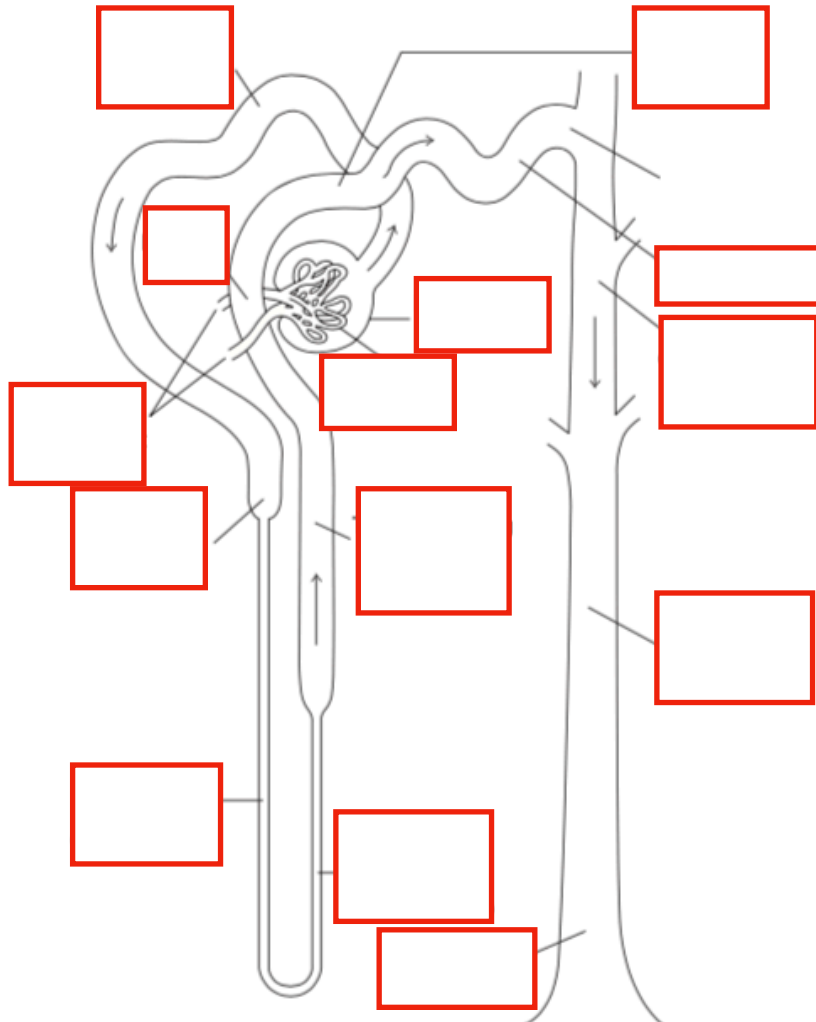
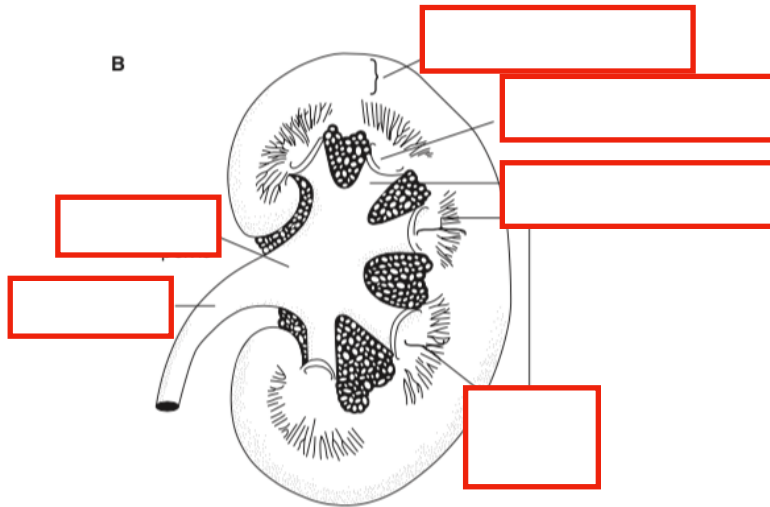


