Images in Cellular / Molecular Medicine

Cellular components of the air-blood barrier

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The lung is a complex organ of defined vital functions such as the respiratory and metabolic functions that interrelate and influence each other. The lung is perfectly adapted to fulfill the exchanges of gases. The latter takes place at the level of the alveolar capillary unit composed of the endothelial cells (lining the capillaries) and the epithelial cells (covering the alveoli). A peculiarity of the alveolar-capillary endothelium is the existence along the same cell of two well defined areas: (i) an

avesicular zone, a thin area (35 to 65 nm) that has few or no plasmalemmal vesicles, generally in close apposition with alveolar type I epithelial cell and (ii) a *vesicular zone* that is thicker (~200 nm) and, as in other endothelia, is provided with numerous plasmalemmal vesicles. The *avesicular zone* together with the corresponding type I epithelial cell and their basal laminae, often fused, constitute the *air-blood barrier*, at the level of which, the major exchanges of O₂/CO₂ take place.

Keywords: alveolar endothelium • air-blood barrier • alveolar type I epithelial cell • plasmalemmal vesicles

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Fig. 1 Pulmonary air-blood barrier. Longitudinal section through an alveolar capillary (rat lung) occupying almost completely the alveolar wall. The thin *avesicular zone* (az) of the endothelium and the adjoining type I epithelial cells (epi) constitute the air-blood barrier (between arrows), vz = vesicular zone of endothelium; s = surfactant. x 9300. **Inset.** Albumin adsorbed to gold particles binds specifically to albumin binding proteins located on uncoated pits (arrow) and vesicles opened to the endothelial luminal plasma membrane (pm). l, lumen.

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