
Seminar XII. Respiration (11/10/2017).
Resistance in the respiratory system. Neuroregulation of the respiratory system.
1. Resistance in the respiratory system – division.
2. Elastic resistance:
   • Lung compliance,
   • Elastic recoil of the chest wall.
5. AWR – airway resistance – effect of autonomic nervous system to airways.
6. Static, dynamic (hysteresis loop) relationships of volume and pressure.

Seminar XIII. Respiration (18/10/2017).
Neuroregulation of respiratory system.
2. Respiratory cycle.
3. Classical understanding of function of respiratory neurons.
   • Inspiratory centre.
   • Expiratory centre.
   • Apneustic centre.
   • Pneumotaxic centre.
   • DRG (Dorsal Respiratory Group of Neurones).
   • VRG (Ventral Respiratory Group of Neurones).
   • NPBL (Nucleus Peribrachialis of pons).
   • Bötzinger Complex.
5. Factors affecting pattern of ventilation.
   • Chemoreceptors and chemosensitive area.
   • Pulmonary receptors.
   • Reticular system.
6. Defensive reflexes of respiratory system.

Seminar XIV. Functions of the nephron – glomerulus (25/10/2017).
1. Renal circulation – RBF, RPF, RF, FF.
2. Glomerulus:
3. Filtration barrier
4. Composition of ultrafiltrate/primary urine (GFRx – filtered load)
5. Effective filtration pressure
6. Glomerular filtration rate (GFR)
7. Clearance – definition; test substances.

Seminar XV. Functions of the nephron – renal tubules (08/11/2017).
2. Functions of following parts of nephron tubules: proximal, distal tubule, collecting duct, loops of Henle.
3. Transport maximum (T_{max}), renal threshold.
1. Inspection, palpation, percussion in the examination of the respiratory system.
2. Auscultation of the respiratory sounds.
4. Minute alveolar ventilation.

Terms and problems:
- Respiratory muscles, chest respiration movements, changes of pressure in airways, alveolar pressure and intrapleural pressure, compliance of the lung and chest wall.
- Lung volumes and capacities (TLC, VC, RV, IRV, ERV, TV, IC, FRC) respiratory rate and minute alveolar ventilation, maximal breathing capacity (ventilation), maximal voluntary ventilation.
- Functional division of airways, anatomical dead space, control of airways smooth muscles, protective roles of airways, airway resistance components and values.
- Retraction of lungs. Alveolar surface tension, surfactant, hysteresis loop – its components.

Unit 15. Respiration – part II (18/10/2017).
1. Assessment of the respiratory efficiency – volume-time curve and flow-volume loop.
3. Neural and chemical regulation of the respiratory system.

Terms and problems:
- Phases of ventilation. Oxygen cascade – partial pressure of O₂, CO₂, composition of the inspired, alveolar and expired air.
- Forced expiratory volumes (FEV1 and FEV1%) and other parameters of forceful expiration.

2. Calculation of glomerular filtration rate (GFR) and maximum tubular transport (Tm).
3. The urinary sediment analysis.

Obligatory terms and problems:
- Glomerular filtration, effective pressure. Autoregulation of the blood flow and of pressure in glomerular vessels.
- Tubuloglomerular balance. Tubular transport of Na⁺ and K⁺ Countercurrent mechanism.

Unit 17. Physiology of the gastrointestinal system. Gastrointestinal hormones (08/11/2017).
1. Motility of the gastrointestinal tract.
2. Digestion and absorption in the gastrointestinal system
3. Analysis of radiograms displaying the gastrointestinal tract motility.
4. Anatomy and function of the liver.

Terms and problems:
- Phases of swallowing (deglutition). Characteristics of the gastrointestinal motility. Visceral smooth muscles, BER, Enteric nervous system (submucosal and myenteric myoenteric nerve

- Gastrin, secretin, CCK – their action.
- Regulation of the bile secretion. Composition and function of bile. Functions of hepatocytes (secretion and reabsorption end), bile acids and pigments. Detoxication in liver.
- Gastric juice, importance of HCl, phases of secretion and enzymes of the gastric juice. Enzymes of the pancreatic and intestinal juice. Colon: absorption, defecation. Importance of the physiological bacterial flora. Differentiation of secretion in various parts of the gastric mucosa.

Unit 18. Thermoregulation and metabolism. Thyroid gland hormones (15/11/2017).

1. Estimation of the metabolism.
2. Assessment of components and proportions of the human body.
4. Action of the thyroid hormones.
5. Repetition of absent and/or failed activities in cycle 3.

Terms and problems:


Credit of the cycle 3. Topics of seminars XII – XV and units 14 – 18. (22/11/2017).