

Fatty acid vesicles as drug carriers

Type of project: Bachelor (10 or 15 ECTS) or Master (30 or 45 ECTS)

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Language: Danish or English

Project description

Liposomes are intensively studied as drug carriers for both lipophilic and hydrophilic drugs and some liposome formulations are already in clinical use [1,2]. However, mixtures of cationic and anionic amphiphiles can also form vesicles in aqueous dispersions, for example fatty acids in admixture with cationic surfactants such as trimethyldecylammonium bromide [3]. Such vesicles have been used, for example, as models for artificial cells (Luisi et al., 1999) but they have not yet been explored for drug delivery purposes.

The aim of the projects is to explore such fatty acid vesicles as drug carriers. Due to their composition (a combination of a fatty acid and a cationic surfactant) as well as their sensitivity against pH changes and dilution, fatty acid vesicles may provide interesting opportunities especially for oral and (trans)dermal drug delivery. In addition to studies on efficiency of drug incorporation, physical stability and drug release properties, formulation optimization with respect to the use of amphiphiles (e.g. replacing the cationic amphiphil) to obtain a formulation with better physiological compatibility presents a major focus of the projects.

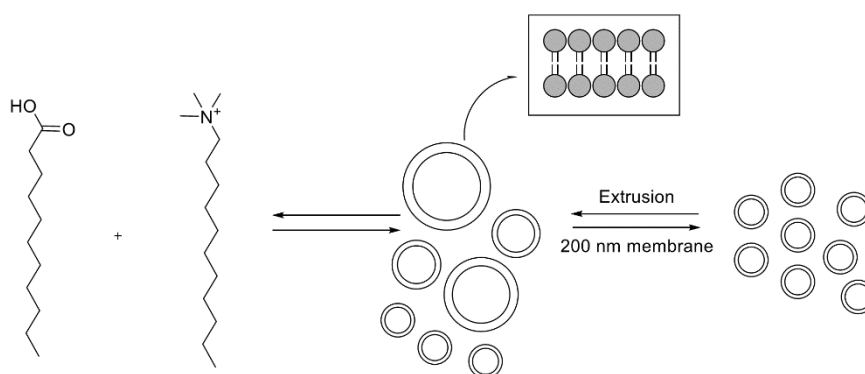


Figure 1: Schematic illustration of the preparation of fatty acid vesicles composed of lauric acid and dodecyltrimethylammonium bromide (from: A. Abourashed, Bachelor report 2016, SDU).

References

- [1] D.D. Lasic. Novel applications of liposomes. *Trends Biotechnol.* 16 (1998) 307-321.
- [2] Y. Barenholz,. Doxil – The first FDA-approved nano-drug: Lessons learned. *J. Control. Rel.* 160 (2012) 117-134.
- [3] F. Caschera, J. Bernardino de la Serna, P.M.G. Löffler, T.E. Rasmussen, M.M. Hanczyc, L. Bagatolli, P.A. Monnard. Stable vesicles composed of monocarboxylic or dicarboxylic fatty acids and trimethylammonium amphiphiles. *Langmuir* 27 (2011) 14078-14090.