

On the chemistry of ion exchange in monomolecular layers of lipids

Santis, Marcella

Rojas, Eduardo

The main purpose of this work has been to study further the association of cations and anions with cell membrane lipids, in particular with phosphatidylcholine. The adsorption of Ca^{2+} or SO_4^{2-} to phosphatidylcholine monolayers (measured with isotopes) shows that there is no uptake of these ions under various experimental conditions including different bulk pH values and concentrations. The presence or absence of charges in monomolecular films of lipids can be inferred by utilizing a method of analysis proposed here; it depends on the study of the cation and anion exchange properties of each functional group found in lipids. To mimic the structure of the polar head of phosphatidylserine and phosphatidylcholine, surface-active molecules with phosphoric, carboxyl and trimethylammonium groups were combined in various proportions and used to form a mixed monolayer. The uptake of Ca^{2+} or SO_4^{2-} by mixed monolayers of octadecyltrimethylammonium and octadecyl phosphate (both groups present in