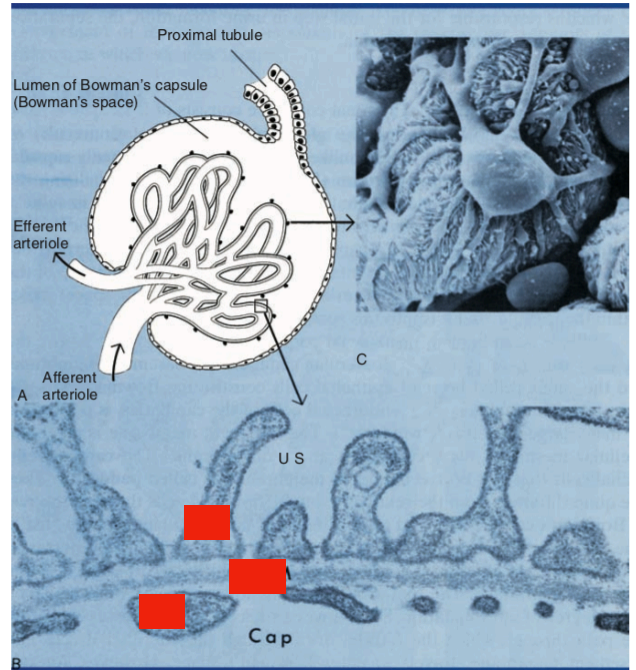
VANDER'S RENAL PHYSIOLOGY CHAPTER 1-3 REVIEW QUESTIONS

Label the diagrams below



What 3 layers form the filtration barrier through with all filtered substances must pass?

1. _____
2. _____
3. _____



Name that structure!

- A. This cell acts as a phagocyte to remove any trapped material from the glomerular basement membrane:
- B. This is an area of specialized cells in the thick ascending limb, closest to Bowman's capsule:
- C. This is the area where renin is released:

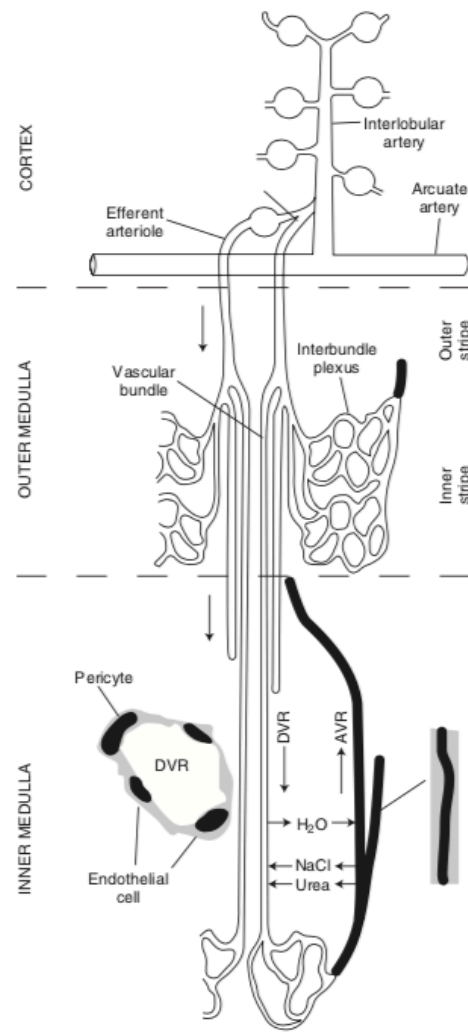
What cells make up the juxtaglomerular apparatus? What is the relevance of the JGA?

1. _____
2. _____
3. _____

List the passage of blood flow through the kidneys (put in correct order).

Efferent arterioles
Interlobar arteries
Afferent arterioles
Renal arteries
Peri-tubular capillaries
Renal veins
Glomerular capillaries
Interlobular branches
Arcuate arteries

How is blood flow to the renal medulla different than blood flow to the renal cortex?



Define the following terms in reference to renal function.

Filtration:

Secretion:

Reabsorption:

Excretion:

Innervation to the kidney is primarily from which part of the autonomic nervous system?

Name that hormone!

Main regulator of sodium and potassium: _____

Main regulatory of water excretion: _____

Match functional descriptions with the correct anatomical location of the nephron

Reabsorbs about 2/3 of filtered water, sodium and chloride: _____

Cells are strongly responsive to ADH and aldosterone: _____

Senses sodium and chloride content of the lumen: _____

Reabsorbs organic molecules like glucose and amino acids: _____

Reabsorbs significant portions of K^+ , Ca^{++} , PO_4^{+} , HCO_3^- : _____

Absorbs about 20% of filtered Na^+ and Cl^- and 10% of filtered H_2O : _____

Site of filtration: _____

Absorb about 5% of water and salt: _____

Site of secretion of organic waste products like urate and creatinine: _____

Plays a major role in urea absorption and acid-base balance: _____

The kidneys received about _____ percent of cardiac output.

