

Permanent petal-shaped stain in lung formed by air-to-interface transport of blood

이현로, 박수진, 최시영[†]

KAIST

(sqchoi@kaist.ac.kr[†])

Serum proteins are thought to cause a sudden lung failure, but the mechanism remains elusive to date. Most studies focused on the transport of proteins from the subphase to the interface of the lung surfactant, even though the opposite way of transport, i.e. from air to interface, could be equally important. We report here that physiological concentrations of serum droplets can quickly form a film when exposed to air, and the whole film can be transferred to the lung surfactant interface upon coalescence, displacing it. Even for several cycles of biaxial compression and expansion, this film was mechanically stable and remains intact. Our results provide a new mechanism for the replacement of lung surfactants with serum proteins that differs fundamentally from the subphase-to-interface transport. We show that it is almost impossible to remove the film at the interface of the lung surfactant, and thus permanently impair the lung.