

LABORATORY EXERCISE 11

Cardiovascular System

Ex. 11

BLOOD AND CARDIAC MUSCLE:

1. Review the sections on “Blood”, “Muscle tissue” and “Functions of the Circulatory System” in your textbook and notes.
2. List the types of cells which are found in our blood and give a function for each cell

3. Blood is classified as _____ tissue. What is the matrix(extracellular material) of this tissue? _____.
4. Blood cells all derive from a stem cell which is called a _____.
5. Where are blood cells produced? _____ Where is this tissue in the adult? _____. Where is it found in the child? _____.

6. List the characteristics for cardiac muscle:

7. List the functions for the circulatory (cardiovascular) system:

Locate the following features on the diagrams in your textbook and on the models in your lab.

HEART, BODY CAVITIES AND MEMBRANES:

8. 1. Label the following chambers, valves, and membranes in a diagram of the heart below:
- Right ventricle
 - Right atrium
 - Left atrium
 - Left ventricle
 - Right atrioventricular valve
 - Bicuspid valve
 - Left atrioventricular valve
 - Tricuspid valve
 - Mitral valve
 - Pulmonary semilunar valve
 - Aortic semilunar valve
 - Inferior vena cava
 - Superior vena cava
 - Coronary sinus
 - Ascending aorta
 - Aortic arch
 - Descending aorta
 - Right & Left coronary arteries
 - Pulmonary trunk
 - R & L pulmonary arteries
 - R & L pulmonary veins
 - Ductus arteriosus
 - Ligamentum arteriosum
 - Foramen ovale
 - Fossa ovalis
 - Apex
2. Now, in a different color, label the following components of the cardiac conduction system:
- Sino-atrial node
 - Atrio-ventricular node
 - Bundle (of His)
 - R & L Bundle Branches
 - Purkinje fibers

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3. In a third color, Label the pathway for blood through the heart in the adult.

4. How does circulation through the heart differ in the fetus?

5. Normally, arteries carry blood that contains _____ and carry blood *toward/away from* the heart. Normally veins carry blood that is _____ and carry it *toward/away from* the heart.

6. Name the exceptions to the rule above

7. The valve located on the right side of the heart between the right atrium and the right ventricle is called the _____ or _____ valve.

8. The valve located on the left side of the heart between the left atrium and the left ventricle is called the _____ or _____ or _____ valve.

9. The membrane which encloses the thoracic cavity and adheres to the body wall is called the _____. The membrane which adheres to the surface of the lungs is called the _____.

10. The cavity in the center of the thoracic cavity in which the heart is found is called the _____.

11. The membranes which cover and protect the heart are called the _____ which is fibrous and more external and is also known as the _____. The _____ which is the more delicate membrane and adheres to the surface of the heart is also known as the _____.

12. The space located between the two membranes above is called the _____. This space contains _____ which functions to _____.

13. The membrane which lines the inside of the heart and is continuous with the lining of the great vessels is called the _____. If this membrane gets infected

with bacteria the result is a serious and life-threatening disease called _____.

14. List the components of the conduction system in order of firing:

List, from most external to most internal, the membranes which enclose and protect the heart, the heart muscle, and the membrane which covers and protects the heart internally.

FETAL CIRCULATION: A SELF TEST

Some of the fetal organs, which do not fully function until after birth are the _____, _____, and _____. Prior to birth, the fetus derives _____ and _____ from the mother's circulation and depends on her body for the elimination of _____ and other wastes. Exchange of materials between maternal and fetal circulation takes place within the _____, which is a highly vascularized structure that is expelled after the birth of the baby and is called the _____. The structure which connects the fetus with the placenta is the _____. The vessels within this structure are the _____ arteries and _____ vein. Blood leaves the fetus by way of the _____. In the capillaries of the placenta, O₂ and CO₂ are exchanged; then blood returns to the fetus by way of the _____. This last vessel enters the abdomen of the fetus, ascends to the liver where it divides into two branches.

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One branch, the _____ continues on to join the inferior vena cava. The other branch joins the _____ vein and goes to the liver. Because of the branching, not all of the blood goes to the liver. Circulation through the lower body of the fetus mingles with the blood that is returning from the placenta where it picked up O₂ and nutrients. This mixing takes place in the inferior vena cava, then enters the right _____.

Blood circulates through the upper body as it does through the post-natal child. It returns to the right atrium by way of the _____. In the atrium, blood from the superior and inferior vena cava mix.

Some of the blood from the right atrium flows directly to the left atrium through the _____. Because the blood goes to the left atrium, it bypasses the fetal _____. Blood that goes to the right ventricle is pumped into the pulmonary circuit because the lungs are not yet expanded. Blood in the pulmonary artery flows through the _____, which shunts blood into the arch of the aorta. Normally, the foramen ovale and the ductus arteriosus close soon after the birth of the baby, when breathing begins. Blood in the aorta is a mixture of oxygenated and poorly oxygenated blood. This is carried to all parts of the body through systemic branches. Upon reaching the branching of the common _____ arteries, part of the blood flows into the internal iliac artery, then into the _____ artery, then back to the placenta. What is the only fetal vessel that carries fully oxygenated blood? _____.

Adapted from Thrash and Merkle, 1990

HEPATIC PORTAL SYSTEM: A SELF TEST

The Hepatic Portal System is a special circulation which brings blood from the organs of digestion to the _____. It is called the "Portal" system from the Latin word *portare* which means _____. The digestive organs process food that contains bacteria, possibly toxins (including alcohol), and perhaps variable amounts of nutrients. This food is chemically digested and absorbed into the _____.

Before this blood containing nutrients and contaminants can be allowed to be sent to all parts of the body, it must go to the _____ to be processed. The liver will remove the _____, will detoxify the _____ and will store excess _____ as fats or starches (glucagons).

Blood vessels leaving the organs of digestion which are carrying _____, will join the _____. This hepatic portal vein will carry the blood and nutrients to the _____. After passing through the liver blood from the digestive system will leave the liver by way of the _____ vein which joins the _____ on it's way back to the heart.