State the formula for how flow (Q), pressure (P) and resistance (R) are related.

As described by Poiseuille's law, resistance to blood flow is determined by which 3 factors?

1. _____

2. _____

3. _____

Hydrostatic pressures in the two capillary beds of the renal vascular are very different. Where are capillary hydrostatic pressure higher – in the glomerulus or in the peritubular capillaries?

What 2 characteristics determine if a molecule is able to be filtered at the glomerulus?

1. _____

2. _____

What are the two major determinants of glomerular filtration rate?

1. _____

2. _____

Write out Starling's Law in reference to GFR

Give an example of how each of the above factors can be altered.

1. **Filtration coefficient:**

2. **P_{GC} (hydraulic pressure in the glomerular capillaries):**

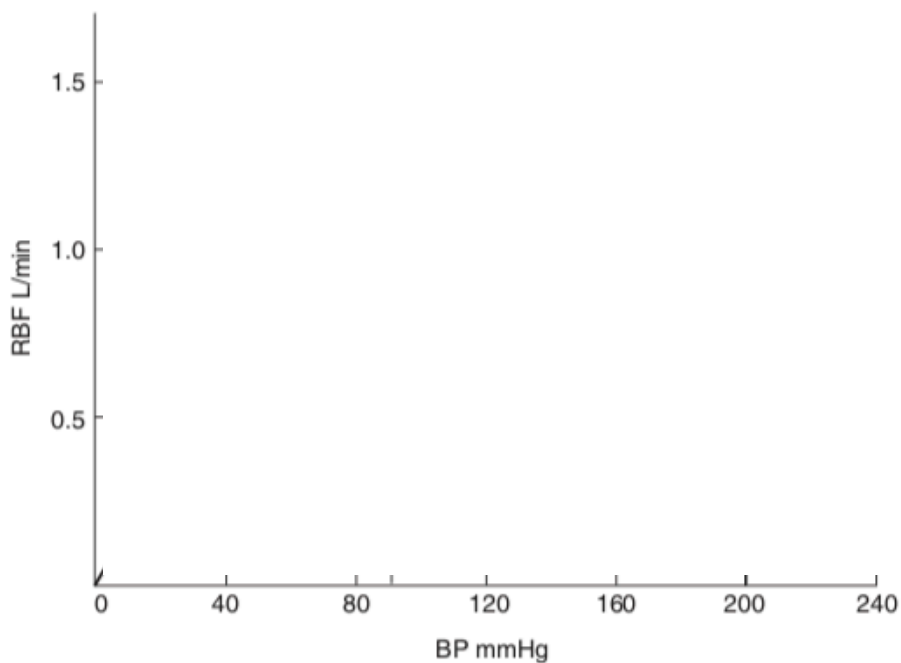
3. **P_{BC} (hydraulic pressure in Bowman's capsule):**

4. **π_{GC} (oncotic pressure in the glomerular capillaries):**

Fill in the following chart with the correct change (increase/ decrease/ no change) to the glomerular hydrostatic pressure, glomerular filtration rate, and renal blood flow.

	P_{GC}	GFR	RBF
Constriction of afferent arteriole			
Constriction of efferent arteriole			
Dilation of afferent arteriole			
Dilation of efferent arteriole			
Constriction of both the afferent and efferent arterioles			
Dilation of both the afferent and efferent arterioles			

Autoregulation allows the kidneys to regulate GFR independent of renal blood flow, preventing excessive pressure natriuresis and hypertensive damage to glomerular capillaries (as the pressure in these capillaries is much higher than elsewhere in the body). Draw a graph representing the relationship between renal blood flow and blood pressure.



Explain the two main mechanisms by which autoregulation occurs.

1. Myogenic response:

2. Tubuloglomerular feedback:

Fill in the blanks:

(Insulin/ Inulin) is freely filtered by the glomerulus but it is largely reabsorbed, thus its renal clearance is very (high/ low).

(Insulin/ Inulin) is freely filtered by the glomerulus but is not reabsorbed or secreted by the nephron, thus its renal clearance is very (high/low).

The gold standard for measure GFR is _____ clearance.

A more routine method of measuring GFR is _____ clearance.

Calculate creatinine clearance (mL/min) using the following information.

Volume of urine produced over 24 hours = 4000 mL

Urine creatinine = 60 mg/dL

Plasma creatinine = 1.5 mg/dL