PROJECT

BOW

Biogenic Organotropic Wetsuits: Implantable autonomous devices and materials

The objective of BOW is to explore and consolidate a technology able to provide the capacities of the extra-cellular vesicles (EVs) to super-paramagnetic nanodevices by "dressing" them with a single- or multi-layer "wetsuit" of EV membrane "fabric".

This project has received funding from the European Union's FET Proactive programme under grant agreement Nº 952183

11	7	€4 M	4
PARTNERS	COUNTRIES	TOTAL BUDGET	YEARS

EN UN CLICK

Coordinador	Programa	Fechas
CSGI	FET Proactive	2020-2024
Sector	**Web**	
Biomaterials	Under construction	

01
Challenge

Up to few years ago, cell communication was thought to be exclusively regulated through cell-cell junctions or via exchange of soluble molecular factors. But several "nanoscale" ways, maintained within a membrane boundary, are today featuring strongly. They include membranous nanoparticles named extracellular nanovesicles (EVs) and tunneling nanotubes, which are "made by cells for cells". Their function is to transport lipids, proteins and nucleic acids, and they stand out for their precision and targeting capacity, which is achieved thanks to the unique composition and structure of their membrane (which to date is inaccessible to synthetic mimics).

02
Solution

BOW project will develop a technology able to impart biological surface precision, circulation and targeting abilities of EVs to superparamagnetic nanodevices (Magnetic Bead Devices, MBDs) by "dressing" them with a single- or multi-layer "wetsuit" of EV membrane "fabric". This will proof and set a general, viable paradigm to recapitulate key biomimetic functions – including camouflage to the immune system and organ site/tumor targeting – to any synthetic nanodevice. It will be disruptive for being the first example of biogenic nanotechnology.

03
Impacts

This non-incremental technology will promote the progress of implantable nanodevices and nanomaterials towards sustainable production and clinical translation, impacting life quality for people. Major objectives include: (i) production high-grade EVs with biomimetic and organotropic functions, (ii) synthesis and functionalization of MBDs, (iii) engineering a microfluidic device for streamlined fabrication of EV membrane coated MBDs (evMBDs) (iv) evaluation of evMBD biological performances and nanotoxiciy in-vitro, ex-vivo and in-vivo.