

Editorial

New Trends in Protein Crystallization and Protein Crystallography

Abel Moreno 

Instituto de Química, Universidad Nacional Autónoma de México, Av. Universidad 3000, Mexico City 04510, Mexico; carcamo@unam.mx

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Biological crystals and their properties have recently unveiled the complex mechanisms where life is supported [1–5]. Crystals are everywhere, and their most important properties have started being used in biological and biomedical sciences, and even in materials science for the development of electronically important materials based on biological structures [6].

Nowadays, there is a modern topic that has shown a potential strategy to produce biomolecular crystals [7]. The *in vivo* crystallization as well as the *in cellulo* strategies using the machinery of many microorganisms have recently been used to produce crystals of biological macromolecules from small molecular weight toxins [8–10] up to large biomolecules like cypovirus and baculoviruses [11,12]. Crystallography has been converted into a transversal science, where Chemistry, Physics, and Biochemistry overlap each other. The investigations of intracellular protein crystallization have also been used as a practical methodology to improve the success of the *in vivo* crystallization. There is nowadays research concentrated on explaining the mechanism of this process to produce tailor-made or usually called synthetically grown protein crystals. A general overview on protein crystallogenesi describing what is needed in the future for precise crystallographic work is a very important topic today. The journey from the crystallogenesi in the time of physiology and chemistry, passing through the history of methods of protein crystallization up to modern techniques to solve three dimensional structures at very high-resolution (using the X-ray free electron lasers at the synchrotrons of the fourth generation) has opened the opportunity to know details about the structure–function relationship of complex biological systems [13,14]. This is why this Special Issue represents the effort of many scientists that show the marvelous world of crystals, from its nucleation, passing through the crystal growth, up to their knowledge of the 3D structure. The crystallization process is not as big an issue as it was in the past. The reason for this is that the biotechnology and applied nano-sciences have recently met with crystallography [15].

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