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Heart and Lung

Problem Set B: Respiratory Topics

This study guide will go over big points covered in lectures pertaining to the respiratory system.

1. Draw a spirometry curve on a graph with volume on the y-axis and time on the x-axis. Label the tidal volume, residual volume, total lung capacity, forced vital capacity, complete breath-out, and complete breath-in.

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2. Draw an inspiration/expiration curve on a graph with volume on the y-axis and time on the x-axis.

3. Draw an inspiration/expiration curve on a graph with expiratory flow (L/sec) on the y-axis and time on the x-axis.

4. Draw an inspiration/expiration curve on a graph with pleural pressure (cm H2O) on the y-axis and time on the axis.

5. Draw an inspiration/expiration curve on a graph with alveolar pressure on the y-axis and time on the x-axis.

6. Draw a graph of tidal breathing and explain what hysteresis is. In addition, explain the function of pulmonary surfactant.

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7. Ventilation is _____ distributed throughout the lung because _____. The apex of the lung is _____ and has _____ compliance. The base of the lung is _____ and has _____ compliance. When you inspire, the _____ expands first.

8. Pressure is _____ in the pulmonary capillaries, but the cross-sectional area of the pulmonary capillaries is _____. In addition, vascular resistance is _____ and compliance is _____. If the capillary hydrostatic pressure increases or the lymphatic drainage decreases, the result is _____. Perfusion is not uniform due to _____.

9. What is the overall ventilation/perfusion ratio? How is this ratio at the apex different from the ratio at the base?

10. Describe how the following conditions would affect the ventilation/perfusion ratio.
    a. Anatomical shunts
    b. Physiological shunts
    c. Pulmonary embolism
    d. Reduced cardiac output