

Protein Tag Mediated Fusion Protein Crystallization

Tengchuan Jin, Ph.D.

Hefei National Laboratory for Physical Sciences at Microscale, the CAS Key Laboratory of Innate Immunity and Chronic Disease, School of Life Sciences, University of Science and Technology of China

Using a non-related protein as a crystallization chaperon to facilitate the crystallization of some challenging proteins is one of the salvaging approaches. These crystallization tags include maltose-binding protein (MBP), glutathione transferase (GST), green fluorescence protein (GFP) and T4-lysozyme. With a thorough literature survey, we identified maltose-binding protein (MBP) as the most successful covalently linked crystallization tag. However, the chimeric construct design is often a challenge. To increase the success rate of MBP facilitated crystallization, we proposed to design a series of vectors harboring either a short flexible linker or a set of rigid helical linkers. A dozen of challenging proteins were tested for crystallization with this system, most of which had never been crystallized before. Most of them were crystallized with at least one of the vectors, and we were able to solve novel structures. We propose that this linker optimization strategy can be translated to the crystallization of other proteins, as well as using other protein tags for crystallization.