

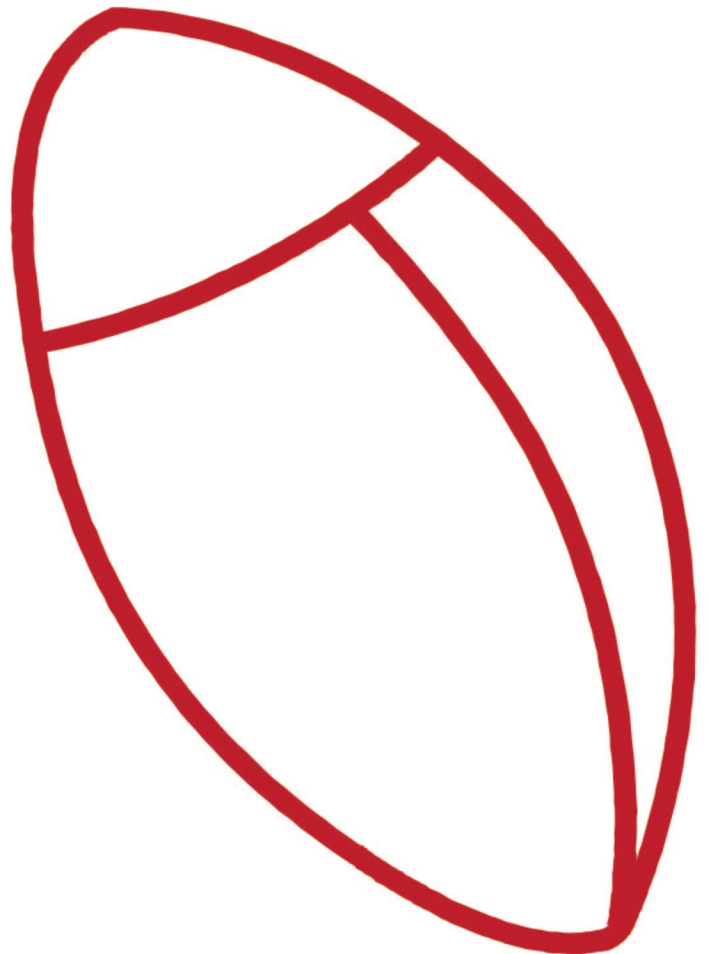
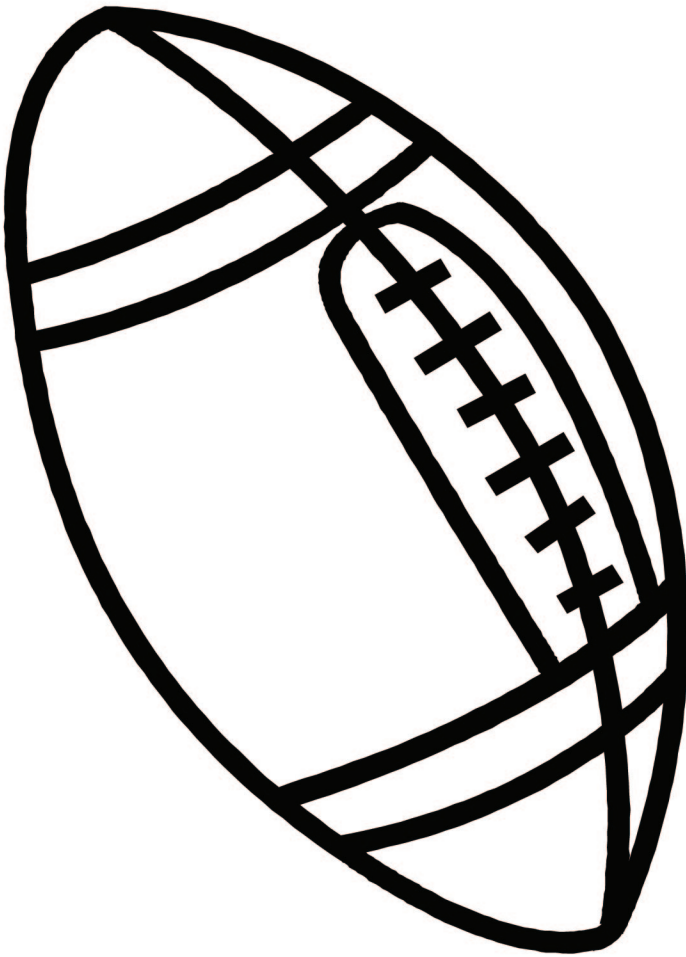
Peristence
& Creativity

Anatomy Comics, Objective 10.4



Simple
Comix

10.4 Follow the flow of blood through each of the major coronary vessels.
Describe the venous return from heart musculature and the location
and relationship of these veins with the coronary arteries.

