Biology 12 Name: _____

Human Biology Per: _____ Date: _____

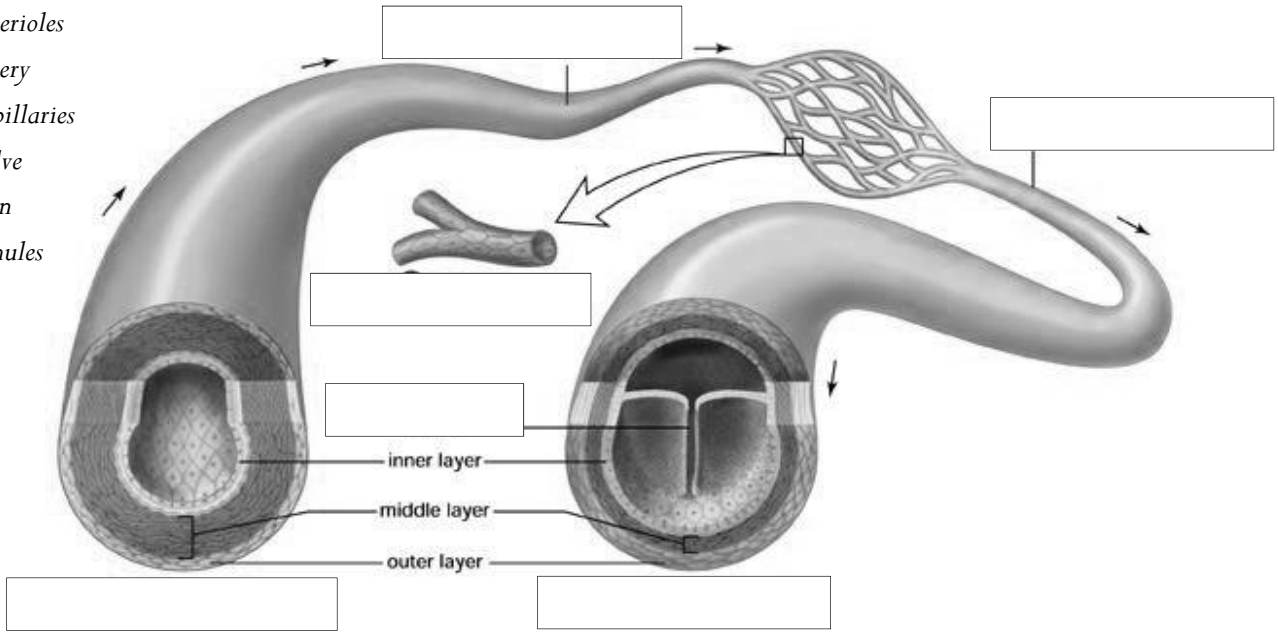
Chapter 10 – The Circulatory & Lymphatic Systems

