

ANATOMY & PHYSIOLOGY

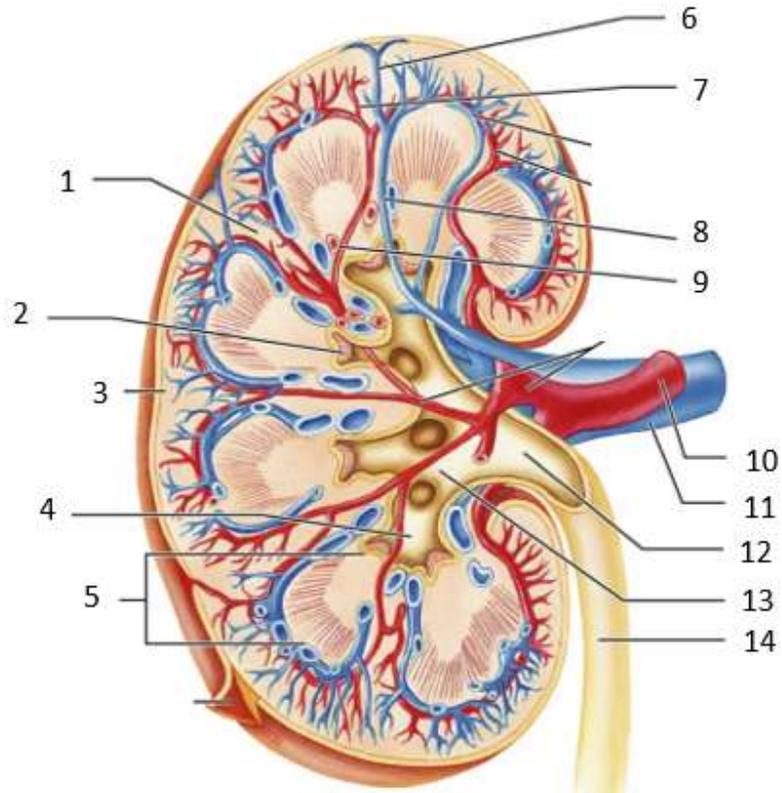
ANSWER KEY

Part I: Labeling

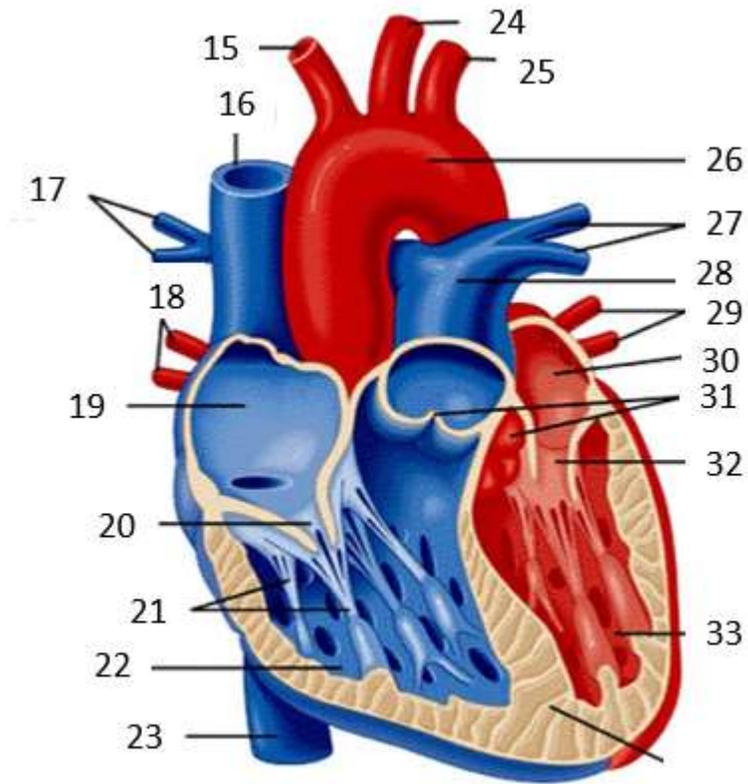
Part II: Short Answer

Part III: Matching

Part I: Labeling (48 pts) *1 pt for each blank*



- | | |
|----------------------------|----------------------|
| 1) Renal column | 8) Interlobar vein |
| 2) Papilla of pyramid | 9) Interlobar artery |
| 3) Cortex | 10) Renal artery |
| 4) Minor calyx | 11) Renal vein |
| 5) Renal pyramid | 12) Renal pelvis |
| 6) Cortical radiate vein | 13) Major calyx |
| 7) Cortical radiate artery | 14) Urethra |



