



## FRONTIERS IN MICRORHEOLOGY



### **Applied microrheology: A crucial need for determining viscoelastic properties of local domains in the study of Respiratory Distress Syndrome**

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**Abstract:** Lung surfactant (LS) is a complex mixture of lipids and proteins originating from the type II cells that line the alveolar epithelial walls. LS reduces surface tension in the alveolar spaces, which minimizes the work of breathing and prevents alveolar collapse. A lack of functional surfactant due to premature birth leads to neonatal Respiratory Distress Syndrome (nRDS) which is routinely treated with animal derived replacement surfactant. One of the essential features of good LS is to reduce the surface tension, which may correlate with an increased surface viscosity at as the surface tension decreases. Monitoring the macroscopic viscoelastic properties of interfacial films is essential to understanding how rheological properties depend on lipid and protein composition, packing properties and other variables at different states of the breathing process.

In addition, there is a crucial need for determining viscoelastic properties in single lipid domains in multiphase monolayers to determine both the local and global features of monolayer viscoelasticity. We will demonstrate for the first time ever an experimental setup which introduces microrheology and imaging to the field of bio-logically relevant monolayers and lung surfactants.



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