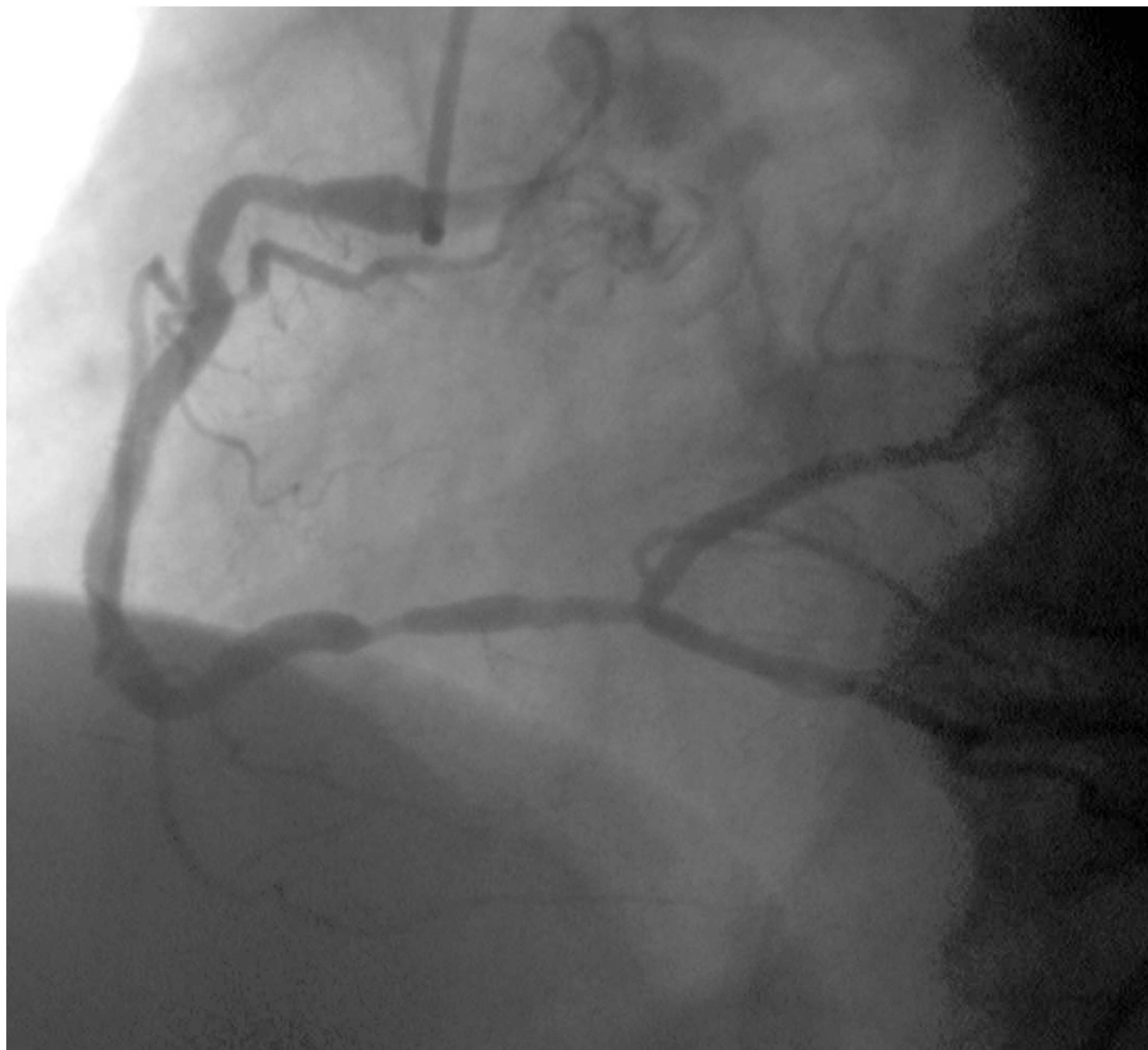


1. A 60 year old woman presents with chest pain and the coronary angiogram below. Which vessel is shown?

- A. Left main
