Keeping Lung Surfactant Where It Belongs

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Lung surfactant causes the surface tension in the alveoli to drop to nearly zero on exhalation; in the upper airways the surface tension is about 30 mN/m and constant. Hence, a surface tension gradient exists between alveoli and airways that should lead to surfactant flow out of the alveoli and elimination of the surface tension gradient. However, the lung surfactant specific protein SP-C enhances the resistance to surfactant flow by altering the ratio of solid to fluid phase in the monolayer, leading to a jamming transition. The accompanying 3 orders of magnitude increase in surface viscosity minimizes surfactant flow to the airways, and likely stabilizes the alveoli against collapse.