

# From Micelles to Vesicles: Basic Aspects of the Self-Organization of Fatty Acids

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Although fatty acids are chemically simple amphiphiles, they self-organize in the presence of water into a variety of different aggregates, depending on the total concentration, on the degree of ionization and on the temperature [1]. In the presence of more than 95 wt% water and above a critical concentration, micelles and vesicles form depending on the ratio of ionized to non-ionized fatty acid (depending on pH) [2]. In systems containing a large excess of ionized fatty acids, polar head group repulsions lead to the formation of micelles (at alkaline pH), while mixtures containing approximately equimolar amounts of ionized and non-ionized fatty acids self-assemble into vesicles (at intermediate pH) as a consequence of intermolecular hydrogen-bonds within the head group area [2-4]. Basic studies on the formation of vesicles from three types of fatty acids have been carried out: decanoic acid, oleic acid (*cis*-9-octadecenoic acid) and *cis*-4,7,10,13,16,19-docosahexaenoic acid [5-7]. A comparison of the physico-chemical properties of fatty acid vesicles with conventional phospholipid vesicles (liposomes) emphasizes the advantages and disadvantages of using vesicles formed from this particular type of single-chain amphiphile.

## References:

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