- B. Circumflex
- C. Left anterior descending
- D. Right

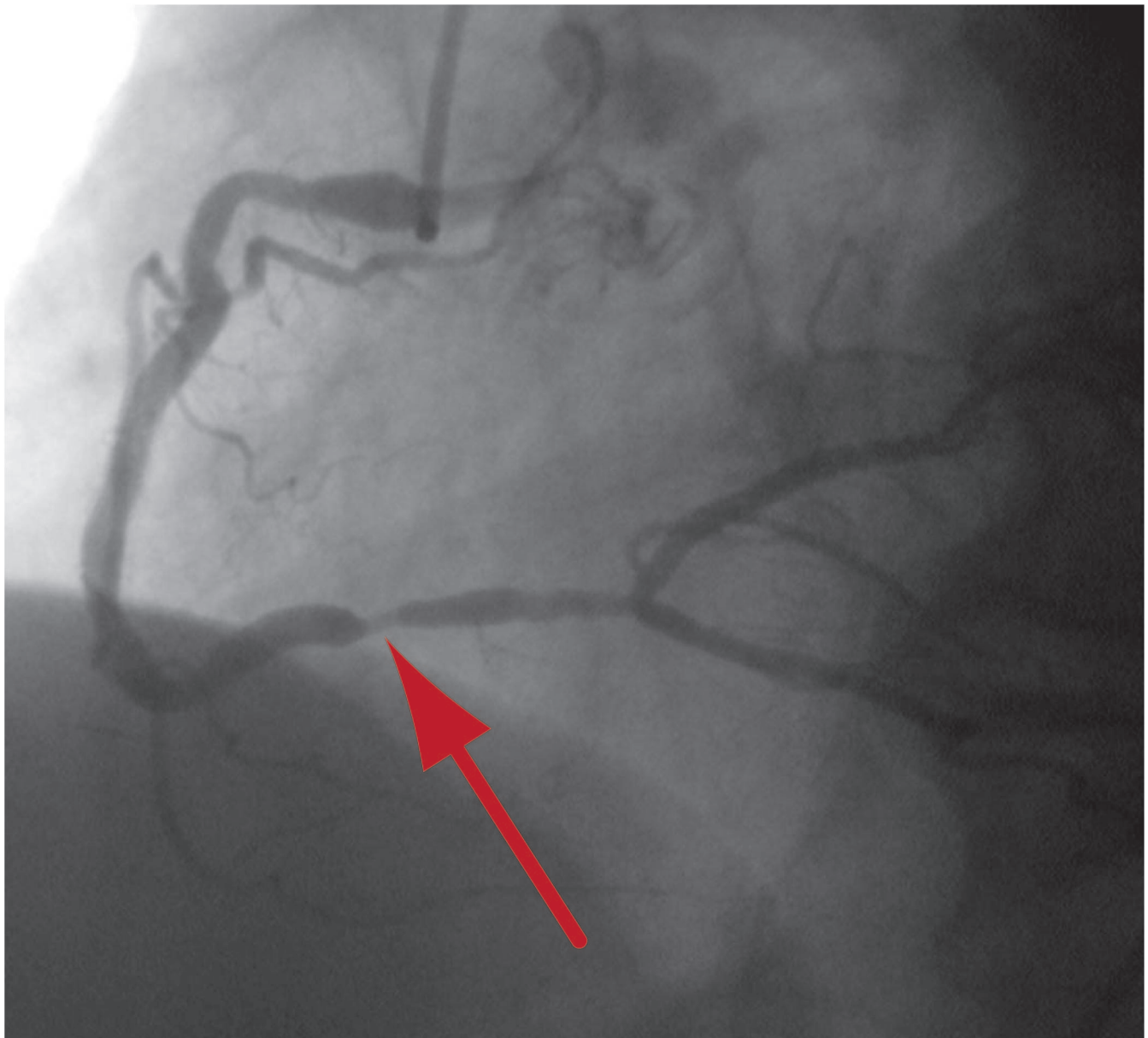
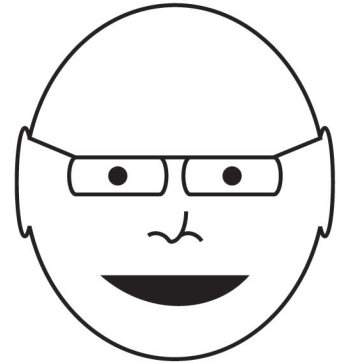
2. What is the abnormality?

