Anatomy of the Heart

Gross Anatomy of the Human Heart

1. An anterior view of the heart is shown here. Identify each numbered structure by writing its name on the correspondingly numbered line:

   1. **RIGHT ATRIUM**
   2. **LEFT ATRIUM**
   3. **RIGHT VENTRICLE**
   4. **LEFT VENTRICLE**
   5. **SUPERIOR VENA CAVA**
   6. **INFERIOR VENA CAVA**
   7. **AORTA**
   8. **BRACHIOCEPHALIC TRUNK**
   9. **LEFT COMMON CAROTID ARTERY**
   10. **LEFT SUBCLAVIAN ARTERY**
   11. **PULMONARY TRUNK**
   12. **RIGHT PULMONARY ARTERY**
   13. **LEFT PULMONARY ARTERY**
   14. **LIGAMENTUM ARTERIOSUM**
   15. **RIGHT PULMONARY VEINS**
   16. **LEFT PULMONARY VEINS**
   17. **CORONARY SULCUS**
   18. **RIGHT CORONARY ARTERY**
   19. **CORONARY SULCUS**
   20. **CIRCUMFLEX ARTERY**
   21. **APEX**
2. What is the function of the fluid that fills the pericardial sac? Lubrication, friction, reduction

3. Match the terms in the key to the descriptions provided below. (Some terms may be used more than once.)

**Key:**
- atria
- coronary arteries
- coronary sinus
- epicardium
- endocardium
- myocardium
- ventricles

**Coronary Sinus**
1. drains blood into the right atrium

**Atria**
2. superior heart chambers

**Ventricles**
3. inferior heart chambers

**Epicardium**
4. visceral pericardium

**Atria**
5. "anterooms" of the heart

**Myocardium**
6. equals cardiac muscle

**Coronary Arteries**
7. provide nutrient blood to the heart muscle

**Endocardium**
8. lining of the heart chambers

**Ventricles**
9. actual "pumps" of the heart

4. What is the function of the valves found in the heart? To force the flow of blood in one direction through the heart

5. Can the heart function with leaky valves? (Consider this: can a water pump function with leaky valves?) Yes

6. What is the role of the chordae tendineae? To keep the atrioventricular valve leaflets from evertting into the atria

**Pulmonary, Systemic, and Cardiac Circulations**

7. A simple schematic of a so-called general circulation is shown below. What part of the circulation is missing from this diagram?

The circulation to the lungs from the right heart

Add to the diagram as best you can to make it depict a complete systemic/pulmonary circulation, and re-identify "general circulation" as the correct subcirculation.
8. Differentiate clearly between the roles of the pulmonary and systemic circulations. **PULMONARY CIRCUIT**
   Takes all incoming blood from body & sends it to the lungs; blood returns to left heart which then sends it to the systemic circulation.

9. Complete the following scheme of circulation in the human body:

   Right atrium through the tricuspid valve to the **RIGHT VENTRICLE** through the **RIGHT SEMILUNAR** valve to the pulmonary trunk to the **PULMONARY ARTERIES** to the capillary beds of the lungs to the **PULMONARY VEINS** to the **LEFT ATRIUM** of the heart through the **MITRAL** valve to the **LEFT VENTRICLE** through the **LEFT SEMILUNAR** valve to the **AORTA** to the systemic arteries to the **CAPILLARIES** of the **SYSTEMIC** tissues to the systemic veins to the **SUPERIOR** and **INFERIOR VENA CAVA** entering the right atrium of the heart.

10. If the mitral valve does not close properly, which circulation is affected? **SYSTEMIC**

11. Why might a thrombus (blood clot) in the anterior descending branch of the left coronary artery cause sudden death?

   **BECAUSE O₂ DELIVERY WOULD BE SHUT OFF TO THE LEFT VENTRICLE PREVENTING IT FROM FUNCTIONING & NO BLOOD WOULD THEREFORE BE PUMPED TO THE HEAD & BODY**

**Microscopic Anatomy of Cardiac Muscle**

12. Add the following terms to the photo of cardiac muscle at the right:

   - intercalated discs
   - nucleus of cardiac muscle fiber
   - striations
   - cardiac muscle fiber

13. What role does the unique structure of cardiac muscle play in its function? (Note: Before attempting a response, describe the unique anatomy.) **THE INTERCALATING DISCS SUPPLY STRENGTH TO THE CELLULAR CONNECTIONS FOR LONG TERM USE; THE SIDE BRANCHING ALLOWS FOR BETTER TWISTING CONTRACTION & BETTER FORCE APPLIED TO THE BLOOD**
Dissection of the Sheep Heart

14. During the sheep heart dissection, you were asked initially to identify the right and left ventricles without cutting into the heart. During this procedure, what differences did you observe between the two chambers?

**LEFT HEART SEEMED BIGGER & THICKER THAN RIGHT HEART**

How would you say this structural difference reflects the relative functions of these two heart chambers?

**RIGHT HEART ONLY HAS TO PUMP TO THE LUNGS SO IT IS SMALLER & LEFT HEART PUMPS TO WHOLE REST OF THE BODY SO MUST BE BIGGER**

15. Semilunar valves prevent backflow into the **VENTRICES**; AV valves prevent backflow into the **ATRIA**. Using your own observations, explain how the operation of the semilunar valves differs from that of the AV valves. The **AV VALVES ARE INVOLVED DURING FORCE GENERATION OF THE VENTRICLES; THE SEMILUNAR VALVES ARE INVOLVED DURING CARDIAC RELAXATION.**

16. A remnant of the fetal structure is observable in the heart. What was it called in the fetal heart, where was it located, and what purpose did it serve as a functioning fetal structure?

**DUCTUS ARTERIOSUS; BETWEEN PULMONARY TRUNK & AORTA; ROLE IN FETAL LIFE IS TO SHUNT BLOOD AWAY FROM THE LUNGS WHILE THE FETUS IS STILL WITHIN THE WOMB.**