

DEPARTMENT OF CHEMISTRY
ART & SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

FOR APPLICATION YEAR: 2021

PROJECT TITLE: Structural analysis of ADP-ribosylation metabolizing proteins

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Project Description

ADP-ribosylation is a transient post-translational modification that has widespread effects on DNA repair and replication, gene expression, and cell fate in mammals. ADP-ribosylation is cytotoxic when accumulated and thereby dynamically regulated by ADP-ribosylation turnover enzymes. Small-molecule inhibitors targeting ADP-ribosylation metabolism has shown promise in precision cancer medicine, and inhibitors of poly(ADP-ribose) polymerases (PARPs) specifically kill BRCA1/2-deficient breast tumors.

We are working on the structure, mechanism, and drug discovery of key proteins in ADP-ribosylation metabolism and signaling. We are highly interested in determining the crystal structures of and developing a high-throughput assay for our target proteins. These are the pre-requisite steps to discover new cancer-selective therapeutics through a high-throughput screening.

A WISE student will be primarily trained in expression, purification, and crystallization of ADP-ribosylation metabolizing proteins to determine their structures of protein, protein-ligand, and protein-protein complexes. She will obtain extensive experience and background in X-ray crystallography and various biochemical tools, including GST-pull down and time-resolved fluorescence resonance energy transfer (TR-FRET), which will help them to better understand biology and medicine.