

Advanced Imaging in Lab-Scale Protein Crystallization

Moritz Hunkeler

Biozentrum, University of Basel

Crystallization of difficult targets is a key bottleneck in structural biology and requires high-throughput and high-quality screening. Screen preparation has already reached a high level of automation, but crystal detection still largely relies on visual inspection and expert opinion. Advanced imaging modes, such as second-order-non-linear imaging of chiral crystals (SONICC), UV-two photon excited fluorescence (UV-TPEF) and trace-label fluorescence detection, provide tools for optimizing crystal detection and characterization. An overview on two and a half years of routine operation of an advanced imaging system employing all above mentioned imaging modes in a lab-scale environment is provided. Strategies for optimized crystal screening for challenging targets including nanocrystals, lipidic phase crystallization of membrane proteins and large protein assemblies, as well as for rapid optimization of routine protein-ligand co-crystallization are discussed.