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### ***In Situ* Serial Crystallography of Soluble and Membrane Proteins in the Lipid Cubic Phase**

The *in meso in situ* serial X-ray crystallography (IMISX) method was developed primarily to avoid complications associated with harvesting small and delicate membrane protein crystals from the sticky and viscous mesophase in which they grow. It represents a high throughput method for data collection that minimizes the effects of radiation damage and, in its current application with fast detectors, enables structure determination with select diffraction data (images) from select crystals. Additional attractive features of the method include that ♦ it can be used with randomly oriented, micrometer-sized crystals at synchrotron X-ray sources with rastering capabilities and micrometer-sized beams, ♦ it is compatible with robots for setting up crystallization trials and for sample mounting at the beamline, ♦ it is compatible with the rotation method for data collection, ♦ it requires just nano- to micro-gram quantities of protein, ♦ it can be used for rapid data collection at ambient (~20 °C) and cryogenic temperatures, ♦ it works with both membrane and soluble protein crystals, ♦ it provides data of a quality that enables sulfur and traditional heavy atom SAD phasing and ♦ it should prove useful for data collection at laboratory-based and free-electron laser X-ray sources.

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## **References**

Huang, C.-Y., Olieric, V., Ma, P., Panepucci, E., Diederichs, K., Wang, M. and Caffrey, M. 2015. *In meso in situ* serial X-ray crystallography of soluble and membrane proteins. Acta Cryst. D71, 1238-1256.

Huang C.-Y., Olieric V., Ma P., Howe N., Vogeley L., Liu X., Warshamanage R., Weinert T., Panepucci E., Kobilka B., Diederichs K., Wang M. and Caffrey M. 2016. *In meso in situ* serial X-ray crystallography of soluble and membrane proteins at cryogenic temperatures. Acta Cryst. D72, 93-112.