CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
R1108

Project Title:
Recruitment of Rising Stars

Award Mechanism:
Recruitment of Rising Stars

Principal Investigator:
Chen, Taiping

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

Lay Summary:

Dr. Taiping Chen is a geneticist and molecular biologist who uses mouse models and mammalian cells to investigate the regulation and biological functions of epigenetic mechanisms, including DNA methylation and histone modifications. In 2011, he will move from Novartis Institutes for Biomedical Research at Cambridge, Massachusetts to join the faculty of the Department of Molecular Carcinogenesis at The University of Texas MD Anderson Cancer Center at Science Park, Smithville.

Taiping grew up and received his undergraduate education in China. Fascinated by biomedical research and determined to pursue a research career, he came to North America in 1994 for further education and training. His journey started at The University of Texas at El Paso, where he conducted research on the biochemistry of proteases isolated from snake venoms, mentored by Dr. Eppie Rael, and received an MS degree. In 1996, he moved to Canada to pursue his Ph.D. degree at McGill University. Under the supervision of Dr. Stéphane Richard, he characterized the biochemical properties and biological functions of the GSG/STAR family of RNA-binding proteins. He demonstrated that the GSG/STAR domain, in addition to mediating RNA binding, is involved in protein-protein interactions and protein localization. He provided evidence that GSG domain-mediated dimerization is essential for the function of the GSG/STAR protein Qk1. He also showed that Qk1 specifically binds the myelin basic protein (MBP) mRNA, which initiated a study that led to the conclusion that Qk1 participates in myelination by regulating the nuclear export of MBP mRNA. Furthermore, he identified a novel nuclear structure, named the Sam68 nuclear body (SNB), in cancer cells. He graduated with honor and obtained his Ph.D. in 2000. He then joined the laboratory of Dr. En Li at Massachusetts General Hospital, Harvard Medical School, where he gained expertise in epigenetics and mouse genetics. Supported by postdoctoral fellowships from the Human Frontier Science Program and Medical Research Council of Canada (later renamed Canadian Institutes of Health Research), he performed studies on how DNA methylation is regulated in the mammalian system. He identified a novel isoform of DNA methyltransferase, named Dnmt3a2, and showed that de novo (Dnmt3a and Dnmt3b) and maintenance (Dnmt1) methyltransferases function cooperatively in establishing and maintaining DNA methylation patterns. He also made significant contributions toward unraveling the complex interplays between the DNA methylation machinery and other epigenetic factors, including histone modifiers, chromatin remodelers, and microRNAs. In early 2004, Dr. Chen was recruited by Novartis as an investigator and laboratory head. The research in his group has focused on identifying and validating epigenetic factors as

potential therapeutic targets for cancer and other diseases. By taking advantage of the Novartis postdoc program, Dr. Chen has been actively involved in basic research as well. His group's accomplishments include the finding that Dnmt1 is essential for the survival and proliferation of human cancer cells, the discovery that the lysine demethylase LSD1/KDM1A demethylates Dnmt1 and regulates Dnmt1 stability, and the discovery that demethylation of histone H3K4 by KDM1B/LSD2/AOF1 is a prerequisite for the establishment of genomic imprinting during oogenesis.

Dr. Chen is very excited about bringing his expertise back to Texas. At MD Anderson, Dr. Chen will use a combination of genetic, biochemical, and genomic/proteomic approaches to address the roles of epigenetic modifiers in mammalian development and cancer. He is particularly interested in elucidating 1) the mechanisms involved in epigenetic reprogramming during early embryogenesis and in the germline, 2) the roles of epigenetic modifiers in the functions of stem cells, including cancer stem cells, and 3) the mechanisms by which epigenetic alterations drive cancer formation and influence cancer progression. Unlike genetic mutations, epigenetic alterations are potentially reversible, raising the possibility of correcting epigenetic states as a therapeutic approach. Dr. Chen's research program should lead to identification of novel targets for cancer prevention and treatment.