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## Respiration

**LUNG ULTRASTRUCTURE** Morphology which correlates structure and function of the lung requires fixation techniques which preserve the lung in a condition close to its physiologic state. With standard methods, the fixatives are instilled into the airways. The results are adequate for most studies, provided that conditions are standardized with reference to the toxicity of the instillate (it should be isotonic), and the pressure under which it is injected is controlled. This technique, however, does alter the morphology of the extracellular materials, including the alveolar lining layers, surfactant, and the mucous lining of the bronchial tree. To preserve these factors, the author recommends that the fixative be perfused through the lesser circulation, while airway pressure is kept constant, with the transpulmonary and perfusion pressures under close control. A set of five solutions was administered directly into the

pulmonary artery: 1) Ringer's solution containing papaverine sulfate and heparin; 2) 1.5 per cent glutaraldehyde with 1.5 per cent dextran in collidine buffer; 3) Ringer's solution alone; 4) osmium tetroxide with 1.5 per cent dextran in collidine buffer; 5) uranyl acetate in maleate buffer. The dextran adjusts the colloidal osmotic pressure to levels similar to blood. With this technique the author was able to visualize clearly the extracellular lining layers and also to identify tubular myelin figures as a major component of the alveolar lining layer. Intravascular perfusion fixation will also preserve other extracellular liquids in the lung, such as the lining layer of airways and intra-alveolar edema. The author suggests that this technique would be of special value in studies of air pollution. (Gil, J.: *Ultrastructure of Lung Fixed under Physiologically Defined Conditions*, *Arch. Intern. Med.* 127: 896-902, 1971.)