

PULMONARY FUNCTION I

COURSE: Systems Biology, BMSC 414, Tissue and Organ Function

LECTURE: Lecture 19, Pulmonary Function I

DATE: Wed., Nov. 12, 2008, 1:30-3:00 PM

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REQUIRED READING ASSIGNMENT:

Costanzo's Physiology, Third Edition, 2006, Chapter 5 (pp. 183-209)

LEARNING OBJECTIVES

1. To understand how air is pulled into and pushed out of the lungs on a cyclic basis, breath by breath.
2. To describe the structural and functional distributions and divisions of airway and lung volumes in humans.
3. To grasp static principles of the pulmonary system including compliance, elastance, and surface tension forces.
4. To grasp dynamic principles of the pulmonary system including airflow, pressure gradients, resistances and conductances.
5. To know and apply the principle of gas partial pressures and their important in gas transfers across the respiratory membrane.

REVIEW QUESTIONS

1. How does diaphragmatic contraction results in an inhalation of air and how can expiration can be either passive or active?
2. Why is intrapleural pressure usually sub-atmospheric (negative) and when can it actually exceed atmospheric pressure (become positive)?
3. What are the differences between conductance and compliance in pulmonary physiology?
4. Can you trace out lung volume, intrapleural pressure and alveolar pressure as functions of time during the three phases of a normal eupnic breath?
5. Why do the fluxes (mL/min) of O₂ and CO₂ across the respiratory membrane increase during a voluntary hyperventilation maneuver?