Dissection manual for porcine heart

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Photos: Lotta Arborelius

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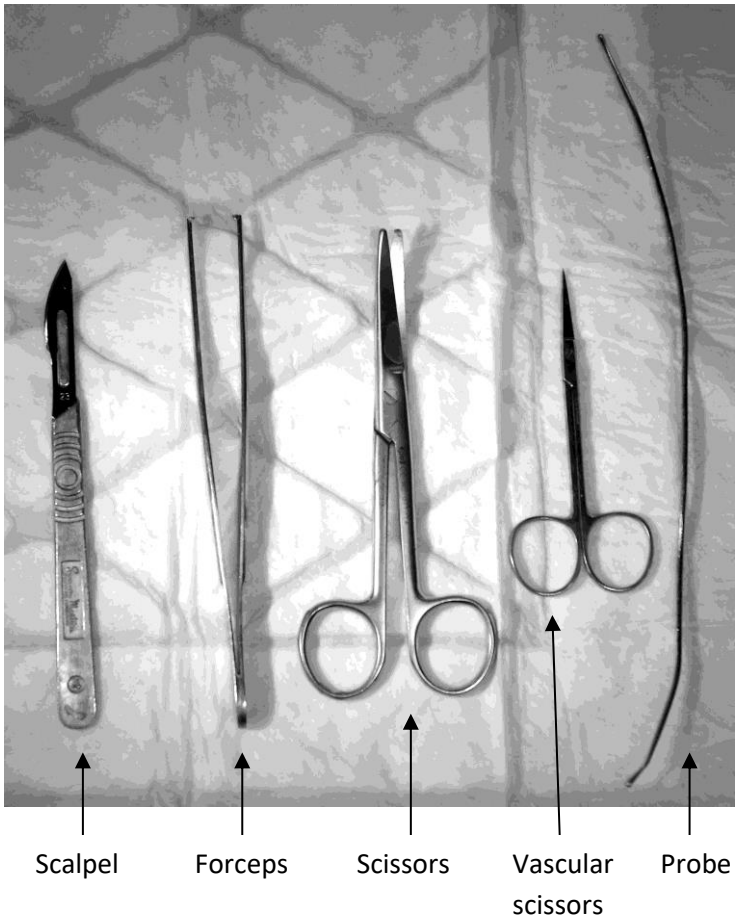
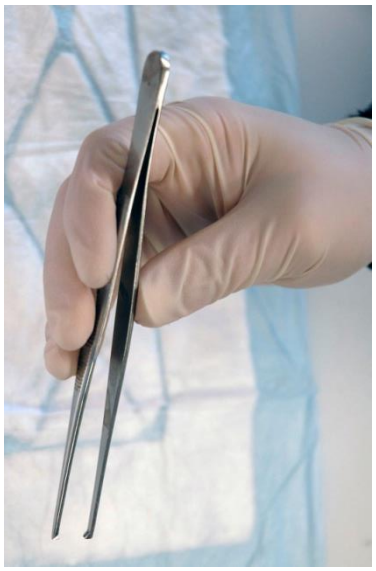
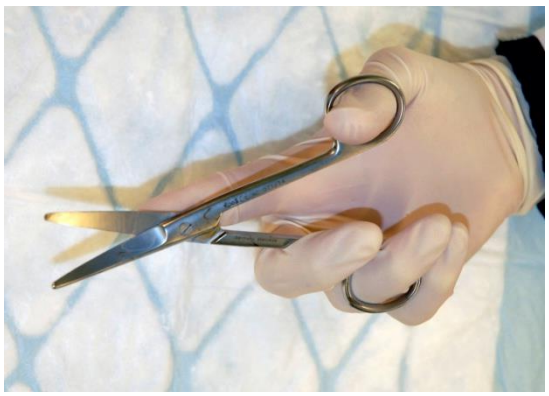
1. Instruments







