WATER BETWEEN LIPIDS: DOMAINS FOR PEPTIDES INSERTION?

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Results of capacitance values of monolayers at different areas denote that in a state at which the area per lipid is above a critical value water path are formed beyond the hydration shell of the lipids.
This area increase is just 12% of the area for lipids in the expanded state and is comparable to that at which the insertion of proteins and peptides takes place in a variety of lipid composition. Therefore, it is concluded that for a broad lipid composition, two states of water can be distinguished: the hydration water and the confined water. These water paths formed by expansion imply the entrance of few water molecules into the lipid network. Interestingly some aminoacids having biological activity are able to induce those water paths which contribute significantly to the kinetics and stabilization of the peptide-membrane interaction. The discussion is therefore the kinetics of formation; the thermodynamic and structural properties of those water restricted microenvironments and its relevance in the selective modulation of the protein-membrane interaction.
One important feature is to analyze the state of water induced by the different kinds of groups at the interface region that may act as donor or acceptors in H-bonds, for instance, PO, CO and NH. The analysis is made considering surface pressure and capacitance values in monolayers and compared with structural data obtained by means of standard FTIR and biodimensional infrared spectroscopy.
We will use this information for a further insight on the insertion of positively charged peptides into lipid membranes as described by molecular dynamics. .