BIO 2402 - Human Anatomy & Physiology

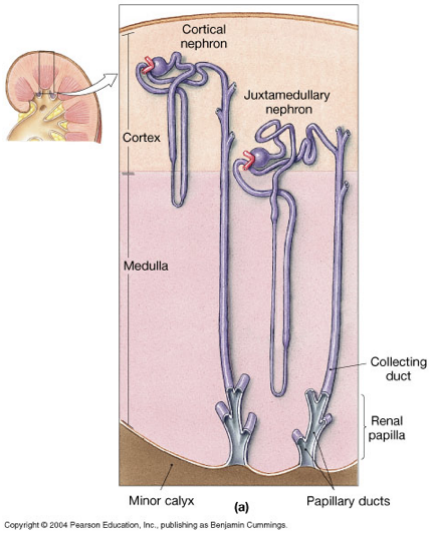
Week 12

Hi everyone! This week we are going to be looking at the urinary system. This chapter has a significant conceptual component to it, so I have included some charts with instructions on how to utilize them. Let me know if you have any questions!

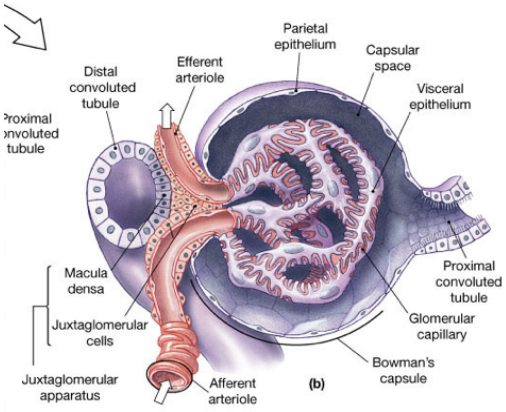
Remember that the Tutoring Center offers free individual and group tutoring for this class. Our Group Tutoring sessions will be every Wednesday from 6:00-7:00 PM CST. You can reserve a spot at https://baylor.edu/tutoring.

KEY TERMS: Nephron, Medulla, Glomerulus, Blood pressure, Blood pH

1. Kidney
   a. Tissue around kidney
      i. Renal capsule: fibrous CT on kidney
      ii. Adipose capsule: hard fat superficial to the renal capsule
      iii. Renal fascia: most exterior, dense irregular CT
   b. Kidney structure
      i. Cortex
         1. Nephron
            a. Juxtamedullary: very long nephron loops
               i. VASA RECTA
            b. Cortical: most common
      ii. Medulla
         1. Renal Columns
         2. Renal Pyramids
         3. Minor & Major Calyx
         4. Renal Pelvis



2. Nephron Structure: Functional unit of kidney
   a. Renal Corpuscle
      i. Glomerulus
         1. Fenestrated capillaries
      ii. Glomerular/Bowman's capsule
         1. Podocytes
            a. Pedicels
               i. Filtration slits
      iii. PCT
      iv. Loop of Henle
         1. Descending
         2. Ascending
      v. DCT
      vi. Collecting Duct