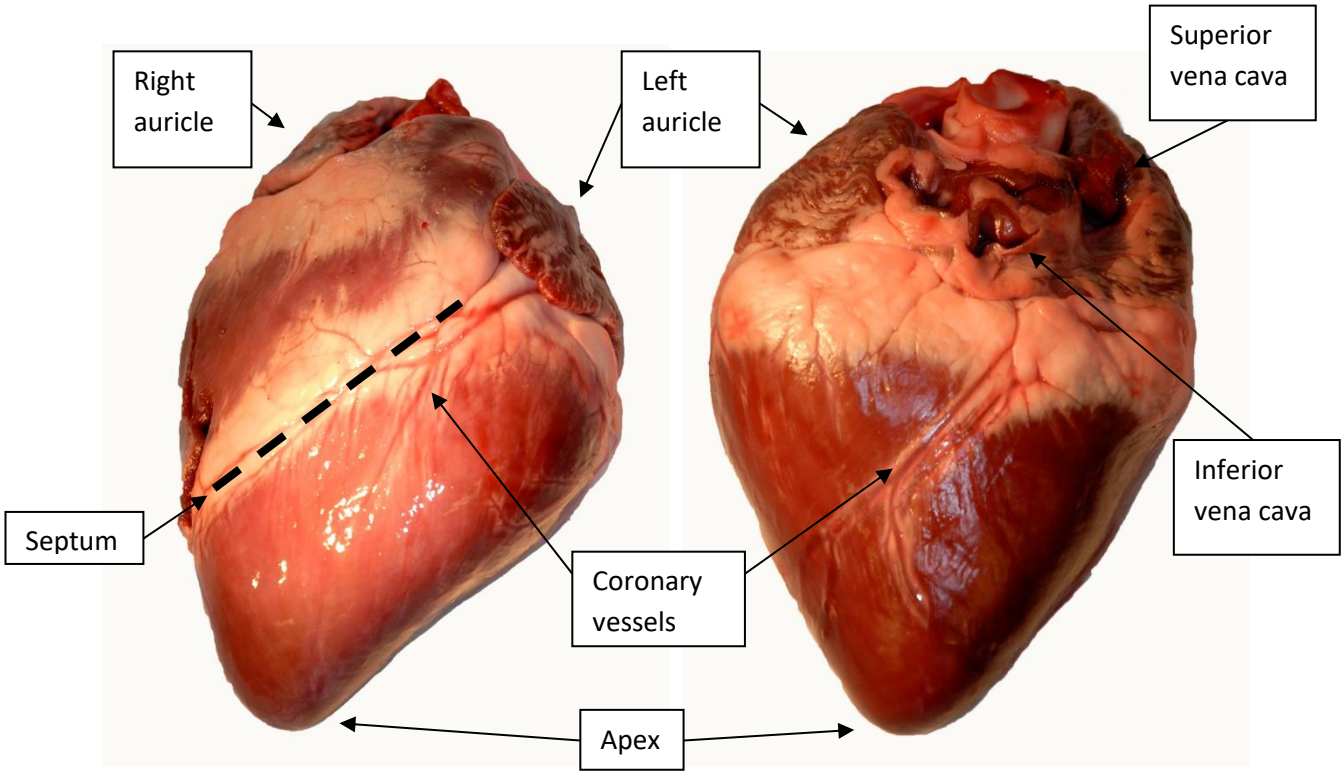
Forceps and scissors (including vascular scissors) are best held as shown here, as these grips give good control.

2. Surface anatomy of the heart

Begin by orienting the heart. Take note of its size and shape. Identify the following landmarks:

- Apex
- The cardiac auricles
- The demarcation between the right and the left ventricle (*septum*)
- The entrances of the superior and inferior vena cava

Also identify the coronary blood vessels.

