SNC 2DO HEART COMPARISONS

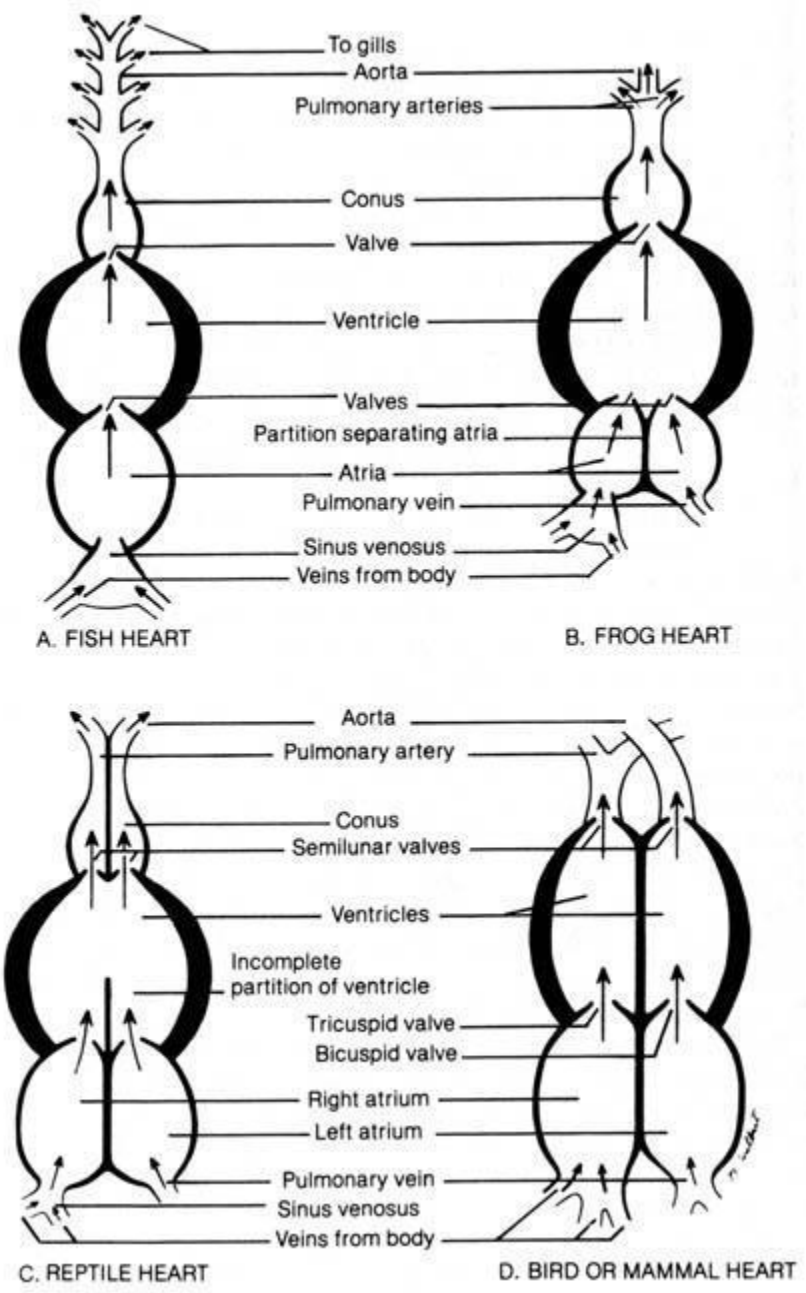

Figure 2.34. Diagram comparing the structures of vertebrate hearts. Adapted, with permission, from Villee, C. A. *Biology*. 7th ed. Philadelphia: W. B. Saunders Co.; 1977. © 1977 by the W. B. Saunders Co. [137]

SNC 2PO HEART COMPARISONS

Use the diagrams of the hearts from fish, amphibian, reptile and mammal/bird to answer the following questions.

The **arrows** (□) show the direction of blood flow. The word **pulmonary** refers to the lungs. **Atria** is plural of **atrium**.

1. Name the two types of chambers that are found in all four hearts.
Atria, and ventricles

2. Name two additional chambers that are found in fish, amphibian and reptile.
Sinus venosus, Conus

3. (a) Which chambers have thicker muscle in their walls, atria or ventricles?
Ventricles

(b) Given your answer to part (a) and the direction of the arrows, what is the role of:
(i) the atria
-to collect blood from the body and pump it into the ventricle
(ii) the ventricles
-to forcefully push blood through the body to deliver oxygen … provides blood pressure

4. Compare the **number** of each type of chamber in the four hearts:

Chamber	Fish	Amphibian	Reptile	Mammal/Bird
Atrium/Atria	***1***	***2***	***2***	***2***
Ventricle(s)	***1***	***1***	***1***	***2***

5. Why don't fish have pulmonary arteries and veins?
Fish do not have lungs (they have gills) … so they have no pulmonary arteries.

6. What is the function of the valves located between the:
(a) chambers
-to let blood into the ventricle … but to prevent blood from flowing backward into the atria

(b) ventricle and blood vessels
-to let blood flow into the blood vessels, but not let blood flow backward into the ventricle

7. Is the blood that enters the heart from the body oxygenated or deoxygenated? Explain your answer.

De-oxygenated. After the blood travels through the body, it has no oxygen in it.

8. Is the blood that enters the heart from the lungs (pulmonary veins) oxygenated or deoxygenated? Explain your answer.

Oxygenated. The blood just picked up lots of oxygen from the lungs.

9. Where does the blood flow to if it leaves the heart through the:

(a) pulmonary arteries

To the lungs

(b) aorta

To the body

10. Describe several problems that exist with the design of the amphibian and reptile hearts.

Blood from the heart and from the body mix together in the ventricle.
-it doesn't send oxygen-rich blood to the tissues
-it doesn't send de-oxygenated blood to the lungs.

11. How does the reptile heart partially solve some of these problems?

Has half a wall in its ventricle … doesn't mix blood as much.

12. How does the mammal/bird heart fully solve these problems?

Does not mix blood at all … keeps blood separate in the 4 different chambers.

13. Why do mammals and birds need the 4 chambered heart but amphibians and reptiles can survive with their "inferior" hearts?

Mammals and birds need more oxygen from their circulatory system … for a smarter brain and more active muscles.