CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP180244

Project Title:
Functional analyses of linkage-specific ubiquitination in the DNA damage response

Award Mechanism:
Individual Investigator

Principal Investigator:
Wang, Bin

Entity:
The University of Texas M.D. Anderson Cancer Center

Lay Summary:

Our genetic material (DNA) is continuously damaged from exogenous and endogenous sources leading to DNA lesions. DNA double-strand break (DSB) is one of the most deleterious cellular lesions; one of their harmful effects is that it can promote genome instability, a hallmark of cancer. The cellular responses to DSB involve a sophisticated DNA damage response network that detects, signals, and repairs the lesion; failure of this repair system leads to cancer. Our project aims to decipher the mechanistic details of DSB response in the context of its natural cellular environment, i.e. chromatin in human cells. Ubiquitin (a small molecule that can be attached to a target protein) modification of chromatin proteins at the DNA damage site plays crucial roles in the DSB damage response. In this proposal, we aim to characterize a novel ubiquitin modification signaling cascade at the DNA damage sites. The findings from this proposal will provide novel insights into the understanding of how chromatin modification at DSBs is involved in signaling events to coordinate transcription and repair of DNA damage for safeguarding genome integrity. Discoveries made in this research will also uncover novel therapeutic targets for sensitizing patient tumors to ionizing radiation treatment. We envision that this study will pave the way for future translational studies based on our basic science findings.