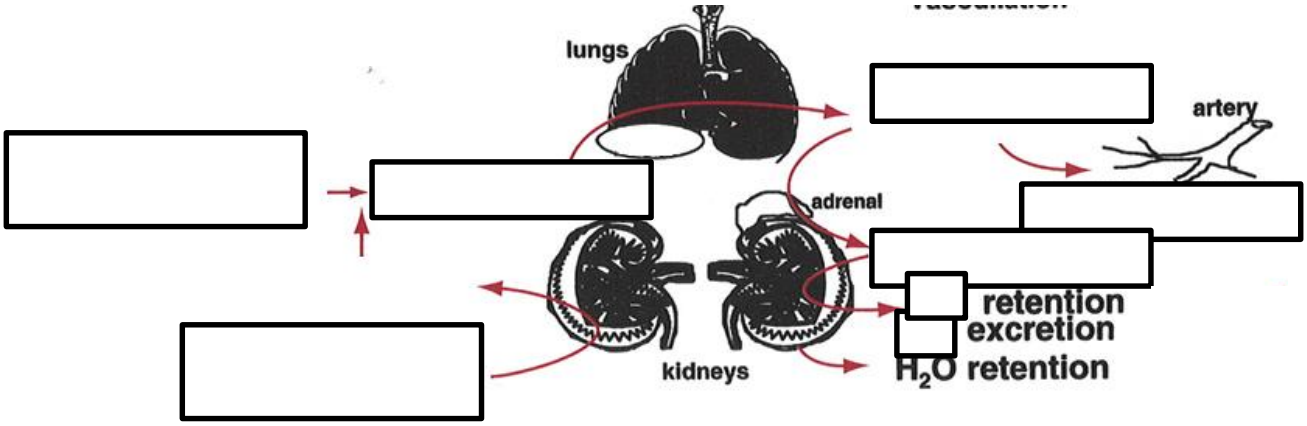
Electrolyte and Iron Review Questions

1. Please list the 4 regularly measured electrolytes:

2. Give 2 examples on unmeasured cations and 4 examples of unmeasured anions

3. Fill in the blanks on the following chart:



4. In order to maintain osmolality, when a glucose is above 180 mg/dL water will shift from inside the cell to outside the cell. This will appear to result in low levels of which electrolyte?

5. Patients with adrenal insufficiency will tend to exhibit what levels of Na^+ and K^+?

6. Why is the reference range for K+ higher for serum samples than plasma samples?

7. Acidosis will tend to cause potassium values that are **higher/ lower** than normal. (circle one)

8. Please list the electrolytes for which hemolysis will raise results artificially:

9. What level of sweat chloride is diagnostic for CF?

10. Please describe how metabolic alkalosis and prolonged vomiting may BOTH lead to hypochloremia.

11. Please diagram the function of the electrodes in a coulometric amperometric titration such as a Cotlove chloridimeter.

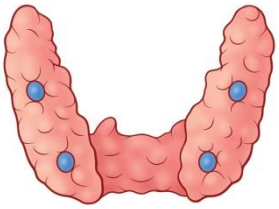
12. The majority of plasma CO_2 takes the form of:

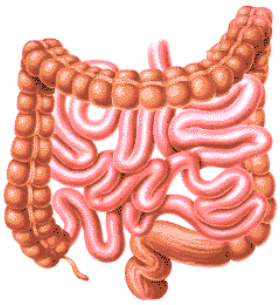
13. Please list the 3 physiological states of calcium and their relative proportions

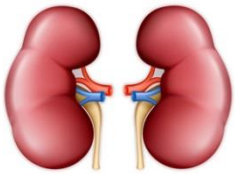
14. Describe the effect of pH on 2 of the above forms of calcium

15. Describe the relationship between calcium/magnesium and neuromuscular excitability. Please give an example of *increased* neuromuscular excitability.

16. Please use the following images to diagram the effects of PTH and Vitamin D:
SEE NEXT PAGE







17. Please diagnose the following patient:
    Total Calcium: 13.4 mg/dL
    $iCa2^{+}$: 1.46 mmol/L
    Phos: 1.8 mg/dL
    PTH: 250 pg/mL (15-65 pg/mL)
    Symptoms: weakness, fatigue, nausea, vomiting, and sharp flank pain

18. Assays for Ca and Mg often cross-react. Please name 2 compounds that are added to the assay in order to eliminate interference by either.

19. Please diagram an atomic absorption spectrophotometer and describe the purpose of the chopper

20. Plasma phosphorus is mostly found in what form? **Organic/Inorganic** (circle one)

21. Ammonia (ammonium) is dramatically affected by the function of one organ system in particular (as in mostly closely associated with one), which is it? How is it affected?

22. Please describe the enzymatic method for measuring ammonia

23. Indicate whether the following will lead to increased or decreased anion gaps
    DKA
    Decrease in unmeasured anions
    toxic substance ingestion
    elevated Ca
    low albumin levels
    decrease in unmeasured cations
    increase in plasma water
    decreased phosphorus
    lactic acidosis

24. What are the two sources of ammonia in the blood?

25. Please list the state of iron (ferrous or ferric) in each of these steps

    Majority in the intestines:

    Absorbed across the membrane:

    Stored in Ferritin:

    Transported in transferrin:

    Incorporated into Heme:

    Hemoglobin:

    Methemoglobin

26. Please diagnose the following patients
    patient 1:
    Iron-high
    transferrin-low end of normal
    transferrin sat-high
    ferritin-high
    TIBC- normal

patient 2:
Iron- low
transferrin- low
% saturation-low
ferritin- high
TIBC- low

27. Please diagram the 2 assays that are done to obtain the TIBC