EuroSciCon

June 04-05, 2018
London, UK

3rd Edition of International Conference on

Advanced Spectroscopy, Crystallography and Applications in Modern Chemistry

Struct Chem Crystallogr Commun 2018, Volume 4
DOI: 10.21767/2470-9905-C1-006

PRECIPITANT-LESS CRYSTALLIZATION OF PROTEIN MOLECULES INDUCED BY SUBSTRATE WITH HETEROGENEOUS TOPOGRAPHY AND SURFACE POTENTIAL GRADIENT

Animangsu Ghatak and **Anindita Sengupta Ghatak**
IIT Kanpur, India

Surfaces with heterogeneous structures facilitate protein crystallization by diminishing the energy barrier for nucleation. Nevertheless, a precipitant remains necessary for shielding the charges on protein molecules, which then overcomes electrostatic repulsion and selfassemble into crystalline structure. For yet-to-be crystallized proteins, identifying the right precipitant is non-trivial and therefore, despite existence of several heterogeneous surfaces, number of such yet-to-be crystallized proteins continues to be large. In this talk, we will describe a novel surface decorated with both nanoscopic patterns and surface charges, the combined effect of which show the remarkable ability to induce crystallization without use of any precipitant. In fact, several protein molecules with molecular weight ranging from 14-450 kDa could be crystallized in this process. These surfaces can induce also crystallization of a specific protein from a mixture of two or more protein species and even simultaneous crystallization from a mixture of proteins. Kelvin probe force microscopy (KPFM) measurements of these surfaces show that surface potential gradient as high as 140 V/μm are generated on these surfaces which can drive largescale molecular ordering in the liquid at the vicinity of the surface. As a result, the surface itself acts both as a precipitant also as a nucleant. Heterogeneity allows it to crystallize protein molecules having large range of radius of gyration, that too at low to moderate concentration of the protein in respective solutions. The prospect of precipitant-less crystallization of protein is expected to open up several possibilities in the areas of disease diagnosis, drug discovery, drug delivery and protein engineering.

aghatak@iitk.ac.in