

Volumes and Ventilation

I. Events of the breathing cycle

A. Phases of the respiratory cycle

1. Inspiration

2. Expiration

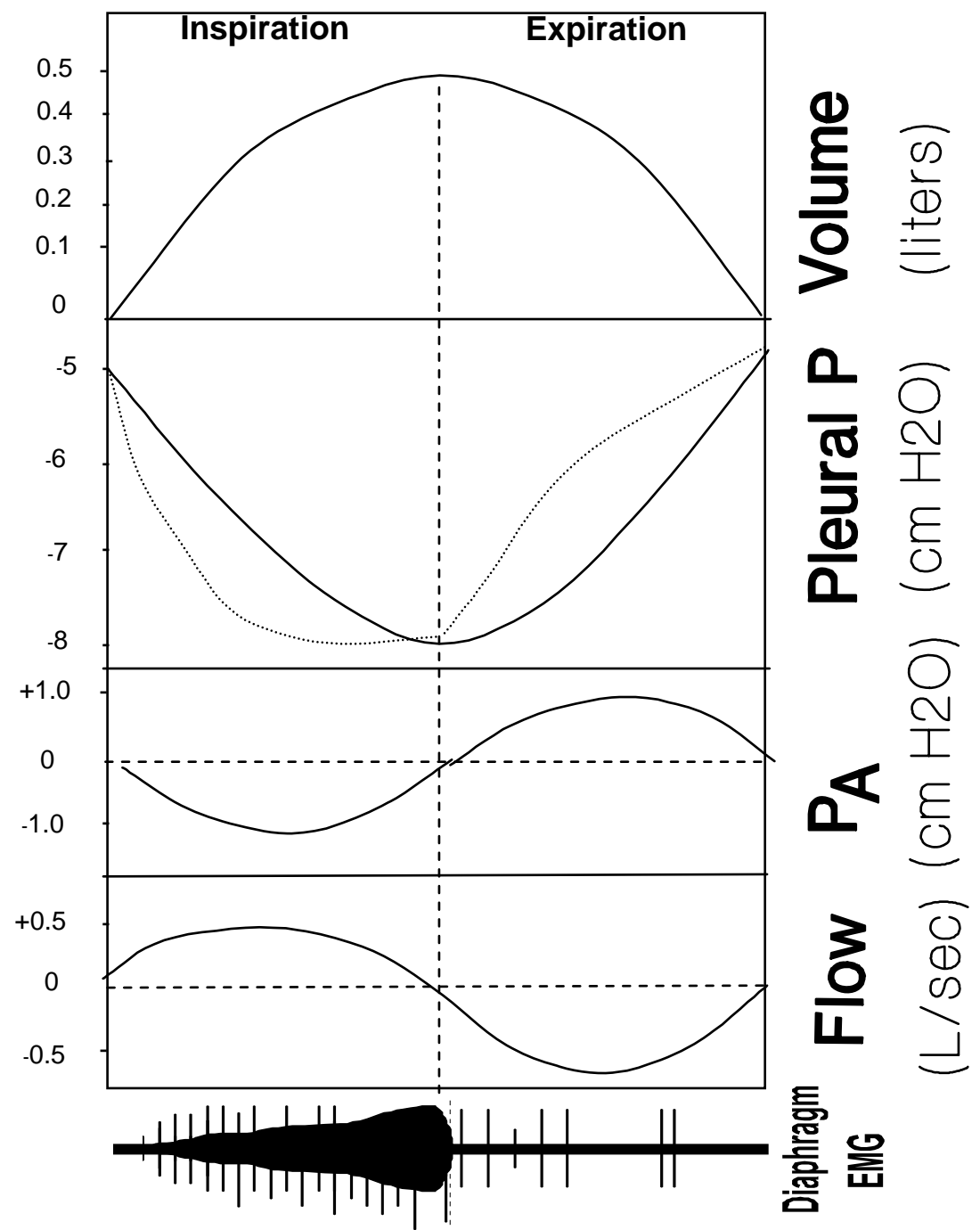
B. Volume of a breath

C. Airflow

D. Pressure, airflow and volume changes during a breath

$$\dot{V}_E = V_T * f$$

Minute Ventilation Tidal Volume Breathing Frequency



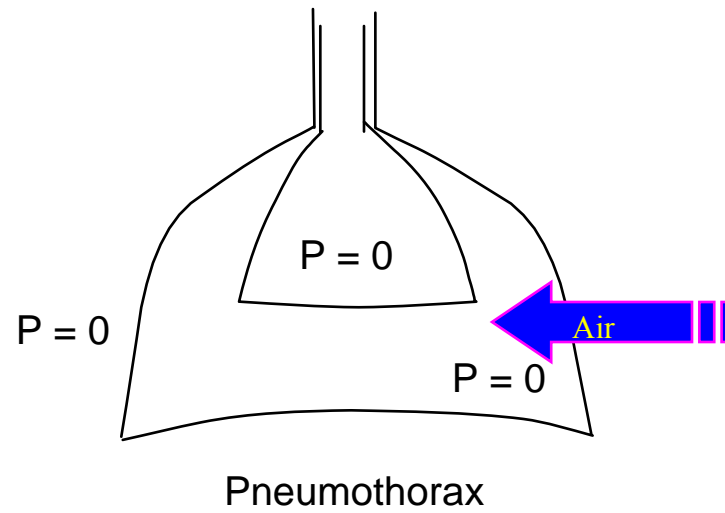
