

Small Angle X-Ray Scattering Applications in Structural Biology

Dr Lixin Fan¹, Dr Yun-Xing Wang²

¹*Basic Science Program, Frederick National Laboratory for Cancer Research, Small Angell X-ray Scattering Facility, National Cancer Institute,* ²*Protein-Nucleic Acid Interaction Section, Center for Structural Biology, Center for Cancer Research, National Cancer Institute, Small Angell X-ray Scattering Facility, National Cancer Institute*
liixn.fan@nih.gov

Small-angle X-ray scattering (SAXS) is a complementary technique to Macromolecular Crystallography, NMR and Cryo-EM techniques and is becoming more widely used in structural biology. Crystallography requires good crystals and NMR has a size limitation. Cryo-EM studies biomolecules under a frozen condition. SAXS, on the other hand, allows for the study of the structure and dynamics of macromolecules and their complexes in solution and under various buffer conditions such as salt concentration, pH, with or without ligand as well as under changing sample environments such as temperature and pressure. SAXS provides insight not only into global information about size and shape of biomacromolecules, but also the information about flexibility and an ensemble of conformers. SAXS data can also be used in tandem with other biophysical methods (including crystallography, NMR, AFM and cryo-EM) by providing additional restraints that further improve simulations, validate structural models as well as find missing fragments. The SAXS Facility of the National Cancer Institute (NCI) opens to all intramural and extramural research communities. The mission of the SAXS Core Facility is to provide support to the user communities with expertise in experimental design, data collection, processing, analysis, and interpretation. The research field includes but is not limited to structural studies of nucleic acids, proteins, protein assemblies, virus particles, lipid membranes and membrane-protein/DNA complexes. This presentation gives a brief introduction to the NCI SAXS facility and highlights recent scientific achievements in structural biology produced by NCI SAXS core users. NCI SAXS Core website: <https://ccr.cancer.gov/center-for-structural-biology/saxs-core-facility>

Acknowledgments

NCI SAXS Core is funded by FNLCR contract 75N91019D00024 and the intramural research program of the NIH, NCI, CCR.