Special Issue

Protein X-Ray Free Electron Laser (XFEL) Crystallography: A Novel Technology for Membrane Protein Structure and Drug Design

Message from the Guest Editors

X-ray free electron lasers (XFELs) can be used to determine protein structures from tiny crystals sized from sub-micron to microns, expanding the research in structure biology to a new horizon. Successful applications of XFEL have been reported continuously, from the determination of large molecular complexes, to atomic resolution structures, to membrane protein structures from 2D or 3D crystals, and to fast conformational changes using pump-probe time-resolved crystallography. The serial crystallography method with XFEL is especially powerful in the determination of membrane proteins, which are often drug receptors and make it difficult to obtain high quality large crystals using conventional crystallography. In addition, time-resolved structure determination provides unprecedented information regarding the detailed molecular mechanism of protein functions. Thanks to these important applications, XFEL facilities are rapidly constructed to become new bases in structure biology research.

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