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Ves4US: Extracellular vesicles from a natural source for tailor-made nanomaterials

The kick-off of Ves4US took place recently in Palermo



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Ves4US is a new European project funded by the Fet-Open call of the Horizon 2020 Programme that aims to develop a radically new platform for the efficient production and functionalisation of extracellular vesicles (EVs) from a sustainable biosource, enabling their exploitation as tailor-made products in the fields of nanomedicine, cosmetics and nutraceuticals. This could allow the development of natural nanocarriers with unprecedented abilities for drug delivery in specific tissues

such as brain, lung, skin, dendritic or tumour cells.

This project was launched in Palermo recently and counted with the assistance of all the members of the consortium and main important personalities in town as well as renowned researchers and industrial representatives.

Ves4US has a total budget of 2,946,303.75€ with the EU contribution. The project will run for the next three years with 6 organizations from 6 European countries.

Safe, efficient and specific nano-delivery systems are essential to current therapeutic medicine, cosmetic and nutraceuticals sectors. The ability to optimise the bioavailability, stability, and targeted cellular uptake of a bioactive molecule while mitigating toxicity, immunogenicity and off-target/side effects is of the utmost priority. Ves4US aims at creating a fundamentally new bioprocessing approach to generate and functionalise EVs from a renewable biological source using state-of-the-art technologies.

The discovery of EVs as natural carriers of functional small molecules and proteins

has raised great interest in the drug delivery field as it may be possible to harness these vesicles for the therapeutic delivery of miRNA, siRNA, mRNA, lncRNA, peptides and synthetic drugs. However, systemically delivered EVs accumulate in liver, kidney and spleen, and some mammalian-derived secreted EVs have shown to date limited pharmaceutical acceptability because of their source. Ves4US aims to overcome these limitations by developing a biocompatible and cost-effective micro EV-based drug delivery system, which would enhance bioavailability and improve the efficacy and safety of loaded bioactive compounds.

To achieve its aims, Ves4US, will start by doing a selection of EVs-producing natural source strains that at last will get to the production of the EVs needed to develop natural nanocarriers with the abilities for drug delivery in specific tissues. Before that happens, there exists the need for doing a good research practice in a way to discover and define which will be the material needed to develop this research. If this is done correctly, not only will they have a definition but the physiochemical characterisation of EVs from a natural source and the functionalisation and cargo enrichment of itself.

The Ves4US consortium is professional and consists of 5 research centres and universities and 1 consultancy firm.

The group is led by CNR, established in Italy. The other partners are: Institute of Technology Sligo (Ireland), ETH Zürich (Switzerland), Univerza V Ljubljani (Ljubljana), MPG (Germany) and ZABALA Innovation Consulting (Spain).

Mots-clés

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