- A. Stenosis proximal vessel
- B. Stenosis distal vessel
- C. Abnormal vessel course
- D. Abnormal vessel origin



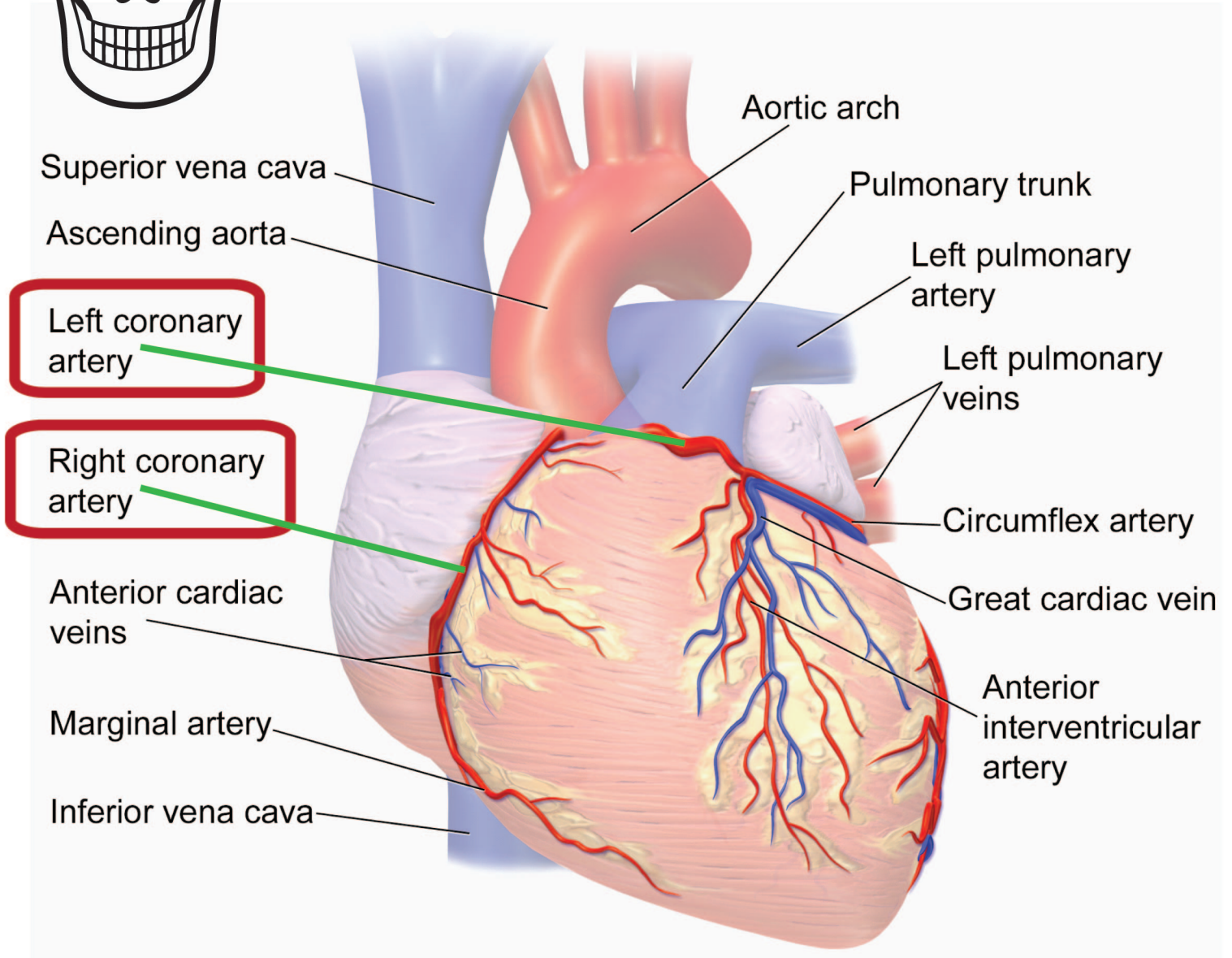
This is a right coronary artery with a distal stenosis or narrowing (arrow). A narrowed vessel may result in decreased blood flow to myocardium distal to the stenosis, resulting in ischemia and chest pain.

