PROJECT TITLE: **Structural analysis of poly(ADP-ribose) signaling proteins**

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**Project Description**

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

We are working on the structure, mechanism, and drug discovery of key proteins in PAR 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 PAR signaling 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.