15) Brachiocephalic artery

16) Superior vena cava

17) Right pulmonary arteries

18) Right pulmonary veins

19) Right atrium

20) Tricuspid valve

21) Chordae tendineae

22) Right ventricle

23) Inferior vena cava

24) Left common carotid artery

25) Left subclavian artery

26) Aorta

27) Left pulmonary arteries

28) Pulmonary trunk

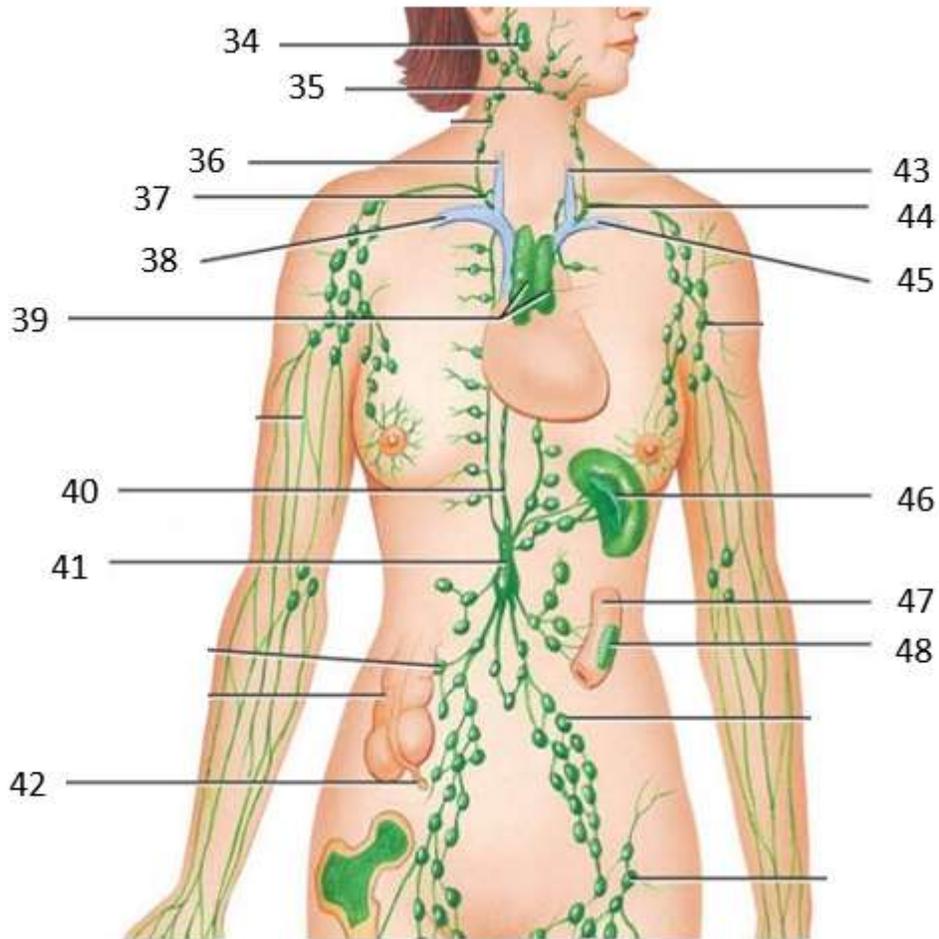
29) Left pulmonary veins

30) Left atrium

31) Semilunar valves

32) Mitral/bicuspid valve

33) Left ventricle



34) Palatine tonsil

35) Submandibular node

36) Right internal jugular vein

37) Right lymphatic duct

38) Right subclavian vein

39) Thymus

40) Thoracic duct

41) Cisterna chyli

42) Appendix

43) Left internal jugular vein

44) Thoracic duct

45) Left subclavian vein

46) Spleen

47) Small intestines

48) Peyer's patches

Part II: Short Answer (30 pts)

