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Room to Move. Crystallizing Membrane Proteins in Swollen Lipidic Mesophases. V. Cherezov¹, J. Clogston¹, M.Z. Papiz², M. Caffrey^{1,3}, ¹Dept. of Chemistry, The Ohio State Univ., Columbus, OH, USA; ²CCLRC Daresbury Lab., Daresbury, Warrington, UK; ³College of Science, Univ. of Limerick, Limerick, Ireland.

The cubic phase or *in meso* crystallization method is responsible for almost 40 solved integral membrane protein structures. Most of these are small and compact proteins. A model for how crystals form by the *in meso* method has been proposed. In light of this model, we speculated that a more hydrated and open mesophase of reduced interfacial curvature would facilitate crystallization of bigger and bulkier proteins. The proposal was explored in the current study by performing crystallization in the presence of additives that swell the cubic phase. The additive concentrations inducing swelling, as quantified by small-angle X-ray diffraction, coincided with a 'crystallization window' in which two, very different membrane proteins produced crystals. That the swollen mesophase can grow structure-grade crystals was proven with one of these, the light-harvesting II complex. Packing density in the *in meso*-grown crystals was dramatically higher accounting for their enhanced diffracting power. These results present a rational case for including mesophase-swelling additives in screens for *in meso* trials, which will broaden the range of membrane proteins yielding to structure determination.