

PAL Worksheet
Week 8 Problem Set 1

RENAL VASCULATURE

1) On your white board, draw the arrangement between the afferent arterioles, glomerulus and efferent arterioles of the kidneys.

- Where are mesangial cells located?
- Where are podocytes located?
- Where are the JG cells located?

2) Sympathetic activity to the smooth muscle cells surrounding afferent arterioles would lead to _____. Following this, what happens to the pressure of the blood in the glomerulus, compared to normal?

FILTRATION, REABSORPTION & SECRETION

1) In the process of urine production, the kidneys perform 3 major tasks (filtration, reabsorption and secretion). Draw a nephron and the associated blood vessels on your white board and then briefly define each task and using arrows, show the direction of substance movement:

2) Which of the above 3 processes involves selective movement of substances, and which involve(s) nonselective (non-discriminant) movement of substances?

3) Define the process of urinary excretion and add it to your diagram:

4) Substance T is present in the urine. Does this prove that it entered the renal tubule by filtration at the glomerulus?

5) Substance V is not normally present in the urine. Does this mean that it does not enter the renal tubule by filtration?

6) In summary, name two ways that substances can enter the renal tubules and 2 ways that they can leave the tubules:

7) Maria made an appointment with her physician for an annual health checkup. As part of her lab workup, a urine sample was collected. Several days later, her physician contacted her to inform her of the presence of red blood cells and albumin in her urine.

- Are red blood cells and albumin normally present in the urine? Please explain in detail why or why not. Be sure to discuss the role and properties of the filtration membrane.