

# Pure Crystals Aid In Drug Development

Cornell University



X-ray crystallography is a technique in which crystals are analyzed to determine their structure, leading to a better understanding of the crystallized substance being studied. These substances include a wide variety of molecules and compounds, including proteins, DNA and inorganic materials. When X-rays are focused through crystals of purified molecules, diffraction patterns are created, revealing key, molecular-level organizational details of the material in question.

This information can be crucial in a number of areas, particularly in the development of drugs and therapeutic agents, since the structural atomic detail provides answers to essential questions about binding drugs to necessary molecules. However, the pure crystals needed to accurately read and analyze materials are rare and difficult to procure.

Christopher Lima, Ph.D., a Cornell University assistant professor of biochemistry, solved this problem by developing a technique to easily develop pure crystals. SUMO is a small protein that, because of its bonding properties, can be used in various cellular processes. Lima discovered that by using SUMO in a protein expression system, a soluble form of the protein could be created that can be purified and split to provide an active, pure crystal.

“ *The rapidly growing crystallography technology also plays a vital role in protein engineering, materials science and structural chemistry.*

Invitrogen Corp., a pharmaceutical and biomedical services company, licensed this technology from the Cornell Research Foundation, Inc. (CRF). In 2004, Invitrogen introduced the Champion™ pET SUMO Protein and Peptide Expression System, which produces SUMO fusion to achieve the highest level of solubility for proteins, leading to purified crystals for research purposes.

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