Complete using BC Biology 12, pages 298 – 325

10.1 The Blood Vessels pages 298 - 299

1. Label the blood vessels in this diagram, using the following list of terms. Use Figure 10.1 to help if needed.

arterioles
artery
capillaries
valve
vein
venules

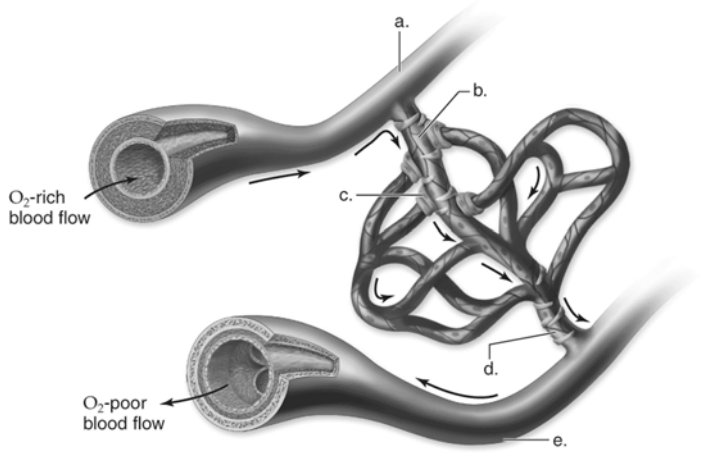


2. Match the statements to the terms: *artery, vein, capillary*

a. _____ Thickest walls
b. _____ Has valves
c. _____ Takes blood **away** from the heart
d. _____ Takes blood **to** the heart
e. _____ Exchanges CO_2 and O_2 with tissues
f. _____ Nervous stimulation causes these to constrict during hemorrhaging; also act as a blood reservoir

3. STRANGE BUT TRUE! The _____ of the _____ is one region of the body that is nearly capillary-free. Why? _____ How do the cells in this region get nutrients? _____

4. Label the diagram below using Figure 10.2.



a. _____

b. _____

c. _____

d. _____

e. _____

5. Explain how it is possible for blood to bypass capillary beds. Use the terms labelled in the figure above.

_____

_____

_____

_____

6. What is the term given to the sleepiness people may feel after eating? _____
   As recent evidence suggests it is not due to decreased blood supply to the brain, what is the suspected reason for this feeling? _____
   What is the largest artery in the body? _____
   What is the largest vein in the body? _____

10.2 Blood

pages 299 - 305

7. Blood is considered to be a _____ _____ tissue.
8. Name the three broad functions of blood and give an example of each
   a. _____ : _____
   _____
   b. _____: _____
   _____
   c. _____: _____
   _____
9. Plasma is mostly _____ (90-92%) and _____ (7-8%).
10. Place the correct plasma protein in the blank: *fibrinogen, albumin, lipo proteins,* or *all plasma proteins*
    a. _____ transports cholesterol
    b. _____ helps blood clot
    c. _____ transports bilirubin (breakdown product of hemoglobin)
    d. _____ helps maintain the pH and osmotic pressure of the blood

11. The red blood cells, scientifically called _____, are made in the _____ of the _____, the _____, the _____, and the ends of the _____. Upon maturation, they are biconcave disks that lack a _____ and contain _____ (a red pigment). After about 120 days, red blood cells are destroyed in the _____ and _____.
12. The condition of _____ is characterized by an insufficient number of red blood cells or not enough hemoglobin. What are three basic causes for this condition?
    (1) _____
    (2) _____
    (3) _____

    What is the most common type of anemia? _____
13. Circle the items that describe hemoglobin correctly:
    a. each molecule contains three polypeptide chains
    b. each molecule contains four polypeptide chains
    c. heme contains iron
    d. globin contains iron
    e. makes leukocytes red
    f. makes erythrocytes red
    g. becomes oxyhemoglobin when carrying oxygen
    h. becomes deoxyhemoglobin when carrying oxygen
14. White blood cells, scientifically called _____, differ from the red blood cells in that they are usually _____, have a _____, lack _____ and without staining appear _____. White blood cells fight _____ and play a role in the development of _____ and the ability to _____ _____.
15. Name the two divisions of white blood cells.
    - _____: contain enzymes and proteins which help defend against microbes
    - _____: also known as mononuclear cells and include the cells that are able to produce antibodies for long term immunity
16. Platelets, scientifically called _____, result from fragmentation of certain large cells called _____, in the red bone marrow. They are involved in the process of _____ or _____.
17. The following shows the reactions that occur as blood clots:

platelets	→	prothrombin activator
prothrombin	→	thrombin
fibrinogen	→	fibrin threads

    Does the left-hand side or right-hand side list substances that are always present in the blood? _____
    Which substances function as enzymes? _____
    Which substance is the actual clot? _____

18. Several nutrients are necessary for clotting to occur. Vitamin _____ is needed for the production of prothrombin. The element _____ is needed for conversion of prothrombin to thrombin. _____ refers to a group of inherited clotting disorders caused by a deficiency in a _____ . The most common type, _____, accounts for about 90% of all cased and almost always occurs in _____ because the faulty gene is found on the _____ chromosome. Since _____ have 2 _____ they have a backup copy of the gene.

