

1. **Which body systems are involved in excretion?**
Respiratory, Integumentary, Digestive, and Urinary systems
2. **If there is a high net filtration pressure or glomerular filtration rate, what is stimulated? What is released? What vessel is affected?**
**GFR is how much filtrate is removed from the blood each minute.
Negative feedback control of high GFR: Rapid flow of filtrate in renal tubules → sensed by macula densa → paracrine secretion → constriction of afferent arteriole → reduced GFR
3. **Why is the filtration pressure high?**
Because afferent arteriole bigger than efferent arteriole causing a resistance to flow.
4. **If systemic pressure increases, the myogenic response of the afferent arteriole is to:**
Smooth muscles contracted → Increased BP → Stretches afferent arteriole → Constricts afferent arteriole → Constricts and prevents blood flow into glomerulus from changing very much
5. **Fluids and solute move through the glomerular membrane because of:**
6. **What regulates glomerular filtration rate moment to moment?**
Blood pressure
7. **What is the primary function of the kidney?**
Excretion
Filters blood plasma & excrete toxic metabolic wastes
Regulates water output to regulate blood volume, pressure, and osmotic concentration
Regulates acid-base and electrolyte balance of body fluids
Secretes erythropoietin which stimulates RBC production
Regulates calcium homeostasis and bone metabolism by participating in the synthesis of calcitriol
Clear hormones and drugs from the blood and limit their action
Detoxify free radicals
Help support blood glucose level by synthesizing glucose from amino acids during starvation
8. **How and where is potassium regulated?**
Regulated in the kidneys by aldosterone. Excess is excreted in the urine.
9. **Differentiate between transepithelial, paracellular, and active transport mechanisms for reabsorption?**
Paracellular -solutes and water pass through gaps BETWEEN cells
Transepithelial - movement of solutes and water THROUGH cytoplasm and out the base of the epithelial cells
Active Transport Mechanisms
 - **Primary:** transport of particles through a selectively permeable membrane, up their concentration gradient, with the aid of a carrier that consumes ATP [Na-K Pump]
 - **Secondary:** indirectly by ion gradients
 - **Solvent Drag:** solutes follow solvent with gradients present

10. What happens at the glomerulus? The peritubular capillaries?

Glomerulus filters the blood in your body - water and sodium pass through Peritubular capillary network surrounds the convoluted tubules of the nephron. They reunite to form an interlobular vein. The peritubular capillary network is drained by interlobular veins which conduct the blood toward the renal vein.

11. Describe osmolarity at the different parts of the nephron.

12. What causes that adrenal cortex to release aldosterone?

Drop in blood pressure, Blood sodium concentrations falls, Potassium concentration rises, Angiotensin II, ACTH

*** Aldosterone acts on the kidney promoting the reabsorption of sodium ions (Na^+) into the blood. Water follows the salt and this helps maintain normal blood pressure.

13. What happens to fluid if ADH increases? Decreases?

High levels of anti-diuretic hormone cause the kidneys to retain water in the body. Excess anti-diuretic hormone is released when it is not needed causes excessive water retention & dilutes the blood, giving a characteristically low salt concentration.

Low levels of anti-diuretic hormone will cause the kidneys to excrete too much water. Urine volume will increase leading to dehydration and a fall in blood pressure.

14. Where is the greatest amount of filtrate reabsorbed?

Most water is reabsorbed from the filtrate in the proximal convoluted tubule.

15. Explain H^+ control by the kidney.

16. What is the relationship between sodium content in the capillaries and interstitial fluid?

17. What does aldosterone do to sodium retention?

Release of aldosterone causes sodium and water retention - increasing blood volume

18. How does water move between body compartments?

By crossing capillary walls and cell membranes

19. What will increasing blood osmotic pressure do to the thirst center in the hypothalamus?

20. How are fluid compartments separated?

By the plasma membrane of the cells or a layer of endothelial cells separated by a basement membrane

Separated by selectively permeable membranes; fluids move from one to another

21. What are the three parts of a sperm cell? What does each part do or contain?

Head - produce enzymes that help penetrate egg, contains nucleus

Middle piece - contains mitochondria for energy

Tail - allows locomotion

22. Describe the path of sperm for ejaculation?

Testes → epididymis → combines with seminal vesicle [ejaculatory duct] → urethra
Swimmer STEVE: Seminiferous Tubules, Epididymis, Vas deferens, Ejaculatory duct

23. What triggers testosterone release? What cells secrete testosterone?

Luteinizing hormone (LH) stimulates interstitial cells to secrete testosterone (androgen)

24. Where is the anatomical location of the prostate? What does it secrete?

Surrounds the urethra and ejaculatory duct immediately inferior to the urinary bladder. Secretes prostatic fluid.

25. What gland "cleanses" the penis?

Bulbourethral (Cowper's) Gland

26. What is the role of FSH and LH in sperm production?

LH stimulates the interstitial cells of the testes to secrete androgens, mainly testosterone.

FSH stimulates the sustentacular cells to secrete a protein called androgen-binding protein which binds testosterone and accumulates it in the lumen of the seminiferous tubules and epididymis. Without FSH and ABP, testosterone has no effect on the testes/no response.

27. Distinguish between autosomal and sex chromosomes.

Autosomal contain genetic instruction & sex chromosomes determine the gender.

28. Where is sperm formed? Matured?

Formed in the testes and matured in the epididymis

29. What is the role of Sertoli cells?

Protect the germ cells and promote their development; secrete two proteins called androgen-binding protein and inhibin both of which regulate sperm production

30. Compare puberty changes in males and females.

Males: Enlargement of penis, testes, scrotum, ducts, and glands. Body growth - bone, muscle, larynx. Erythropoiesis accelerates - higher RBC count and hematocrit. Increased metabolic rate and appetite. Development of pubic, axillary, and facial hair. Increased sperm production.

Females: Thelarche-breast development, Pubarche-pubic and axillary hair, Menarche-first menstrual period

31. How does vaginal acidity influence sperm?

Bacteria ferment glycogen to lactic acid which produces a low vaginal pH to inhibit the growth of pathogens. The acidity is neutralized by the semen so it does not harm the sperm.

32. What do lutein cells secrete?

Estrogen

33. What hormone stimulates milk production? Milk secretion?

Milk production - prolactin