BIOENGINEERING & BIOMEDICAL ENGINEERING RESEARCH SEMINAR

BIOMIMETIC SILICA BASED NANOBIOCATALYSTS

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ABSTRACT

Silica formation in biological systems is mediated by cationic proteins and peptides. Mimicking this process, a range of simple polyamine molecules can also catalyze an analogous in vitro reaction that allow the entrapment of enzymes under mild conditions in silica nanoparticles. The original approach, although extremely simple, has the potential to be adapted to a desire enzyme establishing a new paradigm in enzyme immobilization: instead of testing multiple supports to overcome the constraints imposed by certain materials to a particular protein, one could adapt the material to obtain active and robust heterogeneous biocatalysts. With this idea in mind, our group has designed complementary approaches for the immobilization of active and stable nanobiocatalysts of a variety of single and multi-enzyme systems in biomimetic silica nanoparticles (BSiNp). Our results demonstrate a particular versatility of biomimetic nanosilica to adapt to different classes of enzymatic systems and a contribution to the rational design of integrated immobilized systems that can provide advantages over classical immobilization approaches.

BIO

Dr. Betancor is Research Prof. at the Department of Biotechnology of Universidad ORT Uruguay since 2010. Originally a Biochemist, she obtained her PhD at Universidad Autónoma de Madrid in Molecular Biology. She was a postdoc during 2005 for the Oak Ridge Institute of Science and Education at the School of Civil and Environmental Engineer of Georgia Tech and then at the Department of Biochemistry of the University of Cambridge. She has focused her scientific career in enzymology, enzyme technology and biocatalysis with diverse biotechnological applications, trying to improve the biocatalysts properties via immobilization. She is co-author of more than 50 articles in international peer-reviewed journals, 5 book chapters and 4 patents and she reviews for several journals Her research interests are focused on integration of biomolecules on micro and nanomaterials for biotransformations and the in vitro use of multi-biocatalysts systems.

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