

NAME _____ LAB TIME/DATE _____

REVIEW SHEET
exercise

32

Anatomy of Blood Vessels

Microscopic Structure of the Blood Vessels

1. Use key choices to identify the blood vessel tunic described.

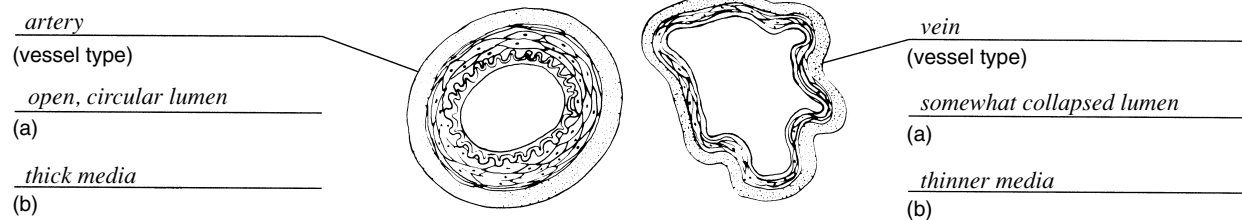
Key: a. tunica intima b. tunica media c. tunica externa

- a; intima 1. innermost tunic
- b; media 2. bulky middle tunic contains smooth muscle and elastin
- a; intima 3. its smooth surface decreases resistance to blood flow
- a; intima 4. tunic(s) of capillaries
- a; intima , b; media , c; externa 5. tunic(s) of arteries and veins
- b; media 6. is especially thick in elastic arteries
- c; externa 7. most superficial tunic

2. Servicing the capillaries is the essential function of the organs of the circulatory system. Explain this statement.

Exchanges of nutrients, respiratory gases, and wastes can occur only through thin capillary walls. All other vessels serve simply to feed or drain capillary beds.

3. Cross-sectional views of an artery and of a vein are shown here. Identify each; and on the lines beneath, note the structural details that enabled you to make these identifications:



4. Why are valves present in veins but not in arteries? The high blood pressure in arteries propels the blood through them. The blood pressure in veins is low and often the blood is flowing against gravity. Valves prevent backflow.

5. Name two events occurring within the body that aid in venous return:

Skeletal muscle "milking action" and changes in thoracic cavity pressure during breathing.

6. Why are the walls of arteries proportionately thicker than those of the corresponding veins? *Arteries must withstand high pressure and pressure fluctuations. Veins are low-pressure vessels.*