We are going to spend the rest of this comic going over the anatomy of the coronary arteries. When we are finished you'll be able to identify the coronaries in your sleep!

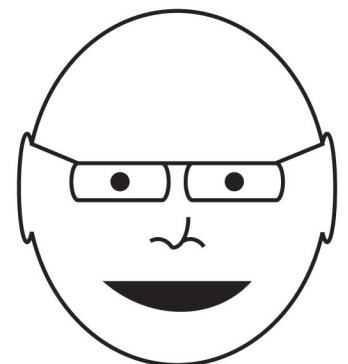




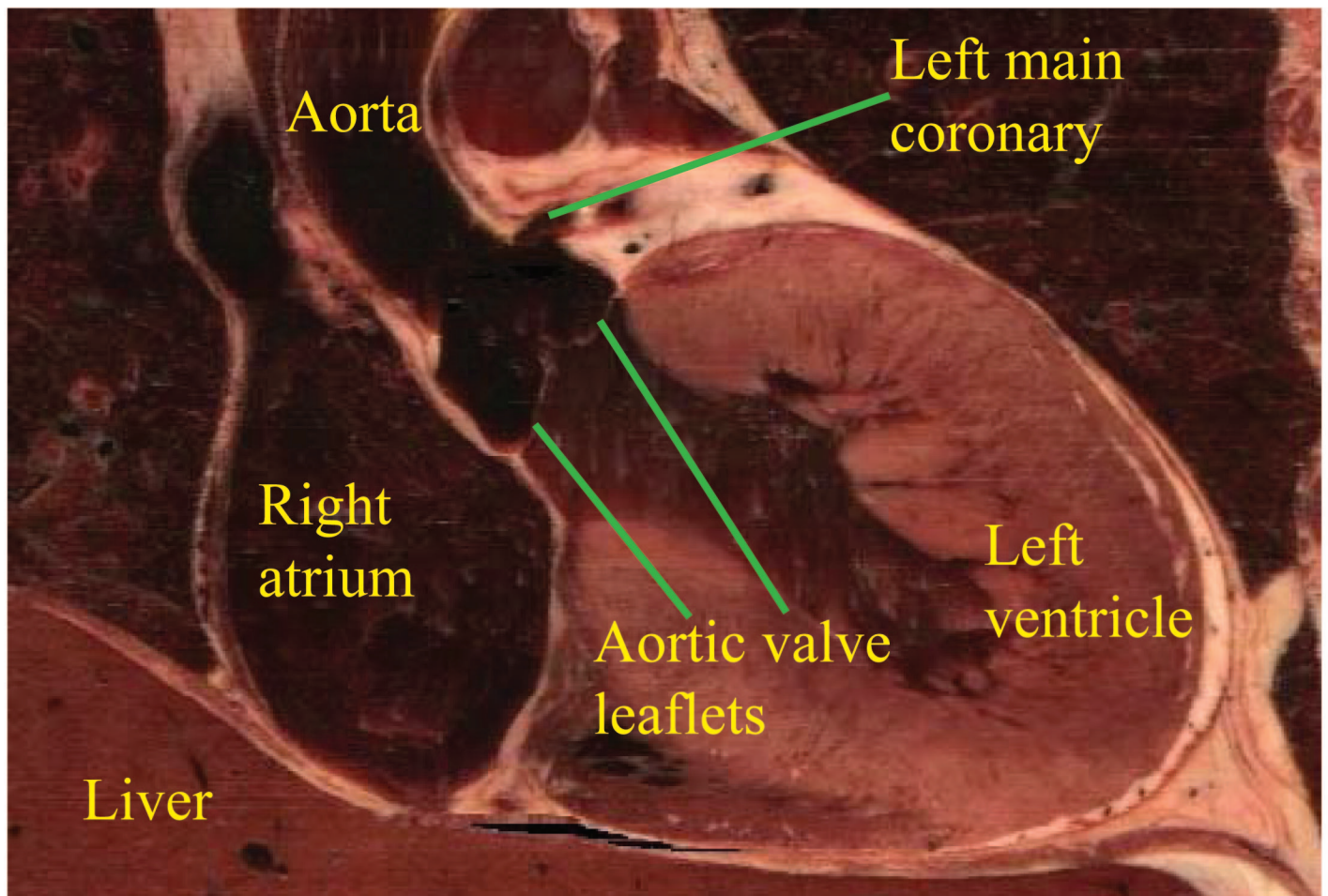
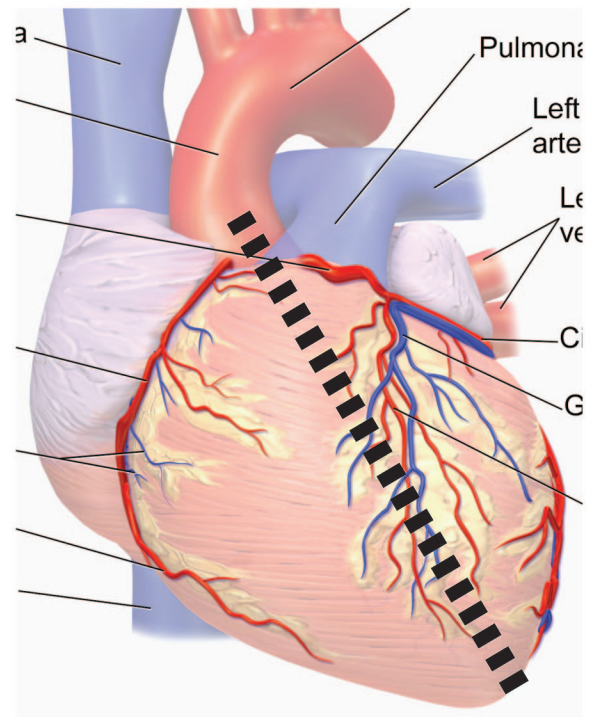
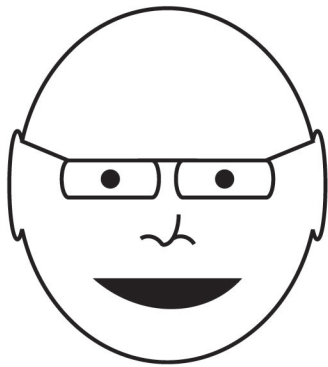
Fortunately, the anatomy is straightforward; there are only two coronary arteries, a right one and a left one. The coronaries are the only vessels that arise from the ascending aorta.