19. Complete the table below using Table 10.3 **Not in order!*

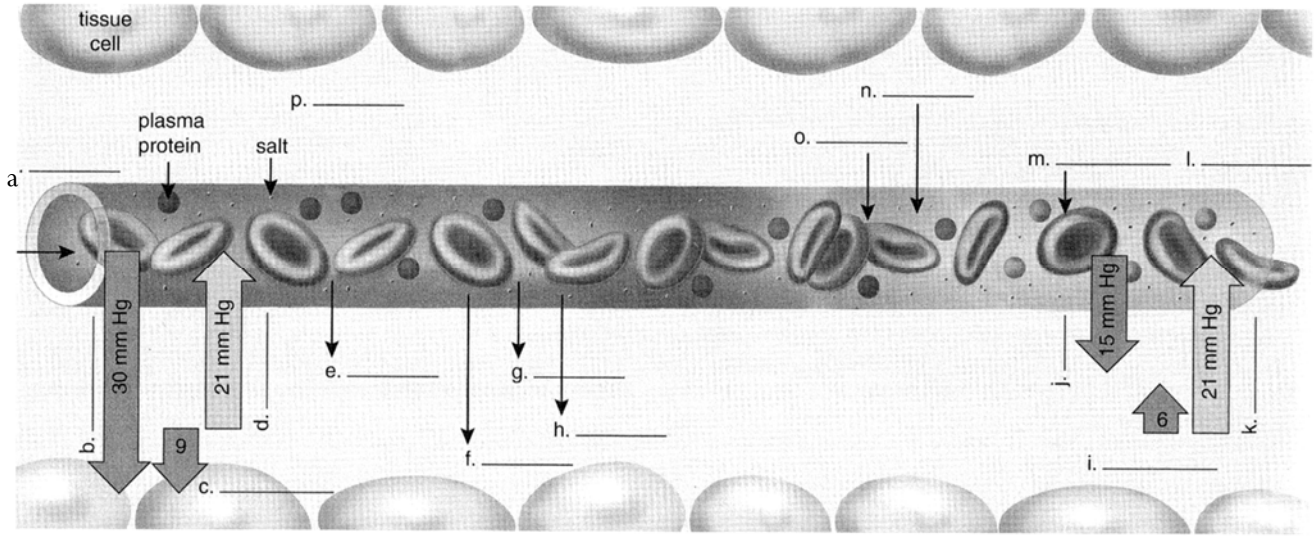
Body Fluids Related to Blood	
Name	Composition
	Formed elements and plasma
	Plasma minus fibrinogen
	Tissue fluid within lymphatic vessels
	Liquid portion of blood
	Plasma minus most proteins

20. A _____ is a cell that is ever capable of dividing and producing new cells that go on to _____. Multipotent stem cells are known to be found in the _____ and have the ability to give rise to other stem cells for the various _____.
Why are researchers so interested in stem cells? _____
_____
_____

21. What is the benefit of using a person's own stem cells as opposed to using donor stem cells? _____
_____

22. Label this diagram of capillary exchange using these terms:

amino acid	glucose	oxygen	water (2)
arterial end	net pressure in	tissue fluid	
blood pressure (2)	net pressure out	venous end	
carbon dioxide	osmotic pressure (2)	wastes	



