

Towards Structure Determination of Membrane Proteins in 2-D Crystals Using Next-Generation Hard X-Ray Sources.

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It has been proposed that hard X-Ray Free Electron Lasers, such as the Linac Coherent Light Source (LCLS) planned for development at Stanford, may be useful for structure determination of membrane proteins in 2-D crystals^[1,2]. More recently, several proposals to develop Energy Recovery Linacs have been put forth. Both types of future X-Ray sources are expected to provide hard X-Rays pulses that are ultrashort and ultrabright; these characteristics are essential for high-resolution structure determination of 2-D samples. Such experiments may someday yield high-resolution structures, and, in conjunction with electron-crystallography experiments, detailed information on electrostatics. Appropriate sample preparation will likely be the main practical difficulty in realizing these aims. Application of pulsed X-Ray techniques to water-soluble proteins in 2-D crystals may also be fruitful.

^[1] Becker, M. (1999) *Biophysical Journal* 76, A121.

^[2] Becker, M. (1999) "Transparencies from the EMBO Workshop: Potential Future Applications in Structural Biology of an X-Ray Free Electron Laser at DESY", EMBL, Hamburg, pp. 184-198.