Respiratory FAQ's

Chapter1
Stability of alveoli x2

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| The terminal bronchioles are the smallest airways without alveoli | | |
| The conducting airways constitute the anatomical dead space | | |
| Anatomical dead space is about 10 ml/kg | | |
| The portion of the lung distal to the terminal bronchus is called the acinus | | |
| The volume of the respiratory zone is about 7 L | | |
| During inspiration the volume of the thoracic cavity increases due to relaxation of the diaphragm and constriction of the intercostal muscles | | |
| Airflow to the level of the terminal bronchioles if by bulk flow | | |
| In the respiratory zone diffusion is the dominant mechanism of ventilation | | |
| Inhaled dust frequently settles in the trachea | | |
| How long does a red cell spend in a normal capillary | | |

Chapter 2 Ventilation
Dead space / Dead space and lung volumes / Lung volumes x3
Pressure changes in inspiration and expiration
Regional differences in ventilation and blood flow x12

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| A  normal total lung capacity is about 7 litres | | |
| Total lung capacity plus residual volume = vital capacity | | |
| Normal alveolar ventilation is about 5 l/ min | | |
| Normal pulmonary blood flow is about 5 l/min | | |
| A spirometer can be used to measure the RV and the FRC | | |
| The anatomic dead space is the same as the physiologic dead space | | |
| The dependant portion of the lung is better ventilated than the non dependant areas | | |
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Chapter 3 Diffusion
Perfusion/diffusion limited diffusion x3
Gas transfer across capillaries

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| What is ficks law | | |
| Oxygenation of blood depends on the lung volume, alveolar thickness, the amount of O2 carried by the arterial blood | | |
| What is the thickness of a normal alveolus | | |
| The diffusion constant is dependant of the tissue and the property of the gas | | |
| The diffusion constant is proportional to the solubility and the moleculare weight of the gas | | |
| CO2 diffuses 20x faster than O2 because it has a smaller molecular weight | | |
| NO2 is perfusion limited because it is about equally soluble in the blood gas barrier as it is in blood | | |
| CO is diffusion limited because …. | | |
| O2 is diffusion limited in normal situation because it binds so well to Hb | | |
| Diffusion limitation may be seen in a patient with a thickened alveolus | | |
| Exercise does not result in diffusion limitation in a normal subject | | |
| The rate of reaction of CO2 and O2 with Hb is a cause of perfusion limitation | | |
| Diffusion is only dependant on the alveolar membrane | | |

Chapter 4 blood flow and metabolism
Pulmonary circulation x3
Pulmonary vasc resistance
Non resp functions of the lung
Erythorpoetin – function, sources and control of secretion

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| The pulmonary arteries run with the bronchi to the level of the terminal bronchioles | | |
| The pulmonary capillary bed is a set of discrete capillaries running in parallel, like street parking | | |
| The pulmonary mean pressure is about 15 | | |
| The pre and post cap pressures are.. | | |
| Pulmonary arteries are very muscular | | |
| The smooth muscle in the walls of the extra alveolar vessels constrict and increase resistance with histamine, serotonin and noradrenaline | | |
| The main drop in pulmonary pressure is just prior to the capillary bed | | |
| The average pulmonary capillary pressure is about equal to atmospheric pressure | | |
| As arterial or venous pressure increase the pulmonary vascular resistance increases to protect the lung from pulmonary oedema | | |
| Lung volume has no effect on the resistance of the intraalveolar circulation | | |
| When standing on your head the pulmonary blood flow to the apex is less than the base of the lung | | |
| With exercise regional differences in perfusion are increased | | |
| The difference in pressure between the top and bottom on the lung is about 12 mmHg | | |
| In the top of a normal lung PA>pa>pv | | |
| In the middle of a normal lung venous pressure has no effect of blood flow | | |
| Hypoxic vasoconstriction depends on CNS and O2 content of pulmonary arteriolar blood | | |
| At high altitude there is generalised pulmonary vasodilation to assist in improving ventilation | | |
| The lung is responsible for inactivating a number of vasoactive peptides including angiotensin and bradykinin | | |
| The lung synthesises surfactant components and mucopolysaccharides | | |

Chapter 5 ventilation perfusion relationships
Alveolar gas equation x3
Effects of posture on V/Q ratio
Physiologic shunts in the lung

