

## URINE FORMATION - Notes

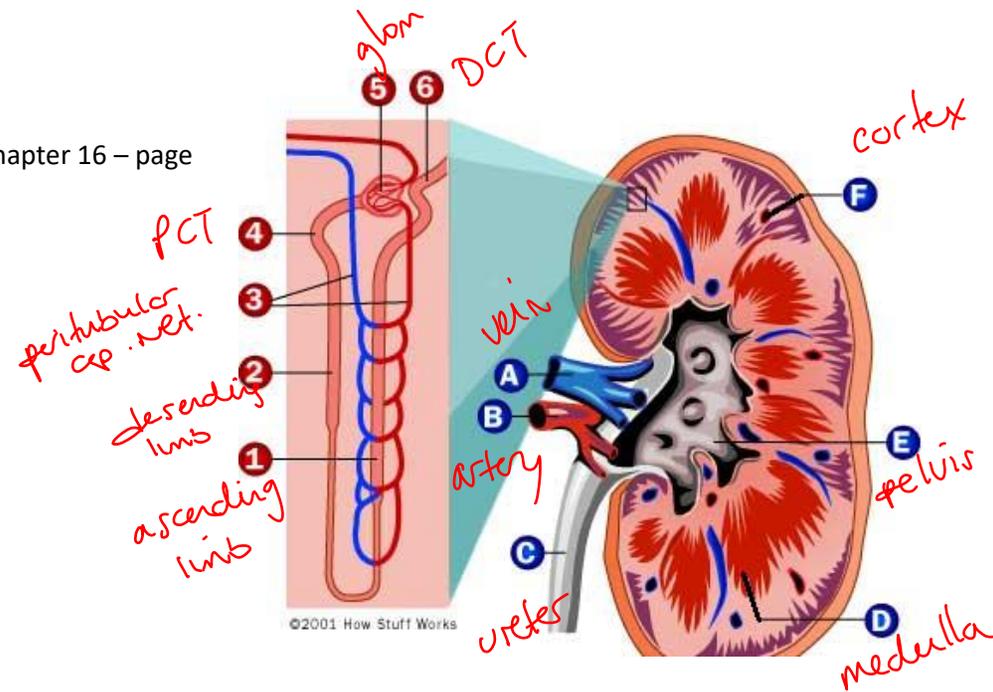
Please fill in the following notes package on your own. You can use the textbook (chapter 16 – page 302 to 308) or any online sources.

The following videos are good ones to watch as a way of introduction or review.

- <http://www.youtube.com/watch?v=glu0dzK4dbU&feature=related>
- <http://www.youtube.com/watch?v=aQZaNXNroVY&feature=related>
- <http://www.kidneypatientguide.org.uk/site/HKWanim.php>

### Terms you need to know (please define in our own words):

1. Tubule – vessel in which urine forms and travels
2. Capillary – vessel in which blood travels
3. Reabsorption – particles moving from the tubules back into the blood
4. Excretion – particles moving from the blood into the tubules



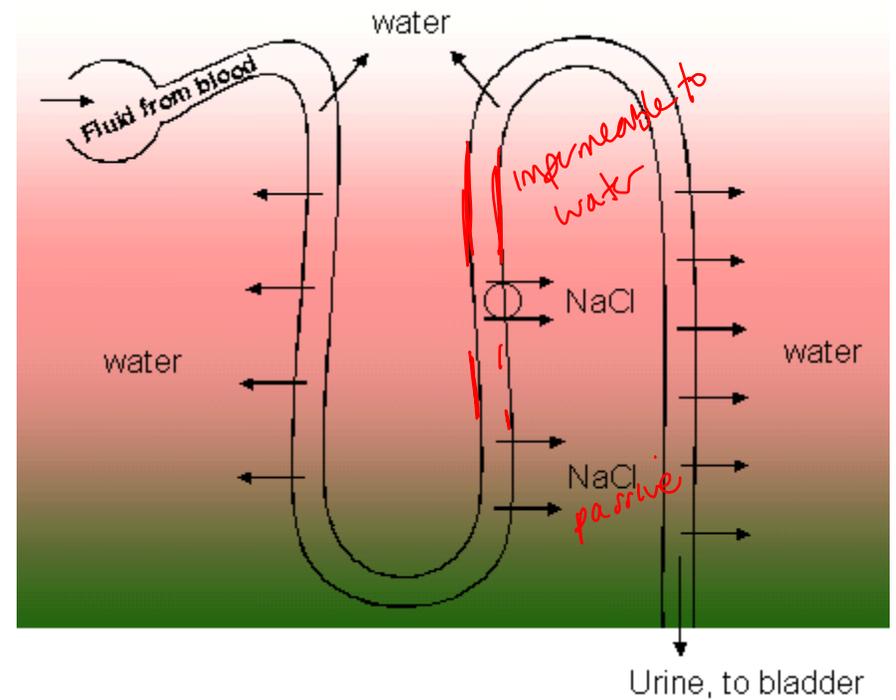
Process	Location	What moves? (be specific)	How does it move? (diffusion, osmosis, facilitated diffusion, active transport)
Glomerular Filtration ( pressure filtration)	Glomerulus to the bowman's capsule	Water, nitrogenous waste (uric acid, urea), nutrients (glucose and amino acids), salt ions (Na <sup>+</sup> and Cl <sup>-</sup> )	Due to high blood pressure
Selective Reabsorption (tubular reabsorption)	Proximal Convoluted Tubule	Na <sup>+</sup> Cl <sup>-</sup> Water Glucose Amino acids Bicarbonate	Active transport Diffusion diffusion/osmosis Facilitated diffusion Facilitated diffusion Active

