

Interactive seminar

Pathophysiology of kidneys, lungs and internal environment

- 1) What is hypoxia? How do cells and the organism react to hypoxia?
- 2) Which causes of hypoxia do you know? What is respiratory insufficiency and what types of it do you know?
- 3) Which is the difference between restrictive and obstructive ventilatory disorders? How can they be distinguished on spirometry?
- 4) How would you characterize COPD? How would you describe bronchial asthma? In which aspects are they similar and in which do they differ?
- 5) What is meant by concept of alveolar ventilation (V_A)? How does it differ from total ventilation (V_E)? How does V_A influence levels of blood gases O_2 and CO_2 ?

- 6) Fill in the table using symbols $\uparrow$ (increase), $\downarrow$ (decrease), N (stays normal).

Used abbreviations:

CO = cardiac output in L/min; V_A = alveolar ventilation in L/min

$[O_2]$ concentration of O_2 (in mmol/L or ml/L); pO_2 partial pressure of oxygen eg. in mmHg

	Decreased CO (by 25%)		Decreased V_A (by 25%)		Anemia/ Hb=70 g/L	
	$[O_2]$	pO_2	$[O_2]$	pO_2	$[O_2]$	pO_2
Arterial blood						
Mixed venous blood						

- 7) Which disorders cause metabolic acidosis and how does each one of them influence Anion gap?
- 8) How would you distinguish a compensated respiratory acidosis from a compensated metabolic alkalosis? Given each one of them, what does happen with a) pCO_2 , b) $[HCO_3^-]$ c) BE ?
- 9) Which types of proteinuria do you know? How do we calculate index of selectivity?
- 10) Which physiological parameters can influence the rate of glomerular filtration? How does each one of them change if there is a decrease in glomerular filtration and which diseases can leads into these changes? (give examples)

- 11) How do acute and chronic renal failures differ? Which types of acute renal failure do you know? What is uremia? Compare ionic changes in acute and chronic renal failure.
- 12) Which types of hematuria do you know by origin and which diagnostic approaches can be used to distinguish between them?
- 13) What is pulmonary emphysema? Is it obstructive or restrictive disorder? What is its relationship to other lung diseases?
- 14) What situations can lead to pulmonary embolism? What are the symptoms of pulmonary embolism?
- 15) Why is there a ventilation-perfusion mismatch in pulmonary embolism? How can this mismatch be diagnosed?
- 16) Which changes of blood gases can be found in COPD, asthma and pulmonary embolism?
- 17) What role does cerebrospinal fluid play in respiratory compensation of metabolic acidosis?
- 18) How are pH and kalemia related? Why can a fast correction of long-term acidosis be dangerous?
- 19) Which changes of internal environment manifest after profuse vomiting and what pathogenesis do they have?
- 20) Which types of edema do you know? Why do they develop?
- 21) Which type of danger does hyposmolarity and hyperosmolarity pose to central nervous system?
- 22) How would manifest a disorder of renal concentrating and/or diluting ability?
- 23) What are the causes of diabetes insipidus and what does SIADH mean?
- 24) What are the indications for acute hemodialysis?