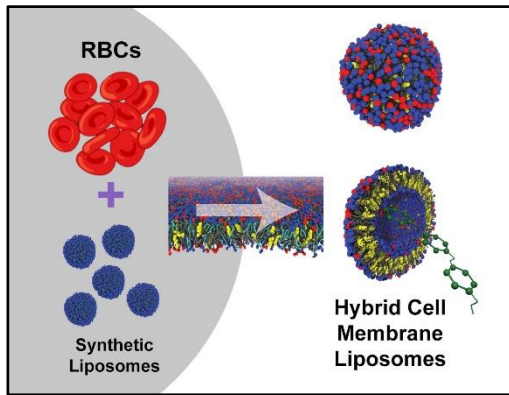


Hybrid Cell Membrane Liposomes as Carriers for Drug Delivery



The efficient preparation of hybrid red blood cell membranes allows encapsulation of molecules for drug delivery applications.

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Inventors

M. Rheinstädter

S. Himbert

M. J. Blacker

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Contact

Carmen Carrasquilla

Business Development Officer

905-525-9140 ext. 21088

carrasc@mcmaster.ca

<http://milo.mcmaster.ca>

Abstract

Current drug delivery methods that use synthetic molecules are often limited by the host's immune response and eventual rejection by the body or require costly implants to remain in a targeted location. Endogenous biological materials, such as red blood cells, can act as carriers that minimize immune reactions, transporting drugs hidden from the immune system while circulating in the blood stream for extended periods of time. However, controlling the morphology and structure of natural cell membranes has proven difficult, typically leading to liposomes with poor biocompatibility, low mechanical strength and lacking specificity with respect to target sites.

McMaster researchers have developed a process to efficiently purify biological cell membranes and modify these with synthetic lipids to create hybrid liposomes with tunable membrane properties (e.g. morphology, charge, mechanical properties). This provides the mechanical strength of synthetic liposomes combined with the benefits of endogenous cell membranes and allows for custom functionalization to increase specificity to certain targets, such as organs, tumours or infections in the body.

Applications

- Molecule encapsulation carriers for targeted drug delivery
- Particles for targeted biomedical imaging

Advantages

- Simple and efficient process allows for customization of endogenous cell membrane properties
- Hybrid cell membrane construction provides biocompatibility required for biomedical applications
- Modification of endogenous biological membranes minimizes the immune response/reaction compared to synthetic membranes, liposomes and other drug delivery carriers

News/Media

<https://brighterworld.mcmaster.ca/articles/special-delivery-mcmaster-physicists-design-super-human-red-blood-cells-to-deliver-drugs-to-specific-targets-within-the-body/>