	Descending Loop of Henle	water	osmosis
	Ascending Loop of Henle	NaCl	Passive at the bottom Active at the top
	Distal Convoluted Tubule	NaCl Water Bicarbonate	Active Passive Active
	Collecting Duct	NaCl Water Urea	Active Passive Active
Tubular Excretion (tubular secretion)	Distal Convoluted Tubule	H+  K+  Creatinine  Drugs (penicillin)  Ammonia	Active  Active  Active  Active  Passive

### Osmotic Gradient

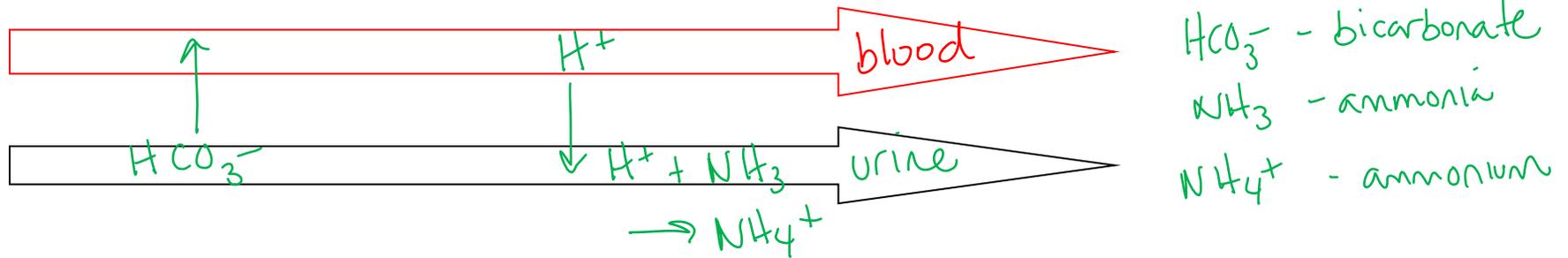
Label this diagram – with the parts of the Nephron

- Due to active transport of salt on the ascending limb, more and more water diffuses out of the descending limb
- The membrane on the ascending limb is impermeable to water



## Acid/Base Balance

- Homeostasis: maintenance of the body within narrow limits
- For examples the blood pH should stay at 7.4. If the blood is too acidic – the following process happens in the PCT and DCT

