

Design of Biohybrid Systems for targeted cancer therapy

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“Biomimicry” derives from Ancient Greek, and it encompasses the fusion of the word *Bios* (life), and *mīmēsis* (imitation), i.e. imitation of Nature. Cells are natural biological entities that secrete small (nano) extracellular vesicles (EVs) as a mean to transport information and biomolecules into other cells. Receiving cells are then equipped with recognition motifs that enable the selective internalization of these EVs.

The imitation of this natural process that enables cells to communicate with both neighbouring and distant cells has inspired the development of new nanotechnological strategies to improve the delivery of drugs at their site of action. Our group has recently conceived nano-biohybrid vesicles, obtained through the fusion of cell-derived components with conventional synthetic materials, which represent an unreported chimeric drug delivery system (DDS) with ideal properties in terms of nano-size (which enables to reach and accumulate at the diseased area), surface cues (which preserve the targeting properties inherited from their original parent cells) as well as ease of loading and functionalization (from the synthetic components), which pave the way towards new advances in the field of nanomedicine.

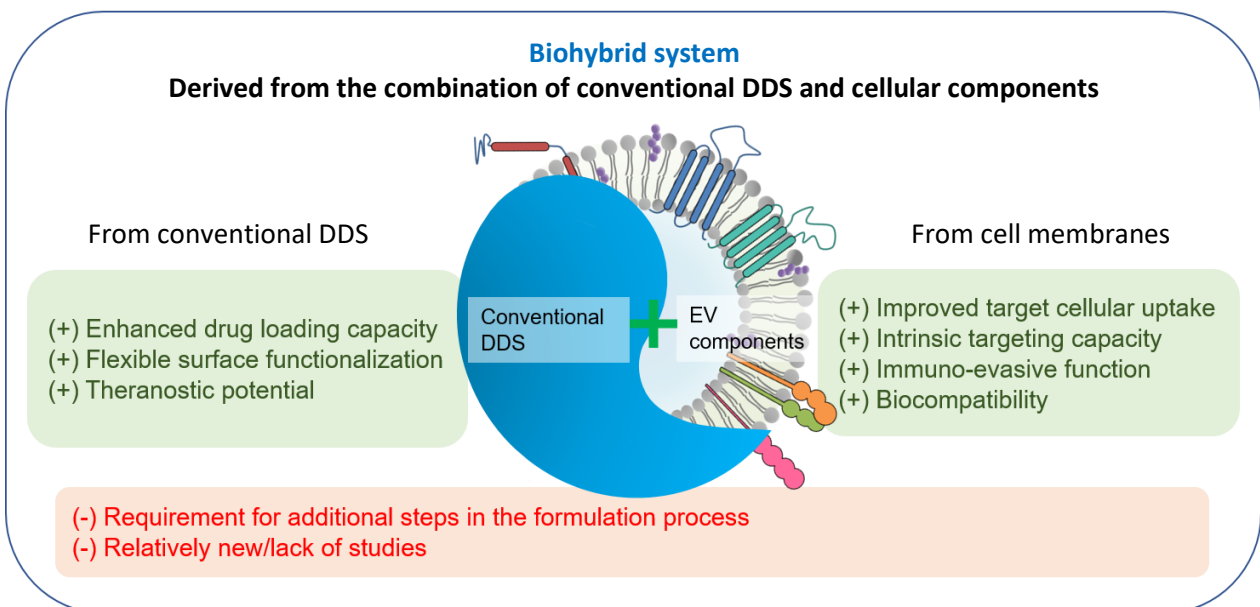


Figure: Schematic representation of a bio-hybrid system, derived from fusing lipids with cell membranes. This system is expected to adopt the beneficial properties from both conventional DDS (i.e. good drug loading capacity, flexibility in functionalization, and theranostic potential) and cellular components (i.e. good biocompatibility, improved cellular uptake and targeting, and ability to prevent premature immune clearance).

References

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