Understanding the adsorption of salmon calcitonin, antimicrobial peptide AP114 and polymyxin B onto lipid nanocapsules

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Résumé en anglais	The adsorption of therapeutic molecules, e.g., peptides, onto nanocarriers is influenced by the properties of the carrier, adsorbed molecule and continuous phase. Hence, through changes in the composition of the nanocarrier and the medium, it should be possible to tune the system to make it capable of efficiently adsorbing peptides. The adsorption of calcitonin, antimicrobial peptide AP114 and polymyxin B onto lipid nanocapsules was investigated. The adsorption data were fitted to a Langmuir isotherm. Dynamic light scattering and laser Doppler velocimetry were used to investigate the changes in the hydrodynamic diameter and zeta potential, respectively, of the nanocarrier. The peptide adsorption was primarily governed by electrostatic forces; however, even without the presence of an ionisable surfactant, a significant amount of each tested molecule was adsorbed due to the enormous surface area of the nanocarriers and to peptide-nanocarrier interactions. The addition of an ionisable lipophilic surfactant, lecithin, improved the adsorption yield, which reached values of up to 100%. The adsorption yield and the properties of the nanocarrier, particularly the zeta potential, depended on the carrier and peptide concentrations and their mixing ratio. The adsorption of all tested molecules obeyed the Langmuir model over a limited concentration range.
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Liens
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