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Microfluidic chip for production and analysis of crystal of biological macromolecule

Context

The microfluidic approach brings novel solutions to different challenges of the crystallization step, the mandatory prerequisite to any crystallographic project. In particular, when utilizing conventional techniques, the amount of biological material is often the limiting factor. The microfluidic technique enables the manipulation of significantly smaller volumes of samples, that is nano-volumes of solutions.

It also provides an environment close to the diffusive one which exists in gel or microgravity and is known to significantly improve the crystal growth process and the resulting crystal quality. Finally, it also allows multiple experimental conditions to be run in parallel.

Scope

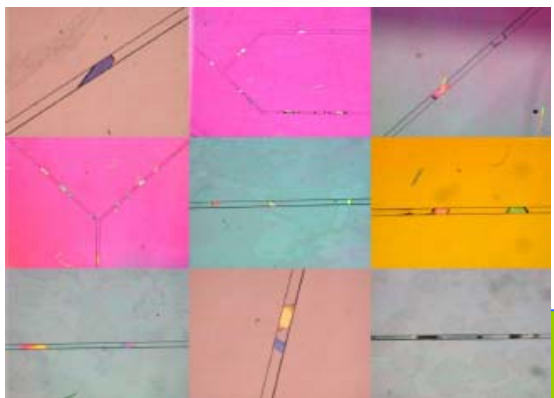
A collaborative work was initiated in 2004 focused on the development of a versatile and easy-to-use crystallization device. This microsystem is dedicated to the screening and the optimization of crystallization conditions, and *in situ* crystallographic analysis of biomolecule crystals (proteins, nucleic acids and macromolecular complexes). The application fields concern structural biology and genomics as well as drug design.

Objectives

The goal is to deliver a cheap and user-friendly chip for the search and optimization of crystallization conditions using minute amounts of target macromolecules. This chip is also to allow the *in situ* crystal observation and diffraction analysis at the synchrotron.

Realization

A prototype is already available that validates the concept of the chip.



Partners

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