

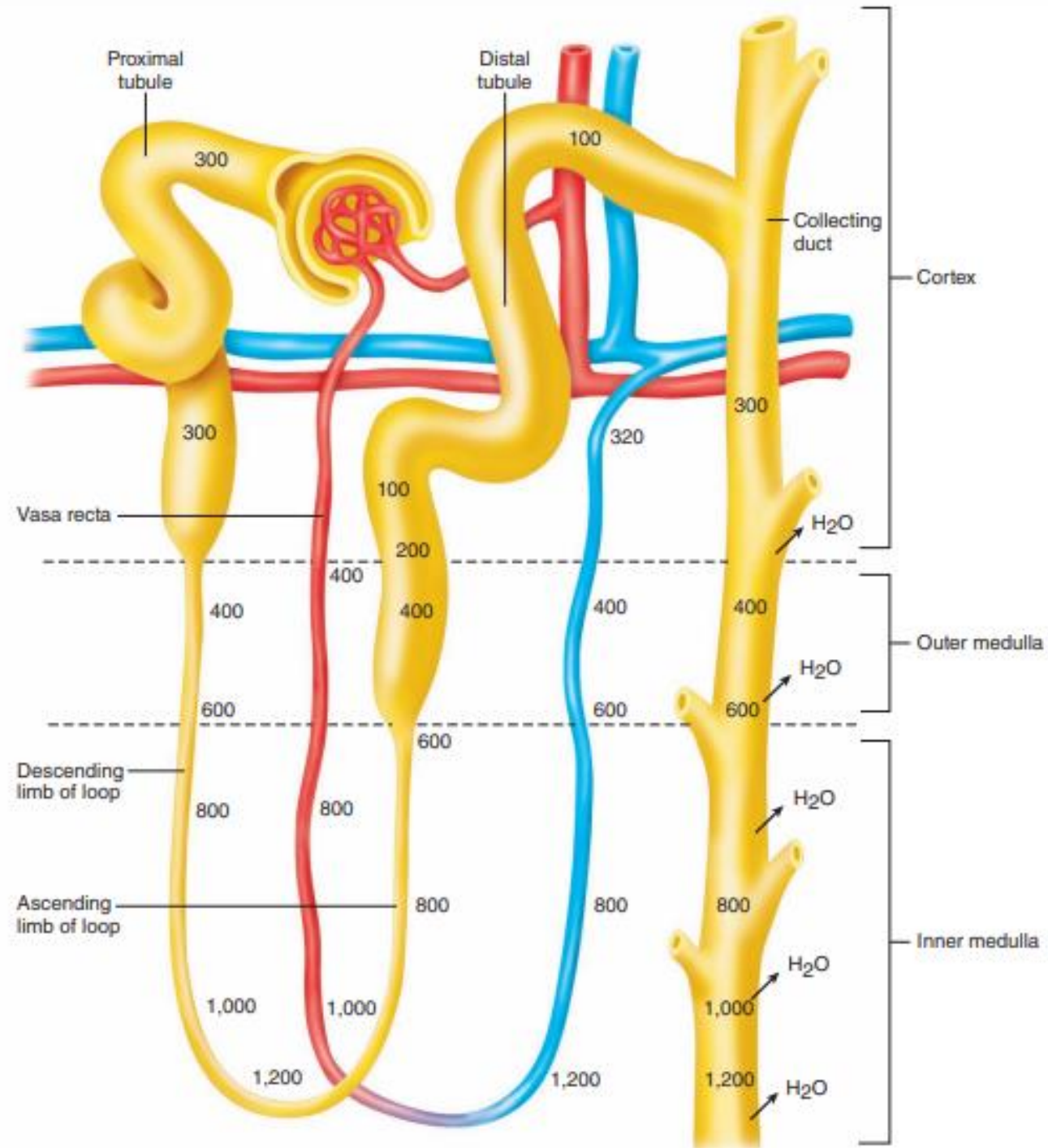
RENAL PHYSIOLOGY (PART 4 Plus)

Dr. Hussein Salah Rebea

Lec. 4-plus

Vasa Recta

- For the countercurrent multiplier system to be **effective**
- **most** of the **salt** that is extruded from the ascending limbs **must remain** in the interstitial fluid of the **medulla**
- while **most** of the water that leaves the descending limbs **must be removed** by the **blood**.
- This is accomplished by the **vasa recta**, *vessels that parallel the nephron loops and serve as the major vessels carrying blood into and out of the renal medulla.*



- These vessels have urea transporters (for facilitated diffusion) and aquaporin proteins (water channels) in the plasma membranes.
- **Because of this,** the vasa recta are freely permeable to water, urea, and sodium chloride.

❖ As a result:

- the descending vessels of the vasa recta gain salt and urea while they lose water.
- whereas the ascending vessels lose salt and urea while they gain water.

