CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
R1117

Project Title:
Recruitment of First-Time, Tenure-Track Faculty Members

Award Mechanism:
Recruitment of First-Time, Tenure-Track Faculty Members

Principal Investigator:
Potts, Patrick

Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

Dr. Patrick Ryan Potts grew up in rural North Carolina and obtained his B.S. in Biology from the University of North Carolina at Chapel Hill in 2000, and his Ph.D. in Cell Regulation from the UT Southwestern Medical Center in 2007. He then did his postdoctoral research at UT Southwestern Medical Center in the Department of Biochemistry as a Sara and Frank McKnight Independent Postdoctoral Fellow (2008-2011). In September 2011, Dr. Potts joined the Department of Physiology at UT Southwestern Medical Center as a tenure-track Assistant Professor.

His basic scientific interest is in understanding the biochemical and molecular mechanisms behind fundamental cellular processes that when deregulated result in cancer. As a graduate student, under the mentorship of Dr. Hongtao Yu in the Department of Pharmacology at the UT Southwestern Medical Center, Dr. Potts studied the molecular and biochemical pathways that safeguard our genome from DNA damage-induced mutations, as well as their contribution to tumor cell maintenance. During his studies, Dr. Potts discovered a novel enzyme that facilitates sister chromatid homologous recombination to promote genome stability. Additionally, he found that this enzyme not only had a protective role, but in a subset of cancers it actually facilitates tumor cell maintenance by promoting telomere elongation and unlimited replicative potential. Our understanding of these basic cellular processes has important implications in determining how cells become cancerous and provide insights into the therapeutic potential of chemotherapeutic drugs.

After obtaining his Ph.D., Dr. Potts pursued his interests in understanding the molecular and cellular underpinnings of cancer as a Sara and Frank McKnight independent postdoctoral fellow in the Department of Biochemistry at UT Southwestern. During this independent postdoctoral fellowship, he addressed a long-standing question in cancer biology regarding the cellular function of cancer-testis antigen (CTAs) proteins. CTAs are genes whose expression is typically restricted to cells of the germline, but becomes aberrantly activated in a wide variety of human tumors. The largest family of CTAs is the melanoma antigen genes (MAGEs) that consist of over 50 unique genes in humans. Importantly, the expression of many MAGE CTAs correlates with poor prognosis in a wide-variety of cancers. However, the function of MAGE CTAs was unknown. Dr. Potts undertook this challenge using a variety of biochemical, structural, and cellular approaches. He discovered that MAGE CTAs bind to and enhance the activity of E3 RING ubiquitin ligases. These findings biochemically defined the function of the enigmatic

MAGE CTA proteins in cancer. Additionally, they established a new family of multi-subunit E3 ubiquitin ligases that likely have significant roles in a variety of signaling pathways during spermatogenesis, normal development, and cancer. Finally, these findings open up a novel class of tumor-specific therapeutics targeting MAGE-RING ubiquitin ligases.

Now in his new position in the Department of Physiology at UT Southwestern Medical Center, Dr. Potts will continue his work on MAGE CTAs to define the specific molecular and cellular processes that MAGE-RING ubiquitin ligases impinge on to promote tumorigenesis. Ultimately these studies will have important contributions to our basic understanding of tumor initiation and progression, as well as identify new therapeutic targets.