



LIQUID CRYSTAL MATERIALS
RESEARCH CENTER
SPECIAL SEMINAR SERIES

Adsorption Behavior of Lung Surfactants

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Lung surfactant adsorption to an air-water interface is strongly inhibited by an energy barrier imposed by the competitive adsorption of albumin or other surface-active serum proteins, and is likely one cause of surfactant inactivation in Acute Respiratory Distress Syndrome. The reduction in surfactant adsorption is quantitatively described using a variation of the classical Smolukowski analysis of colloid stability. Albumin adsorbed to the interface induces an energy barrier to surfactant diffusion of order $5 k_B T$, leading to a reduction in adsorption equivalent to reducing the surfactant concentration by a factor of 100. Adding hydrophilic, non-adsorbing polymers such as polyethylene glycol to the subphase provides a depletion attraction between the surfactant aggregates and the interface that lowers the energy barrier. Surfactant adsorption increases exponentially with polymer concentration as predicted by the simple Asakura and Oosawa model of depletion attraction, which restores normal surfactant function.

Friday, March 30 at 12:00pm
Duane Physics 11th Floor Commons Room



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