23. Explain the diagram in the last question. _____

_____

_____

24. Why is there excess tissue fluid, and what happens to it? _____

_____

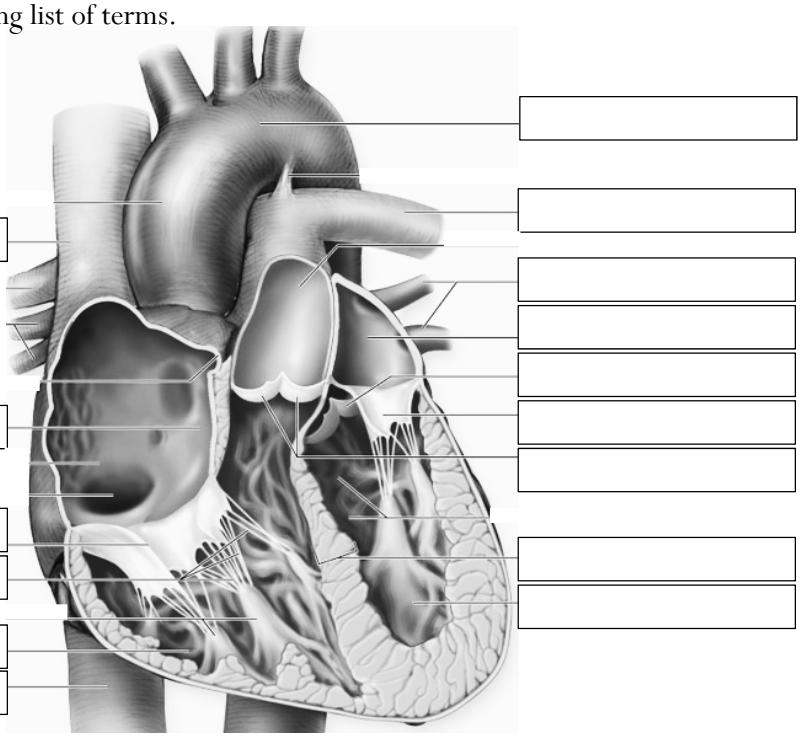
_____

10.3 The Human Heart pages 307 - 311

25. Distinguish between the…
    a. **myocardium** : _____
    b. **pericardium** : _____
    c. and **endocardium**: _____

26. Label the parts of the heart, using the following list of terms.

aorta
semilunar valves (2)
AV (bicuspid) valve
AV (tricuspid) valve
chordae tendineae
inferior vena cava
left atrium
left ventricle
pulmonary artery
pulmonary veins
right atrium
right ventricle
septum
superior vena cava



27. Why is the left ventricle more muscular than the right ventricle? _____

_____

_____

28. Trace the path of blood…
    a. through the heart from the vena cava to the lungs. _____

    _____

    _____

    b. the lungs to the aorta. _____

    _____

    _____

29. When the heart beats the two _____ contract at the same time, then the two _____ contract at the same time, then all of the chambers _____.

30. Fill in the following table with the words *systole* (contraction) and *diastole* (relaxation) to show what happens during the **0.85 seconds** of one heartbeat.

Cardiac Cycle		
Time	**Atria**	**Ventricles**
0.15 sec		
0.30 sec		
0.40 sec		

31. When a heart beats, the familiar _____ sound occurs. This is best heard using a _____. When the atria contract, this forces blood through the _____ valves into the chambers called the _____. The closing of these valves is the lub sound. Next, the ventricles contract and force the blood into the arteries. Now the _____ valves close, making the dub sound.

32. Match the phrases to these nodes: *SA node, AV node*

a. _____ pacemaker
b. _____ contraction of ventricles
c. _____ base of right atrium near the septum
d. _____ Purkinje fibers

*** Draw the SA and AV nodes onto the heart diagram on the last page**

33. Match the actions to these divisions of the nervous system: *parasympathetic system, sympathetic system*

a. _____ normal body functions
b. _____ active under times of stress
c. _____ releases norepinephrine to speed up heart
d. _____ slows heart rate

34. Does the adrenal gland hormone, epinephrine, speed or slow the heart rate? _____

35. What is the significance of each of the following in an electrocardiogram (ECG)?

a. *P* wave _____
b. *QRS* wave _____
c. *T* wave _____
d. Label the following ECG diagram with P, Q, R, S, and T

36. Various types of abnormalities, known as _____, can be detected by an ECG.
Name the abnormalities or equipment based on the descriptions below.