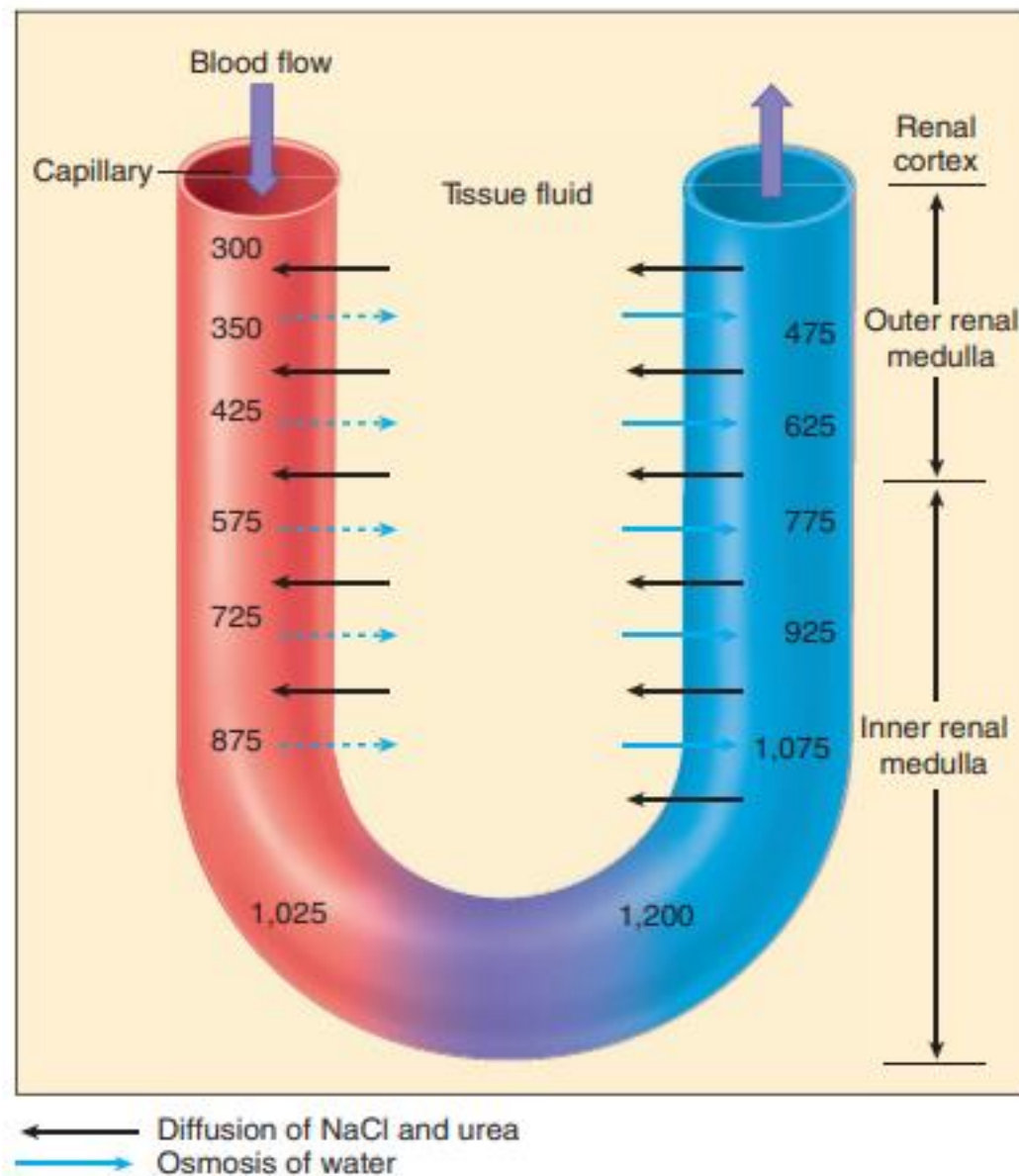


Figure 17.16 Countercurrent exchange in the vasa recta. The diffusion of salt and water first into and then out of these blood vessels helps to maintain the “saltiness” (hypertonicity) of the interstitial fluid in the renal medulla.

- **The vasa recta** *maintain the hypertonicity of the renal medulla by means of a mechanism known as countercurrent exchange.*
- Salt and other dissolved solutes (primarily urea) that are present at high concentrations in the interstitial fluid diffuse into the descending vasa recta
- However, these same solutes then passively diffuse out of the ascending vasa recta and back into the interstitial fluid to complete the countercurrent exchange.

- They do this because:-
- at each level of the medulla, the concentration of solutes is higher in the ascending vessels **than in** the interstitial fluid, and higher in the interstitial fluid **than in** the descending vessels.
- Solutes are thus recirculated and trapped within the medulla.

miyyah@kertas
where everything is paper-made with love



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)