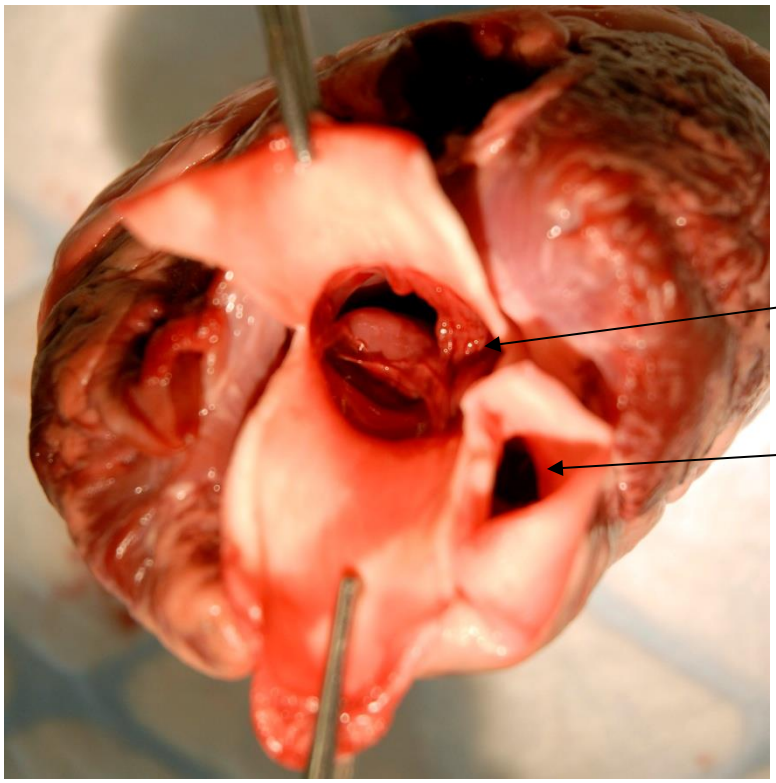


Left: Frontal view of the heart. Right: Posterior view. The heart commonly has some yellow-white fat tissue on the outer surface. You may find cuts that have been made when the heart was removed from the chest cavity.

The cardiac auricles are appendages to the atria. Their function is not entirely known. It has been speculated that they function as reservoirs for blood, which may be mobilized in times of increased physiological need.

3. Aorta and the pulmonary arteries

Several vessels extend from the superior (topmost) side of the heart. The aorta and the pulmonary artery have thick yellowish walls. Identify these vessels and cut them to make the valves visible. The aortic and pulmonary valves are each made up of three leaflets. Inspect the valves and palpate them (feel them with a finger).

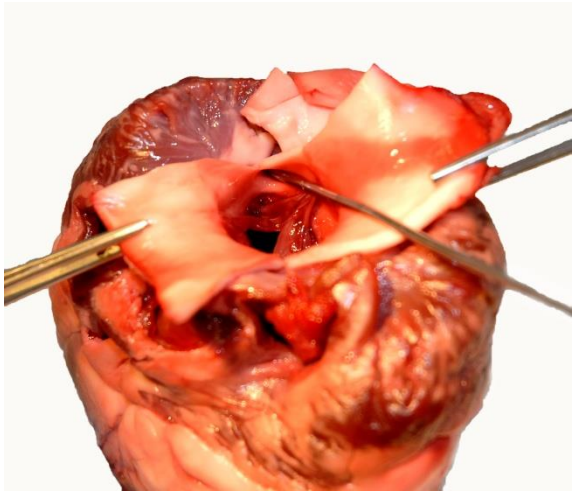


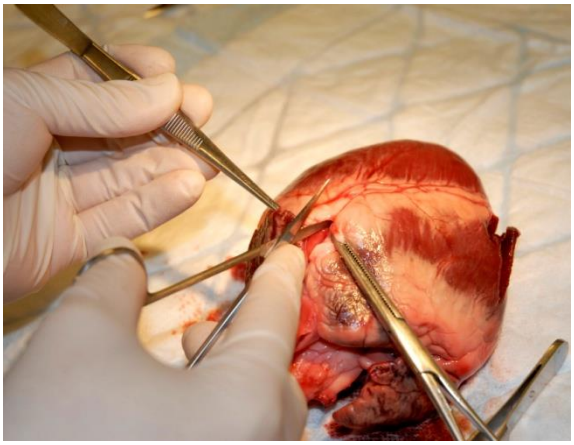
Try pouring a little water on the valve from a kidney dish and see if the valve closes.

