



Supporting groundbreaking discoveries

“Our original goal with the support of the TCRF grant was to develop a bio-nanoparticle system for drug delivery to target DNA repair pathways for cancer therapy. We met technical problems in improving the bio-nanoparticle payload packaging (still working on it). As a result, we have channeled our resource to study an important DNA repair enzyme, human polymerase-theta and also develop inhibitors as anti-cancer therapy.

Because of the TCRF grant, we achieved three important milestones:

- 1). We, alongside our collaborator at Thomas Jefferson University, **have revealed the mechanism for a unique reverse transcriptase activity of this DNA repair enzyme**, and published the findings in Science Advance, June, 2021. This publication attracted many news outlets reporting our discovery.
- 2). **We have solved the crystal structure of this DNA repair enzyme**. This enables us to do structure-based drug design and optimization to develop anti-cancer drugs.

Human polymerase-theta turns out to be a novel precision medicine drug target for many cancers with BRCA1 and BRCA2 deficiency, such as breast cancer, leukemia, etc.

- 3). With the progress obtained from the support of TCRF grant, **we have been able to obtain additional grants totaling \$892K** to support the continued study of human polymerase-theta and the drug development.”

-Dr. Xiaojiang Chen

“This discovery that RNA information can be written back into DNA is a major finding. Has the potential for allowing us to introduce information into cancer cells through ‘targeted vaccines’ and correct driver mutations that determine cancer cell doubling.”

-Dr. Solomon I. Hamburg, President of the Board

MEET THE RESEARCHER

Xiaojiang Chen, MD

University of Southern California

2016 Tower Senior Investigator

Funded Research: Targeting Mismatch Repair System for Cancer Therapy



Dr. Xiaojiang Chen's combined expertise in Molecular and Cell Biology, Biochemistry, and Structural Biology (X-ray, EM) enables him to study critical questions in DNA replication/repair, Cancer Biology and Immunology at molecular/cellular levels.

He has done landmark work on viral replication and viral oncogenes (such as SV40 large tumor antigen, EBV gp350), as well as crucial DNA modifying enzymes which play key roles in genomic stability, cancer, and immunity.

PRESS COVERAGE

“For the first time, scientists have found evidence that polymerase theta can write RNA segments back into DNA.”

-‘Human cells can write RNA sequences into DNA, study shows.’ Published by Drug Target Review, June 2021.

“This is a groundbreaking discovery that can change our lives beyond recognition.”

-‘Scientific discovery of the year: RNA information can be written back into DNA’ Published by TekDeeps, June 2021.

Impact begins here, **and it starts with you.** Join us as we invest in groundbreaking cancer research.