

4th International Conference on **Nanotek & Expo**

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

The role of LB thin protein film in protein crystal growth by LB nanotemplate and robot

Eugenia Pechkova¹ and Claudio Nicolini²

¹University of Genova, Italy

²Nanoworld Institute, Italy

The crystal growth of biological macromolecules is a complex process involving numerous parameters, such as pH, temperature, micro-gravity, protein and precipitant nature and concentration etc. The utilization of Langmuir–Blodgett (LB) thin film as a template was proved to be a solution for producing diffracting, stable, highly ordered and radiation-resistant protein crystals. We tested five standard proteins (ribonuclease A, thaumatin, insulin, proteinase K and lysozyme), changing different parameters such as protein and salt concentration, number of LB layers etc. Firstly, we found out the lowest concentration of protein under which crystals cannot be grown by classical hanging drop crystallization method (so called critical concentration). Secondly, we use LB nanotemplate to grow crystals at the same conditions. Highly reproducible results were quite encouraging: from 2 to 20 LB monolayers (depending on the protein type) was enough to obtain the crystals under critical concentration, moving the solubility curve of the phase diagram of the protein in the area of lower concentrations. The observed phenomena suggests that LB template play an important role both in nucleation and in crystal growth processes, which corresponds to the microGISAX data of the very first steps of protein crystallization with and without LB nanotemplate. Furthermore using LB thin film as template in a nanoliter high-throughput robotic system we were able to reproduce the same results, obtaining also in shorter time and larger crystals with respect to classical method.

Biography

Evgeniya Peshkova is presently an Assistant Professor of Biochemistry and Biophysics at the University of Genova Medical School. After taking her Doctoral degree in Chemistry at Moscow State Lomonosov University in 1998, and the PhD in Biophysics at University of Genova in 2003, she was Scientific Director of Fondazione EL.B.A. (Electronic Biotechnology Advanced) and Principle Investigator of a big FIRB research grant on Organic Nanotechnology. Later she acquired the scientific responsibility of the laboratory of Nanobiocrystallography at the Nanoworld Institute, University of Genova. In 2007 she worked as a Visiting Scientist at the European Synchrotron Radiation Facility (ESRF) in Grenoble in Macromolecular Crystallography and Soft Condensed Matter, remaining up to now one of the PI of Radiation Damage BAG. She is author of more than 50 international scientific publications (ISI-SCI), 2 patents, several chapters to books and textbooks. She is author of "*Proteomics and Nanocrystallography*" and editor of "*Synchrotron Radiation and Nanobiosciences*" with Claudio Nicolini, "*Synchrotron Radiation and Structural Proteomics*" with Christian Riekell within the Pan Stanford Series on Nanobiotechnology. Her main scientific interests are structural proteomics, functional nanoproteomics and nanocrystallography.

eugenia.pechkova@gmail.com