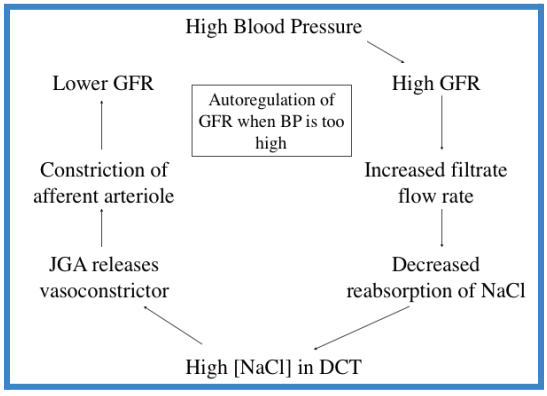


All images are taken from Dr. Taylor's textbook, *Human Anatomy and Physiology*

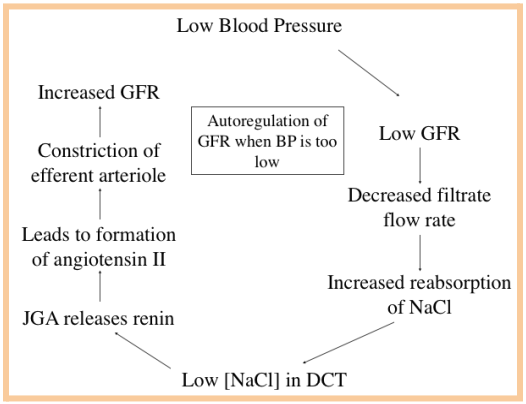
Blood Pressure & the Kidneys

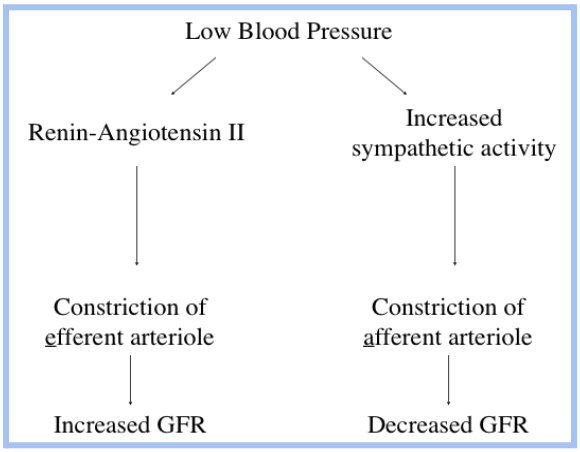
Each of these images represents how the kidneys respond to changes in blood pressure, and the steps that are involved with maintaining homeostasis within the blood vessels. For each image you will want to walk through the cycle and explain what is happening.

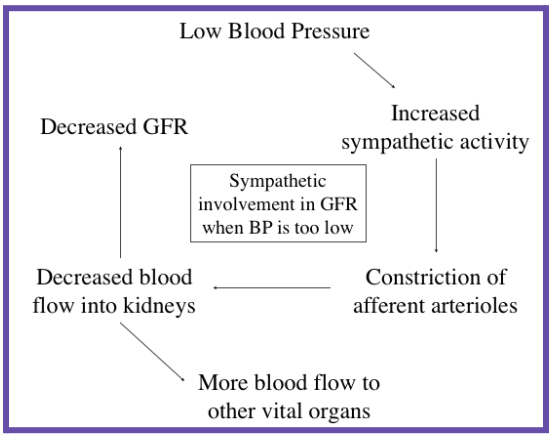
For example, the image to the right shows high blood pressure, and when blood pressure is high, GFR (glomerular filtration rate) is high as well. A high GFR would indicate that there is a lot of fluid moving through the glomerulus, which would increase the filtrate flow rate. The faster filtrate moves the less time it has in the nephrons to absorb or reabsorb ions, so NaCl reabsorption decreases. The JGA responds to the high levels of NaCl by releasing a vasoconstrictor that will result in smaller blood vessel diameter, decreased blood flow, and lower GFR.



You will want to walk through each image like that.







3. Acid-Base Balance
   a. Buffering systems prevent dramatic changes in pH levels
      i. Carbonic Acid-Bicarbonate Buffer
      ii. Phosphate Buffer
      iii. Protein Buffer
4. Kidney regulation of blood pH
   a. Respiratory compensation = lungs

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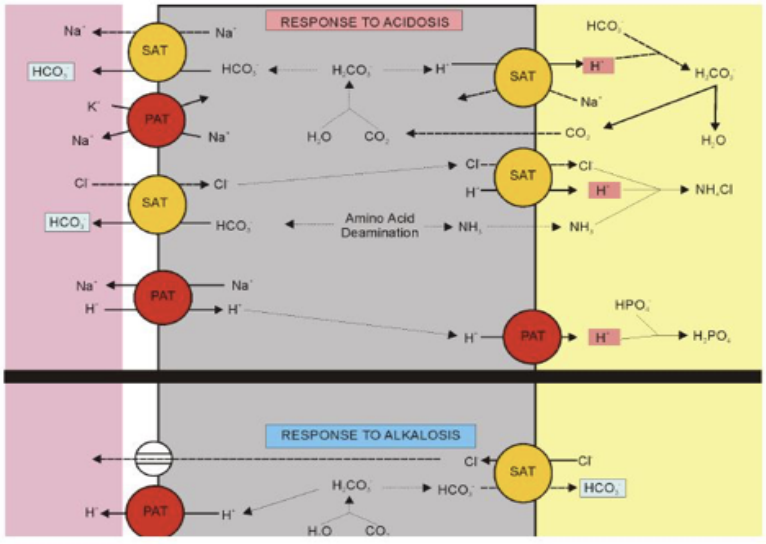
b. Renal compensation = kidneys

The chart below is meant to help you organize the kidneys response to changes in pH. Dr. Taylor has a chart in the textbook which I have included so that you can check your work. You will want to fill in which ions are in the blood vs. filtrate when acidosis and alkalosis is occurring.

BLOOD	ACIDOSIS	FILTRATE
	ALKALOSIS	



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