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| What is the alveolar gas equation | | |
| Alveolar O2 varies +/- 20mmHg with respiration | | |
| What are the 2 mains groups of causes of hypoventilation | | |
| A shunt is blood that enters the arterial system without going thru the lungs | | |
| Give 3 Example's of shunts | | |
| CO2 is generally elevated in people with shunts | | |
| Supplemental oxygen will increase the O2 sat in a person with a shunt | | |
| List the 4 causes of hypoxia | | |
| At a high v/q the co2 will be 50 | | |
| Ventilation and blood flow are both highest at the base of the lung | | |
| The Va/Q is steady across the height of the lung | | |
| In a normal person the A-a difference is about 40 mmHg | | |
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Chapter6
CO2 transport x5
O2 dissociation curve x2
O2 transport
Resp response to acidosis x2

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| How is O2 carried in the blood | | |
| How is CO2 carried in the blood | | |
| For an O2 saturation of 75%, the PO2 is about 40 which is approx normal venous blood | | |
| Normal Hb is composed of an iron-porphyrin compound joined to 4 protein globulin chains | | |
| The ferrous ion can be oxidised to ferric by nitrites, sulphonamides and acetanilid to result in methemoglobin | | |
| O2 saturation is defined as… | | |
| Oxygenated Hb is the tense form conformationally | | |
| O2 concentration of blood = (1.39x Hb gm/lxsat/100) +.003PO2 | | |
| The O2 affinity of Hb is increased acidosis, heat, increase 23DPG | | |
| The bohr effect is … | | |
| 23dpg is an end product of red cell metabolism and is increased in chronic hypoxia | | |
| P 50 is about 27mmHg | | |
| How is CO2 carried in the blood | | |
| CO2 is dissolved in the blood at 0.03mmole/l | | |
| Co2 is converted to bicarb only in the blood cells where there is plenty of carbonic anhydrase | | |
| H+ rapidly diffuses out of the cell down an electrical gradient | | |
| Chloride enters the cell by a process know as the Haldane effect | | |
| Deoxygenation of the hemoglobin increases its capacity to carry H+ | | |
| CO2 is carried by the terminal amine group of blood proteins, albumin is the most important of these | | |
| Carbamino compounds are the most import way that CO2 is carried in the blood | | |
| The CO2 curve is very straight compared to the O2 curve | | |
| The a-v difference of CO2 is about 50 mmHg | | |
| Bicarb and CO2 are controlled mainly by the | | |

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| kidney | | |
| Whenever the CO2 rises the bicarb must also rise in a pure AB disorder | | |
| Ph 7.25 CO2 60 bic 28 suggests what sort of AB disorder | | |
| Ph 7.2 CO2 40 bic 15 suggests what sort of disorder | | |
| List causes of resp alkalosis | | |
| List causes of metabolic acidosis | | |
| List the four types of hypoxia and explain | | |

Chapter7
Alveolar surface tension and surfactant
Regional differences in ventilation and blood flow x12
Factors affecting the work of breathing
Airway resistance x2
Compliance of lung and chest wall / Elastic properties of the lung x3

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| The diaphragm is supplied by T345 | | |
| The diaphragm normally moves 1 cm with gentle resp and 5 cm with forced resp | | |
| External intercostals contract and increase the lateral and the AP diameter of the chest | | |
| The internal intercostal prevent the ic spaces from bulging during staining and they assist in inspiration | | |
| What is the role of surfactant | | |
| The bass of the lung has a smaller resting volume and a larger change in volume than the apex | | |
| The intrapleural pressure ranges from 0 at the bottom to -3.5 cmH2O at the top | | |
| poiseuilles law states that velocity of flow is proportional to radius and inversely proportional to density of the gas | | |
| Heliox has a lower density and has less turbulent air flow | | |
| What is Reynolds number | | |
| Draw the pressure/volume/flow graphs for normal breathing | | |
| The major sites of airway resistance are the terminal alveoli because they are so narrows | | |
| Higher lung volumes increase the amount of airflow resistance | | |
| Beta 1 agonists are found principally in the lung, uterus and | | |
| The terminal portion of the flow volume curve is dependent on effort | | |
| WOB | | |
| Uneven ventilation | | |

Chapter 8
Control of ventilation x6
Chemical control of breathing

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Chapter 9
Effect of altitude on respiration x5
Effects of exercise on ventilation x4

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Chapter 10
Pulmonary function testing

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