a. _____: most common type, results in a fast & irregular heartbeat
b. _____: fluttering sensation in the heart as result of AF
c. _____: serious medical condition, commonly follows a heart attack by can be caused by injury or drug overdose
d. _____: small devices used to determine whether a person is suffering from VF and if necessary to apply appropriate electrical shock

10.4 The Vascular Pathways pages 311 - 313

37. Name and distinguish between the two circuits of the circulatory system.

a. _____ : _____
_____
b. _____ : _____
_____

38. Usually, arteries carry oxygenated blood and veins carry deoxygenated blood.
Name two vessels in which this is not the case.

a. _____
b. _____

39. Trace the path of blood

<u>To the left atrium</u>:	<u>From the legs</u>:
right ventricle	legs
a. _____	c. _____
lungs	d. _____
b. _____	right atrium
left atrium	

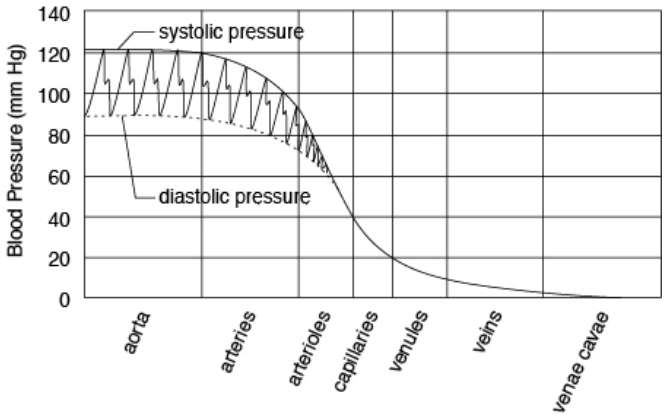
40. Trace the path of the blood

<u>To the liver</u>:	<u>From the liver</u>:
aorta	liver
a. _____	c. _____
digestive tract	d. _____
b. _____	right atrium
liver	

41. Why are coronary arteries more likely to clog than other arteries? _____
_____
_____

42. Define **portal system**: _____
_____

The next three questions are based on this diagram. Use the space provided to answer them in complete sentences.



43. What force accounts for blood flow in arteries? _____

44. Why does this force fluctuate? _____

45. What causes the blood pressure and velocity to drop off? _____

_____

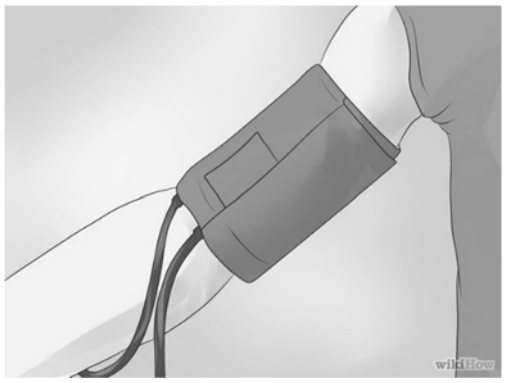
46. Since there is little muscle surrounding the veins, what factors account for blood flow in the veins?_____

_____

47. What keeps blood from flowing backward in veins? _____

48. A _____ is the device used to measure blood pressure. Blood pressure is usually measured on the _____. Why use this artery? _____

_____



10.5 Fetal Circulation pages 314 - 315

49. Why does fetal circulation differ from regular circulation? _____

_____

_____

50. Much of the blood entering the right atrium is shunted into the left atrium through the _____ between the two atria. Also, any blood that does enter the right ventricle and is pumped into the pulmonary trunk is shunted into the aorta by way of the _____.

51. Match each term to its correct description

umbilical arteries *umbilical vein* *ductus venosus* *umbilicus*

a. _____ navel

b. _____ connection of umbilical vein from liver to inferior vena cava

c. _____ takes nutrient and oxygen rich blood to the fetus

d. _____ takes blood that has delivered its oxygen and nutrients back to the mother

52. Explain the function of the placenta. _____

_____

_____

_____

10.6 The Lymphatic System pages 315 - 318

53. What is tissue fluid comprised of? _____

_____

a. Another term for this fluid is _____.