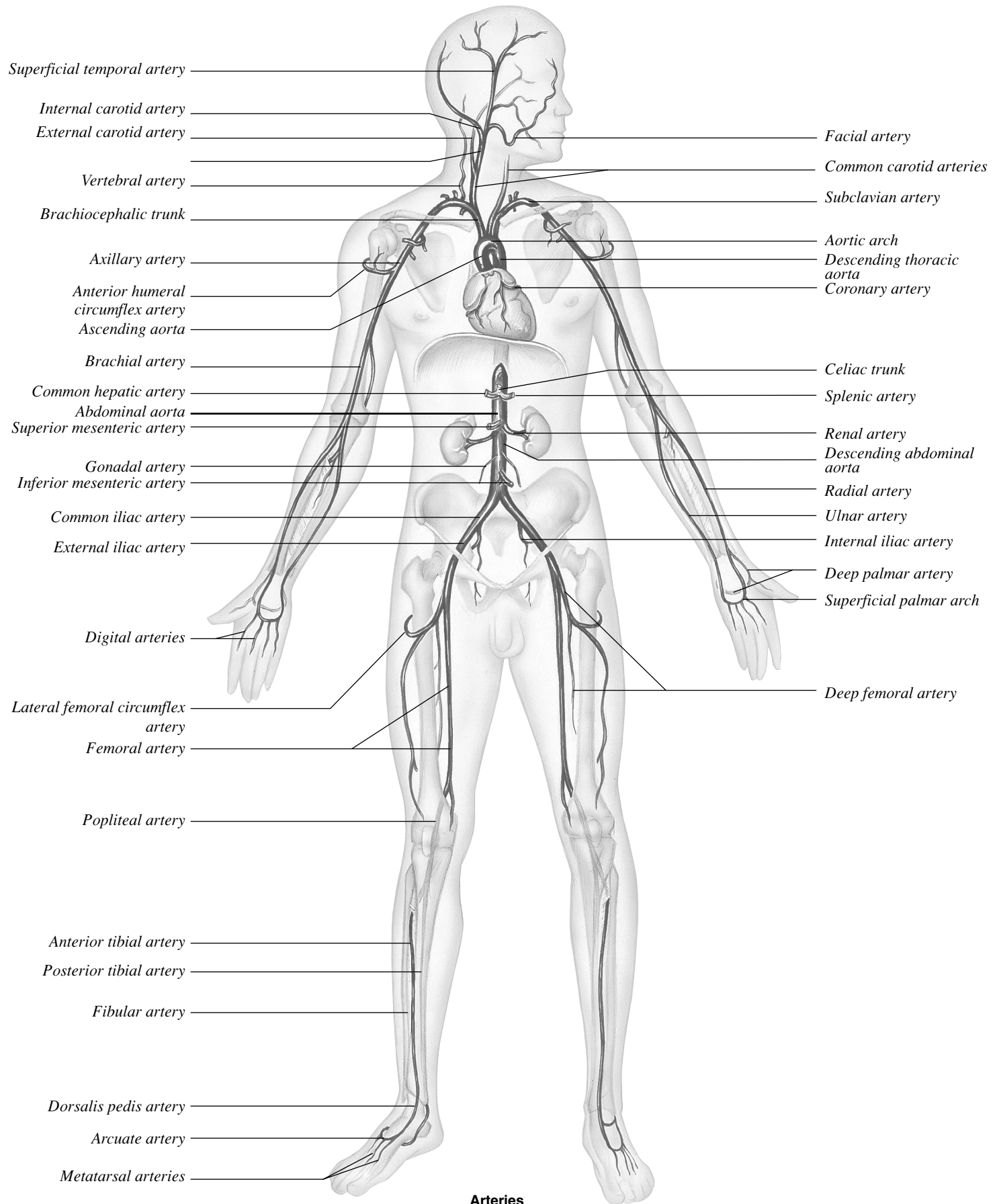
Major Systemic Arteries and Veins of the Body

