Protein crystal growth in a simulated microgravity environment

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Protein crystals have grown in importance in recent years, beyond its traditional application in structure determination. The use of protein crystals as biosensors and in nanobiotechnology demands the development of techniques for their production in a controlled and reproducible manner. Microgravity experiments have shown some promise for the reliable growth of large, well formed crystals. The use of microgravity for everyday work is, however, beyond reach for most practical applications. Here we present devices that take advantage of the growth of protein crystals in semiconductor surfaces (SmartSandTM) to build crystallization microchambers that can be spun without disturbing the crystal growth process. The spinning of the crystallization chamber neutralizes convection forces without introducing new chemicals in the drop composition unlike experiments using viscous or gelled media. Thus, the technique can be applied to any crystallization setting commonly used in the macromolecular crystallography laboratory.

This work has been funded in part with funds from the NCI-NIH (Contract No. NO1-CO-12400). The contents of this publication do not necessarily reflect the views or policies of the DHHS, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.