

Title: *Experimental Nanomedicine, Nanonutraceuticals and BioNanocatalysis.*

Description: Based on our high multidisciplinary background, we provide advisement and production services for the development and characterization of conventional or advanced *on demand* multifunctional nanosystems for biomedical, nutraceutical and catalytic applications.

With regards of the *biomedical application*, the main scope is providing an integrated service focusing the precise and scalable production of different nanomaterials for: a) the targeted (active and passive strategies) and controlled (exogenous and endogenous stimuli-responsive strategies) therapy, b) the diagnosis (by multimodal molecular imaging approach) or c) the theragnosis of different pathologies such as cancers, cardiovascular or immune-based diseases. Regarding the *nutraceutical application*, we offer the design and development of biocompatible nanocarriers to be used as additives in functional foods (e.g., ω -3 fatty acids nanocapsules). Finally, with regards of *BioNanocatalysis*, we offer advanced solutions for: a) the oriented immobilization of different enzymes on a wide set of tailored heterogeneous supports and b) the creation of on demand enzyme-metallic nanoparticles hybrids as multicyclic heterogeneous systems. The main goal is to offer the rational design and the precise and scalable development of cascade multicyclic reactions.

By one hand, we can offer a revision activity of existing processes by analyzing already developed production protocols, identifying potential critical points and proposing alternative solutions.

On the other hand, thanks to our fully and state-of-the-art infrastructure, we offer the complete design, production and fully characterization (physical, chemical and *in vitro* toxicological assessment by 2D and 3D cell culture assays) of a wide set of on demand nanocarriers mainly based on biological lipids, metal oxides, magnetic nanoparticles and silica-based materials. We are also expert in i) the precise nanoparticles surface tailoring and orthogonal functionalization by ‘click-chemistry’ strategies, ii) the oriented immobilization of biomolecules (e.g., enzymes, proteins, peptides, antibodies or oligonucleotides) and iii) the creation of multifunctional nanoplateforms as contrast agents for multimodal molecular imaging (e.g., combination of MRI, PET, CT and Optical Imaging techniques).

Besides the synthesis and *in vitro* characterization, we can also provide support for the initial *in vivo* assessment (mouse models) of the demanded activities of produced nanosystems.

More information: *Nanobiotechnology for Life Sciences Lab:* <http://nanobiotech4ls.com/>

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