Thought question: Why do the arteries leading blood from the heart have thicker walls than the veins leading blood back to the heart?

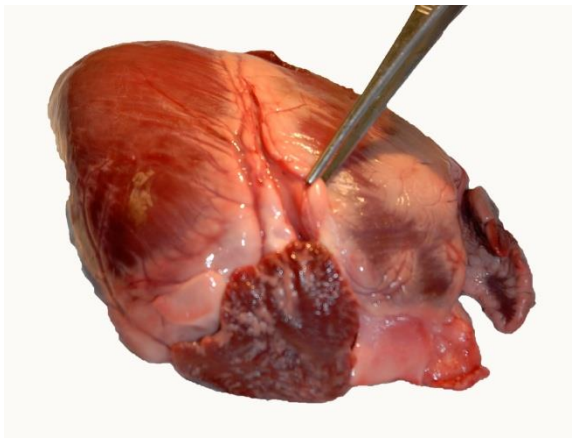
4. Coronary arteries

The two main coronary arteries branch off from the aorta just above the aortic valve. Start by probing the coronary artery entrance. By gripping the heart with the forceps next to the the entrance of the artery, you may straighten out the closest part of the artery, which makes it easier to cut. Cut the coronary arteries starting from the aorta and proceeding along one or more branches as far as their size permit.





Left: Probing of the entrance to the left coronary artery. Right: cutting open the coronary artery.



Opened coronary artery.

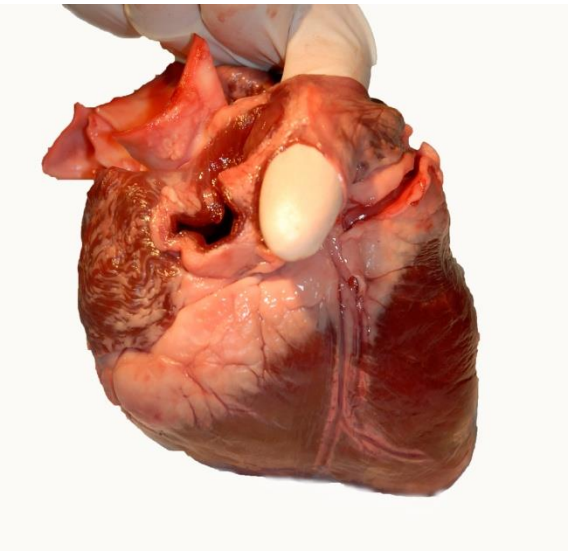
Thought question:

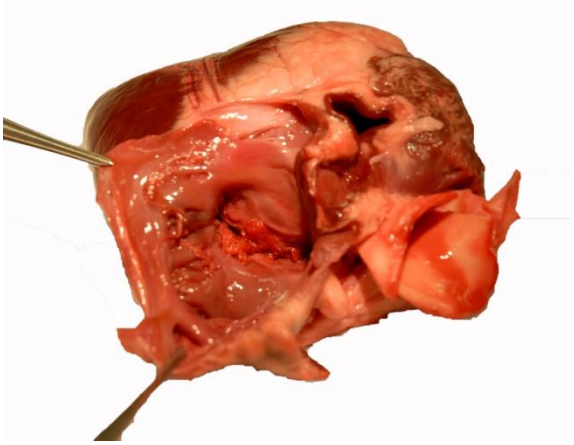
In angina or myocardial infarction, the myocardium (heart muscle) receives insufficient blood flow. The effect of diminished flow in one coronary artery depends on, among other things, whether other arteries can compensate for the decreased flow. The anatomy of the coronary vessels may vary greatly between individuals. How much of the heart appears to receive its blood supply from only one single artery?