*Answers should be similar, don't have to be exactly the same

- 1) What is the thickest layer of the heart? In what chamber is it the thickest, and why? (2 pts)

Myocardium (+1)

Left ventricle because the chamber must create a lot of pressure to pump blood into the aorta and throughout the body (+1)

- 2) What is it called when there is an inadequate supply of blood to the heart? (1pt)

Ischemia (+1)

- 3) Describe the allosteric interaction between oxygen and hemoglobin. (2pts)

The binding of oxygen to one hemoglobin subunit induces conformational changes (+1) that are relayed to the other subunits, making them more able to bind oxygen by raising their affinity (+1) for this molecule.

- 4) What cardiovascular disease is characterized by a red "strawberry" tongue? List two other symptoms of this disease. (3 pts)

Kawasaki's disease (+1)

*Any two of the following: (+2)

Fever

Large lymph nodes in the neck

Rash in genital area

Red eyes, lips, palms, or soles of feet

Sore throat

Diarrhea

- 5) Where is there a delay in the cardiac pulse and why is it important? (2 pts)

Atrioventricular (AV) node (+1)

The delay in conduction is important because it ensures that the atria have ejected their blood into the ventricles first before the ventricles contract. (+1)

- 6) Name two proteins involved in the process of coagulation and describe the functions of each. (4 pts)

Thrombin- catalyzes conversion of fibrinogen to fibrin (+2)

Fibrin- along with platelets, forms blood clot around wound (+2)

- 7) Name and describe the two phases of ventricular systole. (4 pts)

Isovolumetric ventricular contraction- the muscles in the ventricle contract, the pressure of the blood within the chamber rises, but it is not yet high enough to open the semilunar valves and be ejected from the heart (+2)

Ventricular ejection- contraction of the ventricular muscle has raised the pressure within the ventricle to the point that it is greater than the pressures in the pulmonary trunk and the aorta; blood is pumped from the heart, pushing open the pulmonary and aortic semilunar valves (+2)

- 8) Name 4 arteries that supply blood to the heart. (4 pts)

Right coronary artery (+1)

Left anterior descending artery (+1)

Circumflex artery (+1)

Left coronary artery (+1)

9) What is the difference between hydrostatic and osmotic pressure? (2 pts)

In the capillaries hydrostatic pressure increases filtration by pushing fluid and solute OUT of the capillaries, while capillary oncotic pressure (also known as colloid osmotic pressure) pulls fluid into the capillaries and/or prevents fluid from leaving. (+1)

Hydrostatic pressure is based on the pressure exerted by the blood pushing against the walls of the capillaries, while oncotic pressure exists because of the proteins - like albumin, globulins and fibrinogen - that do not leave the capillary and draw water. (+1)

10) Name two hormones that cause vasoconstriction. (2 pts)

Angiotensin (+1)

ADH (anti-diuretic hormone) (+1)

11) Give two examples each of primary lymphoid tissue and secondary lymphoid tissue. (4 pts)

Primary- thymus, bone marrow (+2)

Secondary- lymph nodes, spleen, MALT (Peyer's patches, tonsils, adenoids) (+2)

12) What is a lacteal, and what fluid drains from it? (2 pts)

A lacteal is a lymphatic capillary that absorbs dietary fats in the villi of the small intestine. (+1)

It transport the fluid chyle. (+1)

13) Name and describe the functions of three hormones produced by the thymus. (3pts)

*Any three of the following four, +1 each

Thymosin- stimulates the development of T cells.

Thymopoietin and thymulin- make it possible to distinguish T lymphocytes and enhances T cell Functions.

Thymic humoral factor (THF)- increase immune responses particularly to viruses.

