeting those in the Department of Radiology and the AIRC, and look forward to being a facilitator to any other Departments that are either currently involved in or planning imaging research studies.