CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP110784

Project Title:
A Mass spectrometer for transcrption factor and protein ubiquitination profiling in cancer cells upon drug treatment

Award Mechanism:
Shared Instrumentation Awards

Principal Investigator:
Qin, Jun

Entity:
Baylor College of Medicine

Lay Summary:

Cancer is a multifaceted disease and much progress has been made in recent years in developing more effective 'targeted' therapeutics for specific cancer subtypes. These types of drugs aim to directly bind and dismantle the functions of particular proteins – the building blocks of human cells, or signaling pathways that become diseased and thereby cause cancer development. However, we now know that all cancer therapies cause broad changes within the cells that may differ from patient to patient. The true impact of drug action on a particular type of cancer cell is currently not well defined. Yet, knowing precise mechanisms of drug action on a molecular level is likely to explain why some patients respond differently to therapy, and, importantly, how cancers develop drug resistance. Thus, in order to develop better targeted therapeutics in the future, we need to be able to find and characterize the broader molecular changes in a cell exerted by administration of drugs. Currently, mass spectrometry technology is becoming capable of measuring thousands of cellular proteins and changes in their levels of expression. However, it is still challenging to profile important classes of regulatory proteins that determine cellular fates due to their low abundance. We have begun to develop reagents and the corresponding methods that can enrich these factors. This proposal requests a particular type of mass spectrometer instrument capable of performing such assays in a timely manner and with adequate precision – a necessity in clinical research. The instrument will be used in collaborative research with five major BCM laboratories that have vast experience in cancer research and are developing new cancer models and cancer drugs. Development of a technology platform proposed in this grant would significantly benefit the capacity to characterize drug actions for future improvement of personalized medicine.