

Pathophysiology lab exam questions

Laboratory evaluation of acid-base balance

1. Traumatic shock (bleeding, crush).

	during first hours	one day later
pH	7.2	7.05
pCO ₂	20 mmHg	55 mmHg
HCO ₃	12 mmol/l	24 mmol/l
st HCO ₃	19 mmol/l	19 mmol/l
BB	42 mEq/l	42 mEq/l
BE	-6 mEq/l	-6 mEq/l

One day after the trauma symptoms of shock-lung develop.

Identify the type and analyze the different stages of the acid-base imbalance!

2. Blood pressure: 180/120 mmHg, pulmonary congestion, fluid intake: 4 l/day, urine output: 1.5 l/day (usual urine volume: 3 l/day), creatinine: 500 µmol/l, urea: 22 mmol/l, pH: 7.32.

Identify the form of acid-base disorder! Find out the possible underlying disease!

3. What is the direction of change in the parameters below during respiratory acidosis?

	during generation	compensation
HCO ₃ ⁻		
st HCO ₃ ⁻		
BE		

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4. Pyloric stenosis. pH: 7.52, pCO₂: 40 mmHg, HCO₃⁻: 31 mmol/l, se Na⁺ 140 mmol/l, se K⁺: 2.8 mmol/l, Cl⁻: 80 mmol/l
- Determine the type of acid-base imbalance!
 - Is BE negative or positive?
 - Is pCO₂ of 40 mmHg acceptable in this condition?
5. Obstructive lung disease. pH: 7.35, pCO₂: 67 mmHg, BE: 11.6 mEq/l, HCO₃⁻: 42 mmol/l, st HCO₃⁻: 35 mmol/l, BB: 60 mEq/l.
Verify the type and the duration of the acid-base disorder!
6. pH: 7.6, Cl⁻: 60 mmol/l, pCO₂: 40 mmHg, HCO₃⁻: 35 mmol/l, BE: 10 mEq/l.
Determine the type of acid-base imbalance and find out a possible underlying cause!
7. How and why do the indicated parameters deviate from normal during chronic vomiting?
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|--------------------|--------------------|----|
| se Na ⁺ | se Cl ⁻ | pH |
|--------------------|--------------------|----|
8. Mixed acid-base disorder. pH: 7.3, BE: -13 mEq/l, pCO₂: 15 mmHg (expected pCO₂: 30-34 mmHg), HCO₃⁻: 10 mmol/l, st HCO₃⁻: 15 mmol/l, BB: 36 mEq/l.
Identify the dominant and the additional acid-base disorder!
9. Diabetic ketoacidosis. pH: 7.18, pCO₂: 16 mmHg. How and why do the indicated parameters deviate from normal?
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|-------------------------------|----------------------------------|----|
| HCO ₃ ⁻ | st HCO ₃ ⁻ | BE |
|-------------------------------|----------------------------------|----|