Title: Advanced materials to make easier protein crystallization

Name: Benny Danilo Belviso
Istituto di Cristallografia, Consiglio Nazionale delle Ricerche, 70126 Bari, Italy

Since 60 years, X-ray crystallography provides structural details of protein molecules, information that is crucial to unravel biological mechanisms at molecular level. Crystallography requires that sample is in crystal form. Getting such crystals at acceptable quality for crystallographic analysis is not trivial and strategies to make this process less expensive and time consuming are not available, still now.

Advanced materials represent a turning point in this field because they can be exploited to control nucleation and growth step,[1] making more effective the crystallization process.

Our group is developing membrane-based materials able to trigger protein crystallization also in conditions that are not fruitful by standard methods. Such materials have a great impact both in industry and academic studies because significantly reduce cost and time of the protein purification and crystallization process. We developed membrane-materials functionalized by hydrogel[2] that proved ability in getting very stress-resistant crystals, which are suitable for structure-based drug design studies that require very harsh soaking conditions. This material, similarly to our metal oxide nanoparticle-functionalized membrane[3], significantly widens crystallization window and produce crystals having good diffraction quality.

Membrane based materials are showing very effective in protein crystallization and to produce crystals having specific features. Our efforts are focusing now in functionalizing such materials by nanotemplate to crystallize very challenging proteins such as intact antibodies, and to develop membrane able to promote biomineralization and to enable polymorphs selection.

[1] G di Profio, E Curcio, E Drioli, *Ind. Eng. Chem. Res.* 2010, 49, 11878.
[2] a)G. Di Profio, M. Polino, F. P. Nicoletta, B. D. Belviso,R. Caliandro, E. Fontananova, G. De Filpo, E. Curcio, and E. Drioli, *Adv. Funct. Mater*. 2014, 24, 1582; b) V. Mirabelli, S. M. Salehi, L. Angiolillo, B. D. Belviso, A. Conte, M. A. Del Nobile, G. Di Profio, R. Caliandro, *Global Challenges* 2018, 2, 1700089.
[3] S. M. Salehi, A. C. Manjua, B. D. Belviso, C. AM. Portugal, I. M. Coelhoso, V. Mirabelli, E. Fontananova, R. Caliandro, J. G. Crespo, E. Curcio, G. Di Profio, *Cryst. Growth Des.* 2018, 18 (6), 3317.

Biography

Benny Danilo Belviso has completed his PhD at the age of 28 years from University of Bari “Aldo Moro” and postdoctoral studies from Institute of Crystallography (CNR). He worked at Nottingham University in the MRC project to study ADAMTS13 protein structure and, now, he is research fellow at Institute of Crystallography. He is involved in several international projects related to structural biology and materials for crystallization applications, has published more than 20 papers in reputed journals.

Presenting author details
Full name: Benny Danilo Belviso
Contact number: 0039 3208079359
Twitter account: @BennyBelviso
Linked In account: benny danilo Belviso
Session name/ number: Characterization and development of novel materials
Category: (Oral presentation)