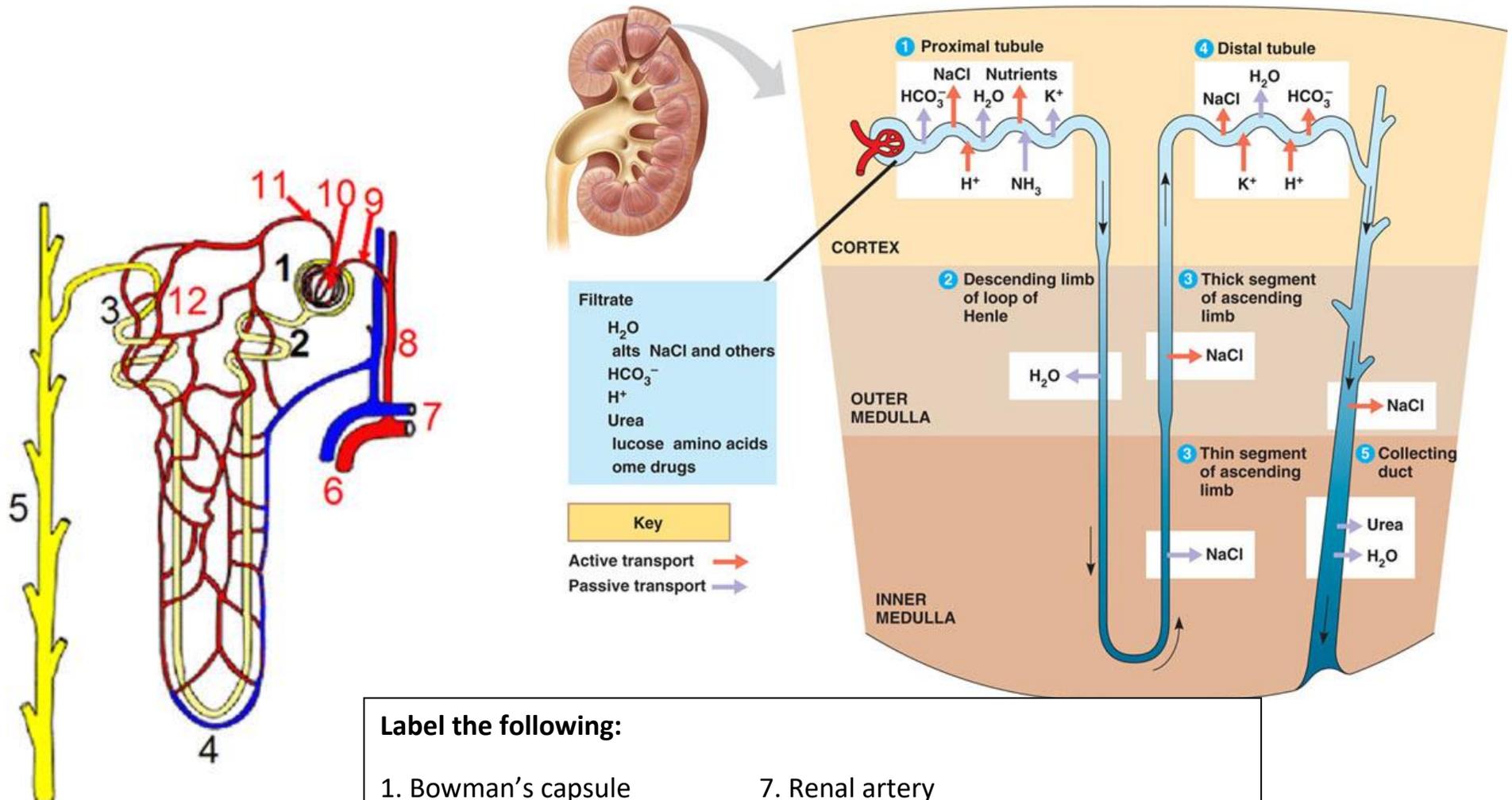


## Water/Salt Balance regulated by 2 hormones

Hormone	Where is it produced?	Why is it released?	Where does it act on?	What does it cause to happen? (refer to both the blood and urine).
ADH (antidiuretic hormone)	Posterior pituitary gland	Body is dehydrated ( low water volume)	Collecting duct	Impermeable to water, so urine has less water (higher concentration of solutes) = hypertonic, blood has more water
Aldosterone	Adrenal cortex of the adrenal gland	Low blood volume/pressure in afferent arteriole (so glomerular filtration cannot occur)	Distal convoluted tubule	Excretion of $\text{K}^+$ and reabsorption of $\text{Na}^+$ Causes more water to be reabsorbed into the tubules. Blood volume increases and urine volume decreases.

### Questions:

1. If you have too much water in your blood will the pituitary gland secrete more or less ADH? - less
2. If your blood pressure is low in your afferent arteriole – what hormone will be released? - aldosterone



**Label the following:**

- Bowman's capsule
- PCT
- DCT
- Loop of Henle
- Collecting duct
- renal vein
- Renal artery
- Renal arteriole
- Afferent arteriole
- glomerulus
- efferent arteriole
- peritubular capillary network