54. Describe an *edema* and its causes. _____

_____

_____

55. Two primary lymphoid organs: _____

Two secondary lymphoid organs: _____

56. Why do physicians feel for the presence of swollen or tender lymph nodes? _____

_____

_____

10.7 Innate & Adaptive Immunity pages 318 - 321

Not specifically covered in this course but an interesting topic!

10.8 Circulatory System Disorders pages 322 - 325

57. Complete the table. Your knowledge of the disorders will not be tested but rather is provided for interest sake.

Disorder	Description
	Accumulation of soft masses of fatty materials beneath linings of arteries. What are these deposits called? • What is the difference between a thrombus and an embolus? •
	High blood pressure. What would be a high blood pressure reading for you? • Name two types of medications used to treat high blood pressure. • •
	Can occur as a birth defect or degenerate due to age or infections. What do they often get replaced by? • •
	Arteriole in the brain bursts or is blocked by a blood clot.
	Partial blockage of a coronary artery.
	Complete blockage of a coronary artery. A portion of the heart muscle dies due to a lack of oxygen.
	Ballooning of the blood vessel, most often in the abdominal aorta or the arteries leading to the brain.

Chapter 10 Review Questions

pages 336 -341

1. _____ 8. _____ 15. _____ 22. _____
2. _____ 9. _____ 16. _____ 23. _____
3. _____ 10. _____ 17. _____ 24. _____
4. _____ 11. _____ 18. _____ 25. _____
5. _____ 12. _____ 19. _____ 26. _____
6. _____ 13. _____ 20. _____ 27. _____
7. _____ 14. _____ 21. _____ 28. _____

29. Composition of blood: _____

30. (a) _____

    (b) _____

31. _____ 32. _____ 33. _____ 34. _____

35. Complete the table

	Red Blood Cells	White Blood Cells	Platelets
Other name			
Site of Production			
Structure & Appearance			
Function			

36. _____

37. _____ 38. _____ 39. _____ 40. _____

41. _____

43. Complete the table

Blood Vessel	Structure	Function
Artery		
Arteriole		
Capillary		
Venule		
Vein		

44. _____

_____

45. Function of circulatory system with respect to each of the following

(a) clotting _____

_____

(b) transport _____

_____

(c) pH balance _____

_____

(d) thermoregulation _____

_____

(e) protection from infection _____

_____

46. Parts of the heart

(A) _____ (I) _____

(B) _____ (J) _____

(C) _____ (K) _____

(D) _____ (L) _____

(E) _____ (M) _____

(F) _____ (N) _____

(G) _____ (O) _____

(H) _____

47. Match the description to the blood vessel

(a) ___ (f) ___ (k) ___ (p) ___

(b) ___ (g) ___ (l) ___ (q) ___

(c) ___ (h) ___ (m) ___

(d) ___ (i) ___ (n) ___

(e) ___ (j) ___ (o) ___

48. Distinguish between…

(a) Artery _____

Vein _____

(b) Atrium _____

Ventricle _____

(c) Blood _____

Interstitial Fluid _____

(d) Plasma _____

Formed elements _____

(e) Tricuspid valve _____

Bicuspid valve _____

(f) Systemic circuit _____

Pulmonary circuit _____

(g) Atrioventricular valve

Semilunar valve

(h) Intrinsic control

Extrinsic control

(i) Left side of heart

Right side of heart

49.

52.

53.

59.

61.

62.

65. Match the description to the fetal circulatory feature

(a) ___	(f) ___	(k) ___	(p) ___
(b) ___	(g) ___	(l) ___	(q) ___
(c) ___	(h) ___	(m) ___	(r) ___
(d) ___	(i) ___	(n) ___	(s) ___
(e) ___	(j) ___	(o) ___	

73. (a) Show your work

(b) Show your work

Mark the review questions using the answer key on pages 544 - 546