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Biomimetic Approaches towards the Creation of Artificial Cells and Organelles for Future Healthcare Solutions

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Therapeutic cell mimicry is an approach that aims to substitute for missing or lost cellular function often in the context of a missing enzyme and, thus, is expected to be a powerful tool for enzyme replacement therapy.

The main feature of biological cells and organelles is compartmentalization. There is no life without compartmentalization and biological cells have developed this strategy as a powerful tool to optimize the chemistry and physics using a single bilayer.

We have recently reported a new class of multicompartiment carriers mimicking the compartmentalized structure of a cell which consist in thousands of liposomes embedded within a polymeric carrier capsule.

In this talk I will present examples of our multicompartiment carrier working as artificial cells towards the treatment of conditions due to a malfunctioning enzyme or as an erythrocyte mimic towards the creation of a universal red blood cell substitute.

Furthermore, when administered into cells, our multicompartiment carrier can act as a “cell implant” in the form of artificial organelles that can contribute to the treatment of several cell disorders by replenishing diminished cell activity.

Therefore, in this talk I will give an insight of how this new class of therapeutics can be used as sustainable therapies for a variety of diseases.