7. Use the key on the right to identify the arteries or veins described on the left.

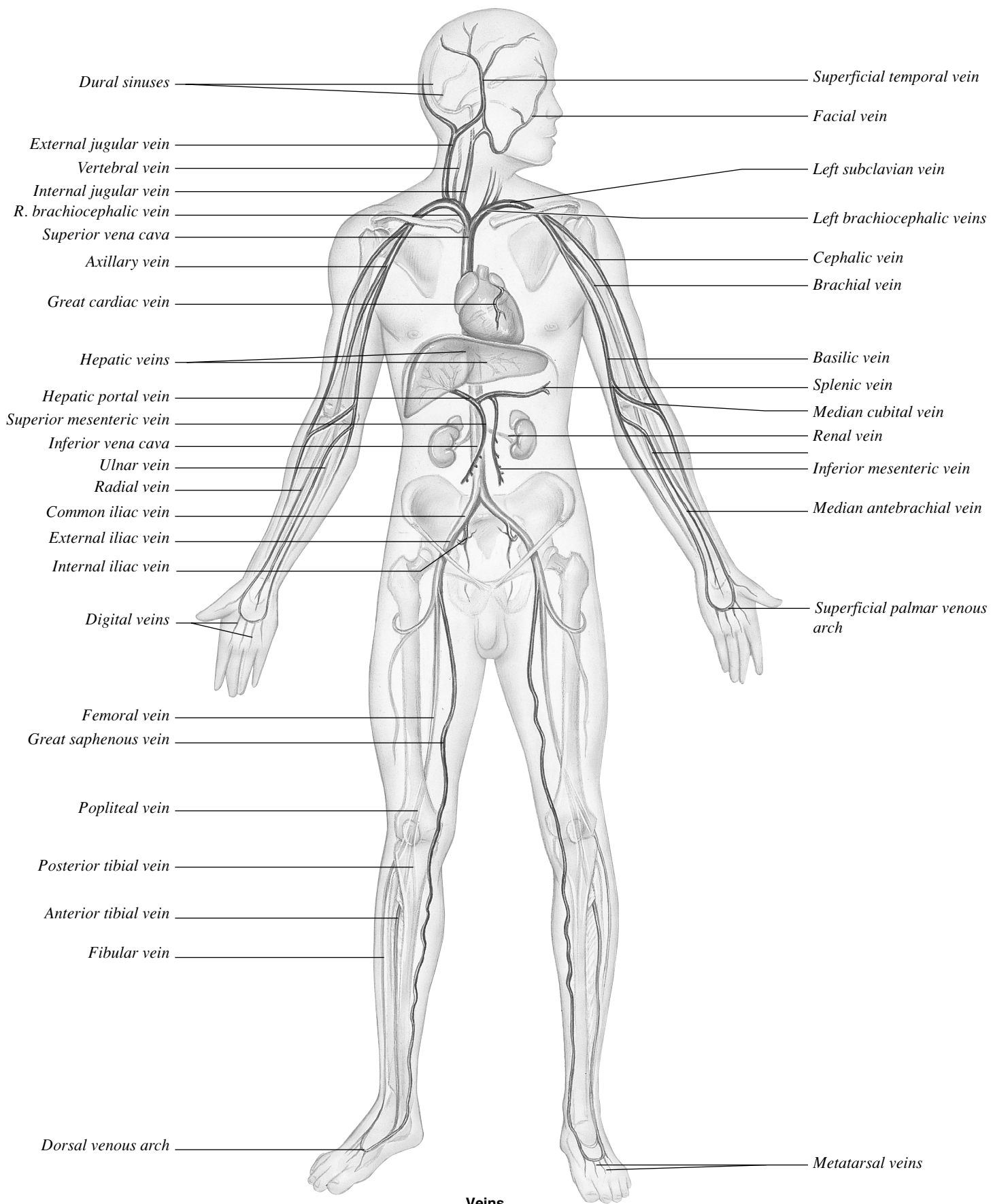
- d 1. the arterial system has one of these; the venous system has two
- i 2. these arteries supply the myocardium
- r, z 3. two paired arteries serving the brain
- o 4. longest vein in the lower limb
- k 5. artery on the dorsum of the foot checked after leg surgery
- j 6. serves the posterior thigh
- t 7. supplies the diaphragm
- c 8. formed by the union of the radial and ulnar veins
- b, f 9. two superficial veins of the arm
- w 10. artery serving the kidney
- p 11. veins draining the liver
- q 12. artery that supplies the distal half of the large intestine
- s 13. drains the pelvic organs
- m 14. what the external iliac artery becomes on entry into the thigh
- c 15. major artery serving the arm
- y 16. supplies most of the small intestine
- h 17. join to form the inferior vena cava
- e 18. an arterial trunk that has three major branches, which run to the liver, spleen, and stomach
- l 19. major artery serving the tissues external to the skull
- a, n, u 20. three veins serving the leg
- v 21. artery generally used to take the pulse at the wrist

- Key:
- a. anterior tibial
 - b. basilic
 - c. brachial
 - d. brachiocephalic
 - e. celiac trunk
 - f. cephalic
 - g. common carotid
 - h. common iliac
 - i. coronary
 - j. deep femoral
 - k. dorsalis pedis
 - l. external carotid
 - m. femoral
 - n. fibular
 - o. greater saphenous
 - p. hepatic
 - q. inferior mesenteric
 - r. internal carotid
 - s. internal iliac
 - t. phrenic
 - u. posterior tibial
 - v. radial
 - w. renal
 - x. subclavian
 - y. superior mesenteric
 - z. vertebral