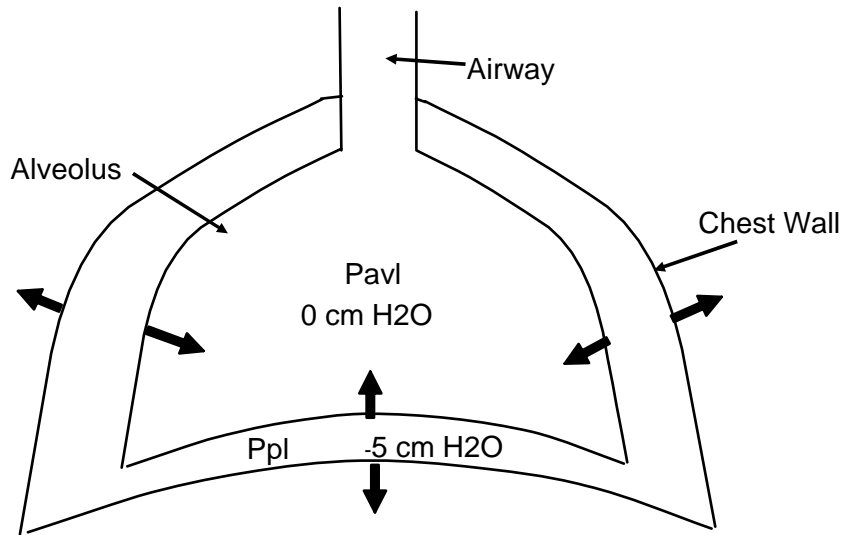
II. Compliance of the Lung - Part 1

A. Collapsing forces of the lung

1. surface tension

2. lung elastic recoil

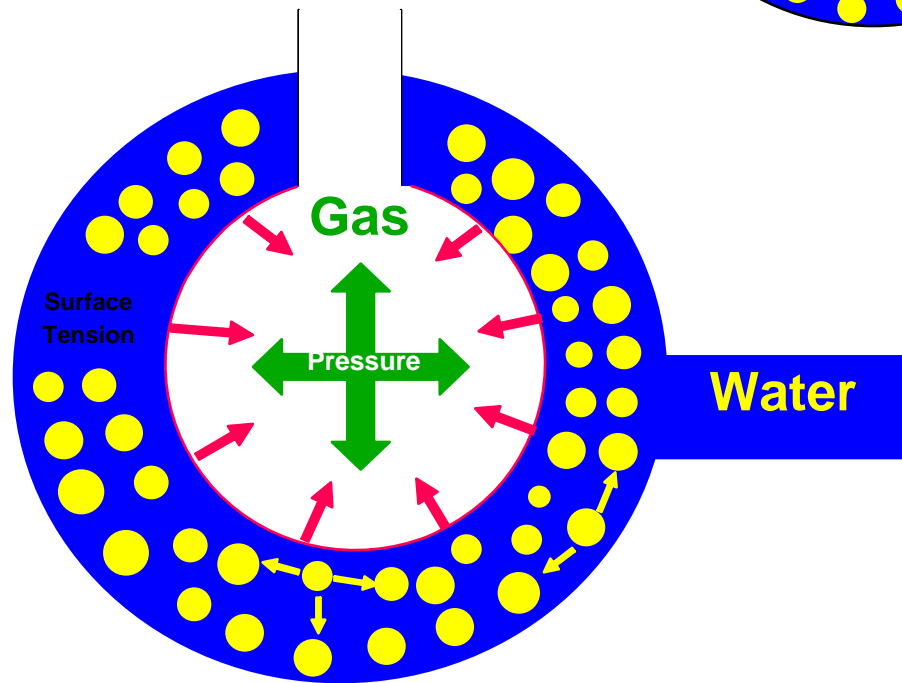
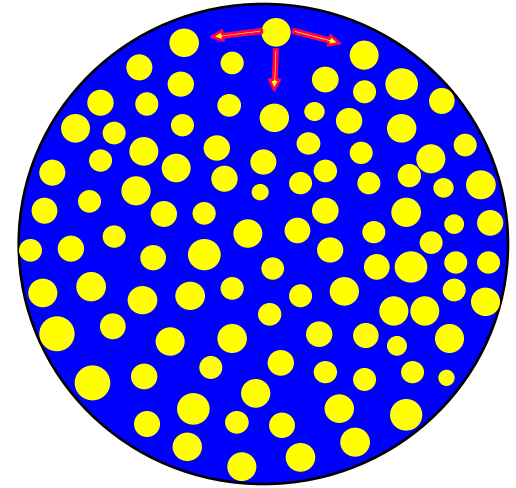
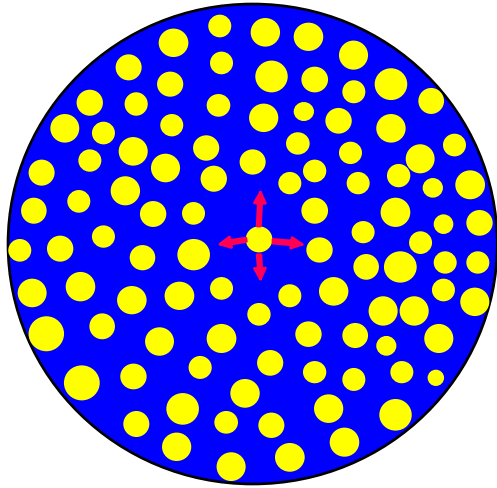
3. Compliance = $\frac{\Delta V}{\Delta P}$ $\frac{\text{ml}}{\text{cmH}_2\text{O}}$



