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DODAB:MO versus novel liposomes for protein delivery: comparing toxicity and encapsulation efficiency

Vanessa Pinho[1], Mário Fernandes[1], Ana C.N. Oliveira[1], Ivo Lopes[1], Cláudia Botelho[3], José A. Teixeira[3], Maria Elisabete Cunha Dias Real Oliveira[2], Andreia C. Gomes*

*[1]Center of Molecular Environment Biology (CBMA), Department of Biology, [2]Center of Physics (CFUM), Department of Physics, University of Minho, Campus de Gualtar, 4710-057, Braga, Portugal, [3]CEB—Centre of Biological Engineering, University of Minho, 4710-057 Braga, Portugal *agomes@bio.uminho.pt*

Nanotechnological solutions for biomedicine underlie the need to carefully validate biocompatibility of the developed technology and eventual exposure risk [1].
Many lipids have been used to produce liposomes, which mimic cell membranes and are very interesting in terms of interaction with cells, tissues and organs. The features of liposomal formulations are dependent on the lipid characteristics, such amphiphile shape, electrical charge and constitution of the lipid mixture [2]. Our group developed a Dimethyldioctadecylammoniumbromide (DODAB) and monoolein (MO) formulation that was validated for delivery of different biomolecules [3] and is now being optimized for protein delivery. These liposomes were compared with a novel liposomal formulation, which consists in a mixture of 5 different lipids similarly to vesicles produced by human cells.
The purpose of this comparative study was to identify the most suitable formulation for efficient delivery of proteins, specifically of bioactive cytokines, to human cells with the minimal toxicity.
Both types of formulations were characterized in terms of size (DLS), surface charge (zeta potential) and stability. Using small quantities of model protein bovine albumin serum (BSA), we optimized the sensitivity of the quantification by the Bradford method, to calculate encapsulation efficiency in both systems. Toxicity was evaluated using *in vitro* animal cell models (MTT assay), hemolysis assessment (spectroscopy).
The balance between efficiency in cargo loading and delivery, and toxicity assessment, is crucial to better adjust the formulation according to the intended application.
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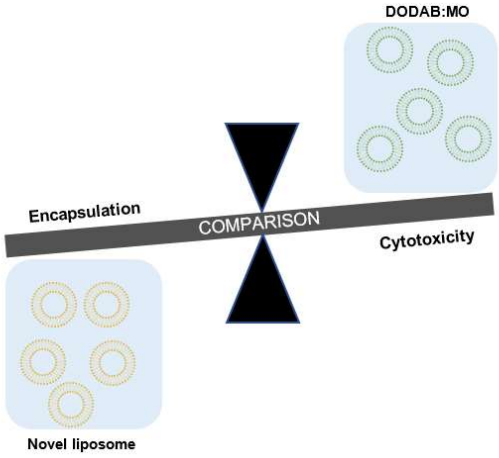

Figure 1 Comparison between encapsulation and cytotoxicity parameters regarding novel liposomes and DODAB:MO formulation.

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