14) Describe the differences between red pulp and white pulp. (2 pts)

Red pulp is made up of several different types of blood cells, including platelets, granulocytes, red blood cells, and plasma. It removes old and damaged red blood cells. The red pulp also acts as a large reservoir for monocytes. (any one of these explanations= +1)

White pulp consists entirely of lymphoid tissue. It develops and produces mature immune cells that can identify and destroy pathogens. (any one of these explanations= +1)

15) What is splenomegaly? Name two causes of it. (3 pts)

A splenomegaly is an enlargement of the spleen. (+1)

It may be caused by infectious mononucleosis, splenic infiltration with cancer cells, and portal hypertension. It may also come from bacterial infections, such as syphilis or an infection of the heart's inner lining. (any two of these explanations= +2)

16) What is autosplenectomy and why can it be caused? (2 pts)

Autosplenectomy is when a disease damages the spleen to such an extent that it becomes shrunken and non-functional. (+1)

It occurs if malformed cells disrupt blood flow to the spleen and cause it to waste away. (+1)

17) What is the function of the cisterna chyli? (1 pt)

It receives fatty chyle from the intestines and thus acts as a conduit for the lipid products of digestion. It is the most common drainage trunk of most of the body's lymphatics. (any one of these explanations= +1)

18) Where are Hassall's corpuscles located? (1 pt)

Thymus (+1)

19) What are the three major groups of lymph nodes found in the mouth? (3 pts)

Parotid (+1)

Sublingual (+1)

Submandibular (+1)

20) List the steps of lymphatic circulation in the body. (1 pt for each step)

Interstitial fluid → Lymph → Lymph capillary → Afferent lymph vessel → Lymph node → Efferent lymph vessel → Lymph trunk → Lymph duct {Right lymphatic duct and Thoracic duct (left side)} → Subclavian vein (right and left) → Blood → Interstitial fluid

(+1 for each step, up to 10 pts)

21) Why are UTIs more common in women than in men? (1 pt)

Women have a shorter urethra, causing them to be more susceptible to a bacterial infection. (+1)

22) What two structures does the renal corpuscle consist of? (2 pts)

Glomerulus (+1)

Bowman's capsule (+1)

23) Why do women have a higher frequency of micturition during pregnancy? (1 pt)

During late pregnancy, the bladder's capacity is reduced because of its compression by the enlarging uterus. This results in an increased micturition frequency. (+1)

24) What is the vesicoureteral reflux? (1 pt)

The condition in which urine flows backward from the bladder into the ureters/kidneys. (+1)

25) How do you calculate GFR, and what is a normal level? (2 pts)

The GFR is the amount of plasma entering Bowman's capsule per minute. It is the renal plasma flow times the fraction that enters the renal capsule (+1 for formula/how to calculate)

The normal range is from 90-120 mL/min/1.73 m² (+1, any number or range between this range gives you the point, units not needed)

26) What is the name of a nephron that extends into the medulla of the kidney? What is the name of a nephron that stays in the cortex of the kidney? (2 pts)

Extends into kidney- juxtamedullary nephrons (+1)

Stays in cortex- cortical nephrons (+1)

Part III: Matching (16 pts) *1 pt for each correct*

- 1) Atrial Fibrillation (k)
 - 2) Myocardial Infarction (e)
 - 3) Atherosclerosis (d)
 - 4) Hypertension (n)
 - 5) Cardiogenic Shock (f)
 - 6) Kawasaki's Disease (i)
 - 7) ASD (g)
 - 8) Lymphedema (l)
 - 9) Lymphoma (b)
 - 10) Lymphadenopathy (o)
 - 11) Anuria (a)
 - 12) Kidney stones (p)
 - 13) UTI (m)
 - 14) Glomerulonephritis (h)
 - 15) Renal failure (j)
 - 16) Incontinence (c)
- a) failure of the kidneys to produce urine
 - b) group of blood cancers that develop from lymphocytes
 - c) lack of voluntary control over urination or defecation
 - d) inside of an artery narrows due to the build-up of plaque
 - e) occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle; may be due to plaque build-up
 - f) inadequate blood flow due to the dysfunction of the ventricles of the heart
 - g) congenital heart defect in which blood flows between the atria of the heart
 - h) inflammation either of the glomeruli or of the small blood vessels in the kidneys
 - i) blood vessels throughout the body become inflamed
 - j) also known as end-stage kidney disease; kidneys no longer function
 - k) abnormal heart rhythm characterized by rapid and irregular beating of the atria
 - l) condition of localized fluid retention and tissue swelling
 - m) bacterial infection of the urethra
 - n) blood pressure in the arteries is persistently elevated
 - o) disease of the lymph nodes, in which they are abnormal in size, number, or consistency
 - p) may be due to the supersaturation of urine