B. Molecular attraction

C. Air-liquid interface

D. Surface tension



Laplace Law $P = \frac{2\tau}{r}$

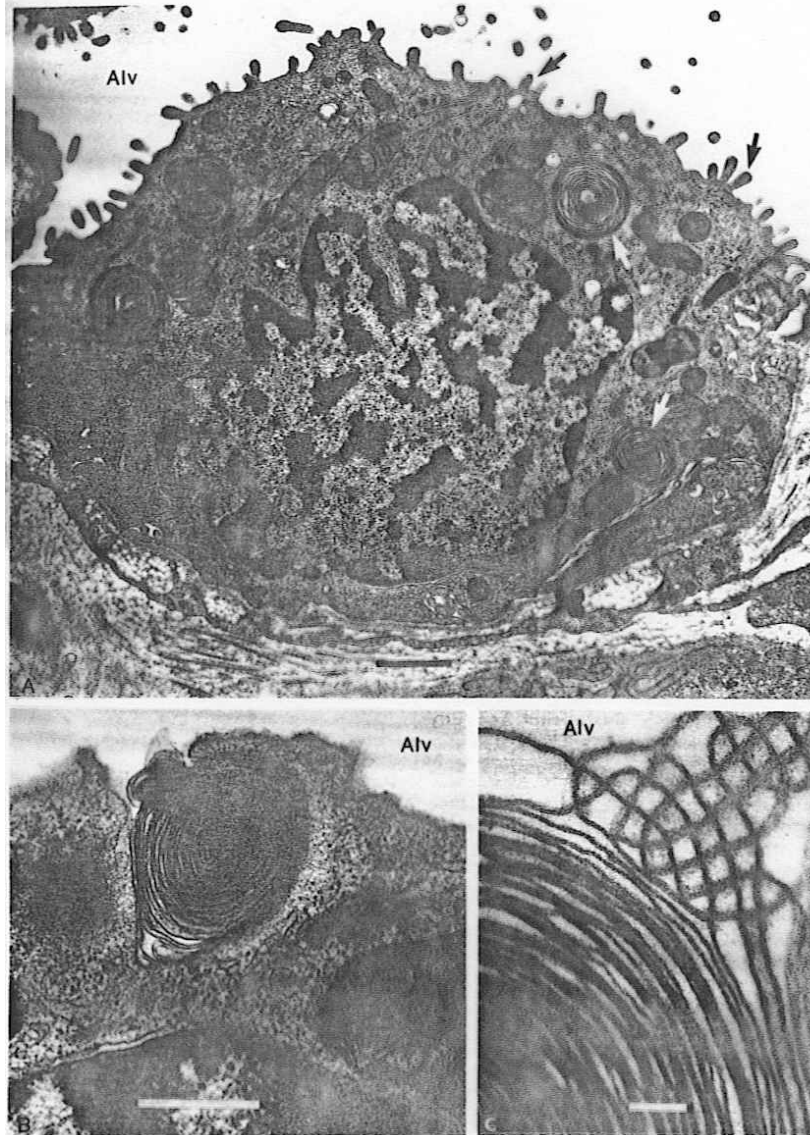
III. Surfactant

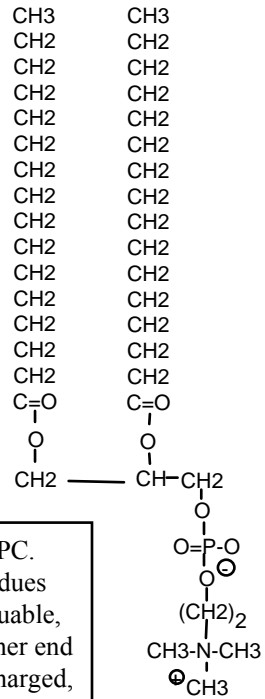
A. Molecular nature

B. Production

C. Consequences of surfactant
insufficiency

Alveolar Type II Cell





The structure of DPPC.
 The 2 palmitate residues
 are oily, water insoluble,
 hydrophobic; the other end
 of the molecule is charged,
 water soluble, hydrophilic.

Alveolar Type II Cell

