Enhancing the success of crystallising biological macromolecules

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Protein crystals play a pivotal role in facilitating rational drug design and other industrial applications. The past decade has seen momentous progress in the miniaturisation, automation and analysis of crystallization experiments. However, production of high quality crystals still presents a major barrier to structure determination; it is often the case that no crystals are formed at all or that clusters of useless crystals are obtained.

There is no 'magic bullet' that will guarantee the yield of useful crystals, hence rational approaches leading to the development of new and improved technologies for attaining high quality crystals is of crucial importance to progress.

This talk will present strategies for increasing the chances of success by highlighting a variety of practical methods that have led to successful crystallization when previous attempts had failed [e.g. 1-6]. Many of the techniques can be automated and adapted to high throughput/nanoscale experiments and several have been patented and commercialised. The design of smart materials and functionalised carbon nano-materials that have produced the first non-protein nucleating agents that can be used for automated screening and optimization of bio-macromolecules will also be presented.

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