5. The right atrium

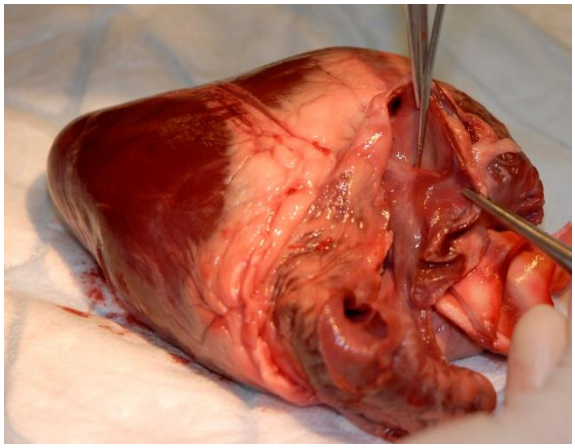
Cut open the right atrium between the two openings for the vena cava, and continue into the auricle. Coagulated blood may be found here; in this case, gently remove it. Take note of the endocardium, the tissue lining the inside of the heart. What does it look like?

Between the right and the left atria there is an opening during fetal life, when the lungs are not used, called the foramen ovale. This opening normally closes at birth, leaving a shallow pit in the myocardium – the oval fossa. Sometimes, a small opening may persist, and is then termed a patent foramen ovale. Try to find the oval fossa and examine with a probe whether any opening remains.





Left: The two entrances of the vena cava. Right: The right atrium, cut open.

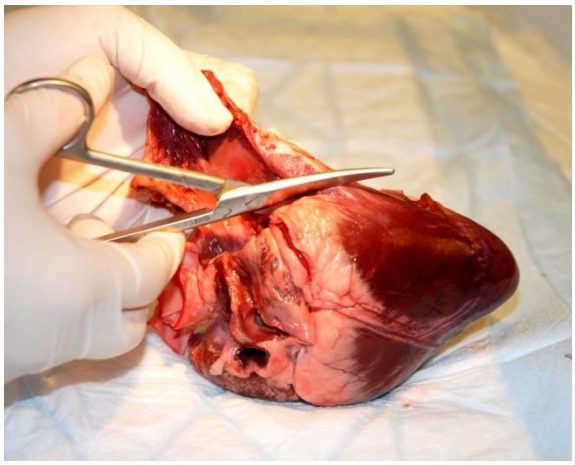


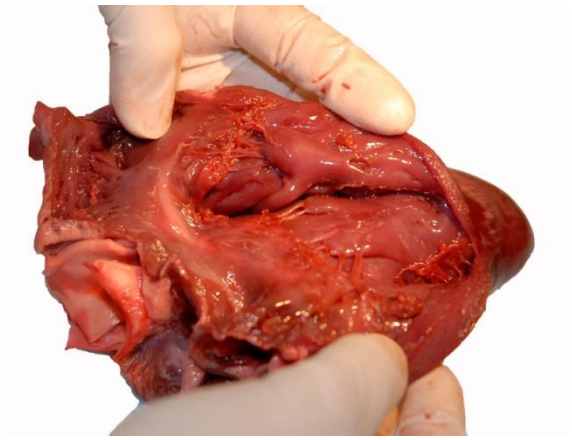
Probing of the oval fossa.

Thought question. Deep venous thromboses are not uncommon. They may give rise to thromboembolism, i.e. that part of a blood clot comes off and is transported by the blood to some other part of the body. How would a patent foramen ovale affect the range of possible outcomes?

