482d Competitive Adsorption of Fibrinogen and Dipalmitoylphosphatidylcholine at the Air/Aqueous Interface

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The competitive adsorption of fibrinogen (FB) and DPPC at the air/aqueous interface, in phosphate buffer saline at 25 oC, was studied with tensiometry, infrared reflection absorption spectroscopy (IRRAS), and ellipsometry. For FB/DPPC mixtures, the tension behavior was found to be similar to that of FB when alone, even with DPPC and FB being at the interface. Thus, FB interferes with adsorption of DPPC and inhibits its surface tension lowering ability. When FB protein is introduced in the solution after a DPPC monolayer has formed, the adsorption of FB is inhibited by the DPPC monolayer. When a DPPC monolayer is spread onto a solution with a preadsorbed FB layer, the DPPC monolayer excludes FB from the surface and controls the tension behavior with little inhibition by FB. When a DPPC dispersion is introduced with Trurnit's method, or sprayed dropwise, onto an aqueous FB/DPPC surfaces, the DPPC layer formed on the surface prevents the adsorption of FB and dominates the surface tension behavior. These results have implications in controlling the inhibition of lung surfactant tension behavior by serum proteins, when they leak at the alveolar lining layer, and in developing surfactant replacement therapies for alveolar respiratory diseases.