8. The human arterial and venous systems are diagrammed on the next two pages. **Identify all indicated blood vessels.**



Arteries



Veins

9. Trace the blood flow for the following situations:

a. from the capillary beds of the left thumb to the capillary beds of the right thumb Digital vein, L radial vein, L brachial vein, L axillary vein, L subclavian vein, L brachiocephalic vein, superior vena cava, R atrium, R ventricle, pulmonary trunk, pulmonary artery, lobar artery, pulmonary capillaries of the lung, pulmonary veins, L atrium, L ventricle, aortic arch, brachiocephalic artery, R subclavian artery, R axillary artery, R brachial artery, R radial artery, digital artery.

b. from the bicuspid valve to the tricuspid valve by way of the great toe Through bicuspid valve into left ventricle, aorta, common iliac artery, external iliac artery, femoral artery, posterior tibial artery, lateral plantar artery, digital artery, capillary beds, digital vein, plantar arch, plantar vein, posterior tibial vein, external iliac vein, common iliac vein, inferior vena cava, right atrium, then through tricuspid valve.

c. from the pulmonary vein to the pulmonary artery by way of the right side of the brain Two pathways: (1) major pathway serves over 80% of cerebral tissue—pulmonary vein, L atrium, L ventricle, aortic arch, brachiocephalic trunk, R common carotid artery, R internal carotid artery, R middle cerebral and right anterior cerebral arteries, capillary beds, dural sinuses, internal jugular vein, brachiocephalic vein, superior vena cava, R atrium, R ventricle, pulmonary trunk, pulmonary artery; (2) pathway supplies occipital lobe and part of temporal lobe (follows pathway 1 until brachiocephalic artery), then R subclavian artery, R vertebral artery, basilar artery, R posterior cerebral artery, capillary beds (return route same as pathway 1).

Special Circulations

Pulmonary Circulation

10. Trace the pathway of a carbon dioxide gas molecule in the blood from the inferior vena cava until it leaves the bloodstream. Name all structures (vessels, heart chambers, and others) passed through en route.

Inferior vena cava → right atrium → right ventricle → pulmonary trunk → right or left pulmonary artery → lobar artery → pulmonary capillary beds in lungs → air sacs (alveoli) of lungs.

Arterial Supply of the Brain and the Circle of Willis

18. What two paired arteries enter the skull to supply the brain?

Internal carotids and Vertebral

19. Branches of the paired arteries just named cooperate to form a ring of blood vessels encircling the pituitary gland, at the base of the brain. What name is given to this communication network? Circle of Willis

What is its function? Provides an alternate set of pathways for blood to reach brain tissue in case of impaired blood flow anywhere in the system.

20. What portion of the brain is served by the anterior and middle cerebral arteries? The bulk of the cerebral hemispheres.

Both the anterior and middle cerebral arteries arise from the internal carotid arteries.

21. Trace the pathway of a drop of blood from the aorta to the left occipital lobe of the brain, noting all structures through which it flows. Aorta → subclavian artery → vertebral artery → basilar artery → posterior cerebral artery → occipital brain tissue.

Fetal Circulation

22. The failure of two of the fetal bypass structures to become obliterated after birth can cause congenital heart disease, in which the youngster would have improperly oxygenated blood. Which two structures are these?

ductus arteriosus and foramen ovale

23. For each of the following structures, first indicate its function in the fetus; and then note what happens to it or what it is converted to after birth. Circle the blood vessel that carries the most oxygen-rich blood.

Structure	Function in fetus	Fate
Umbilical artery	Carries O ₂ -poor blood from the fetus to the placenta.	Obliterated. Becomes the medial umbilical ligament.
<u>Umbilical vein</u>	Carries O ₂ -rich blood from the placenta to the fetus.	Obliterated. Becomes the round ligament of the liver (ligamentum teres).
Ductus venosus	Shunts blood through the fetal liver, bypassing the bulk of its tissue.	Becomes the fibrous ligamentum venosus.
Ductus arteriosus	Bypasses the fetal lungs by shunting blood from the pulmonary trunk to the aorta.	Occludes. Becomes the ligamentum arteriosum.
Foramen ovale	Bypasses the lungs by shunting blood from the right atrium to the left atrium.	Closes. Becomes the fossa ovalis.

24. What organ serves as a respiratory/digestive/excretory organ for the fetus? Placenta