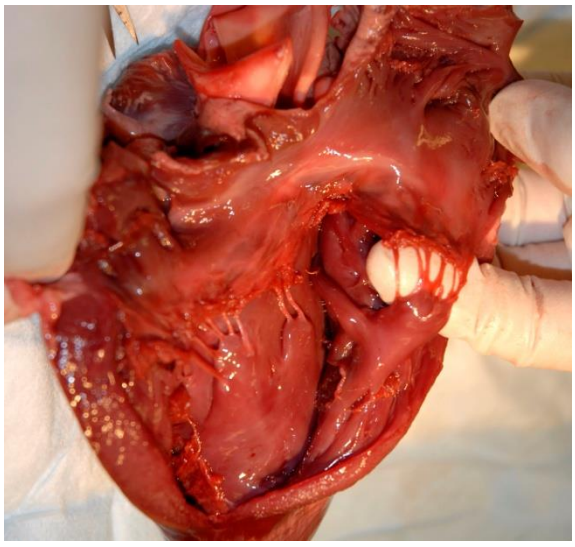
6. The right ventricle

Cut open the right ventricle through the opening from the right atrium, along the right side of the heart. You will then cut through the tricuspid valve. Open the right ventricle and take note of the valve. This valve has three cusps, which are attached to papillary muscles extending from the inner wall of the ventricle. Observe and palpate the valve. Proceed to examine the muscular wall of the ventricle and take note of its trabecular (web-shaped) structure. Finally, identify the pulmonary valve and probe it from the inside of the ventricle.





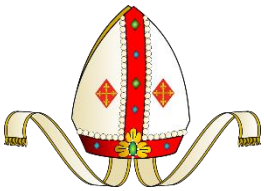
Left: cutting open the right ventricle. Right: Inside of the right ventricle.



One of the cusps of the tricuspid valve, held up by a finger.

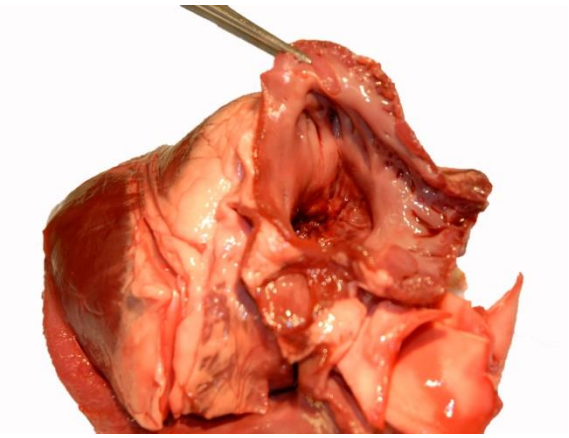
Thought question: from where does the blood flow to the right ventricle come, and where does it go?

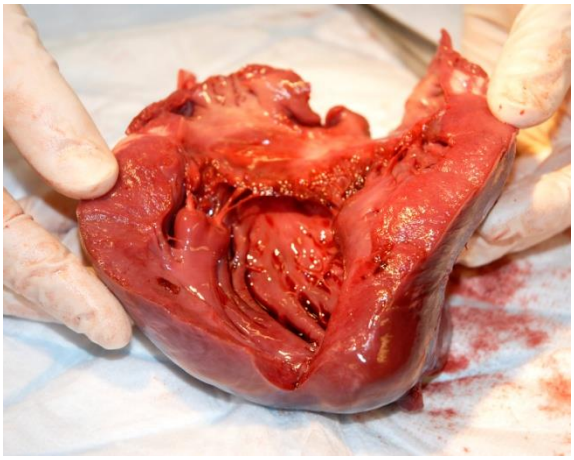
7. Left atrium and ventricle



Cut open the left atrium and ventricle through the entrance for the pulmonary vein into the left atrium. Cut along the left side of the heart. The valve between the left atrium and ventricle has two cusps and is termed the mitral valve (mitre = hat with two points, used by bishops). Examine the endocardium and the mitral valve. Identify the entrance to the aorta and probe it from the inside of the left ventricle.

Compare the right and left ventricles with regard to their respective sizes and the thickness of the myocardium. Finally, palpate the muscle wall between the right and left ventricles (the septum). Here runs His' bundle, which conducts signals for the contractions of the heart.





Left: left atrium. Right: left ventricle.

Thought question: Why is the myocardium of the left ventricle thicker than that of the right ventricle?

Images of kidney dish and mitre are from Wikipedia.

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