That's a mighty fancy picture you took from Wikipedia! First we'll make things a bit more complicated by using the visible human project to explore the anatomy in a bit more depth, then we'll make some simple drawings to summarize what we've learned. As always, I want everyone to do the drawings themselves so that the information is stickier. Knowing the basics will allow us to explore more advanced topics in lab.

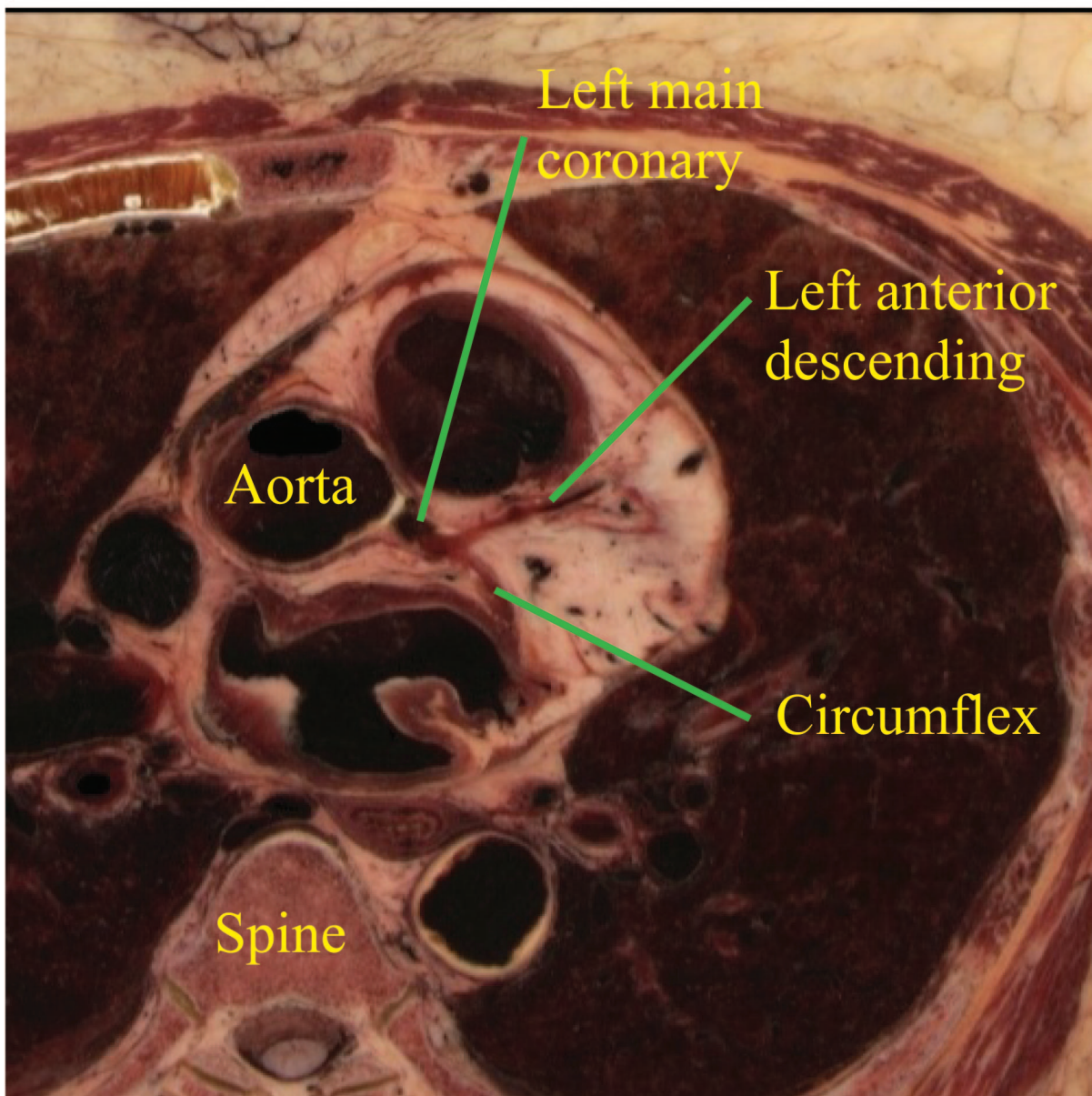
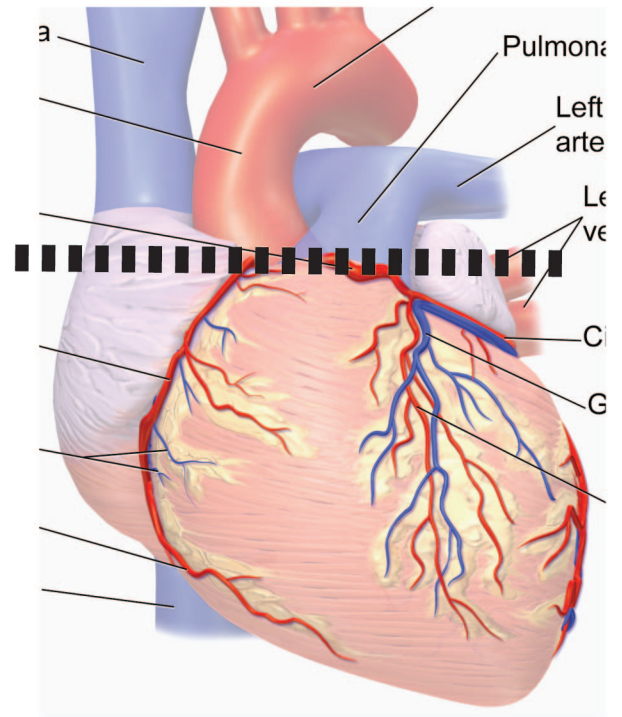


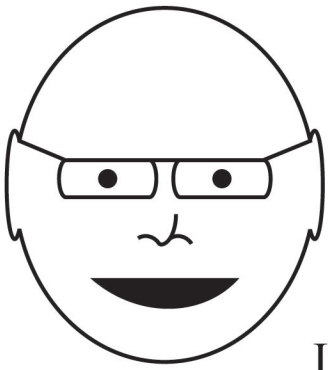
We'll start by looking at where the coronary arteries arise. The cross-sectional coronal image below was obtained by sectioning along the dotted line in the picture on the right and slices the heart from the apex (the pointy part in front) to the proximal aorta. The left and right coronary arteries come off of the aorta from the left and right coronary sinuses, which are those bulges just above the valve leaflets. I've labeled the left main coronary.



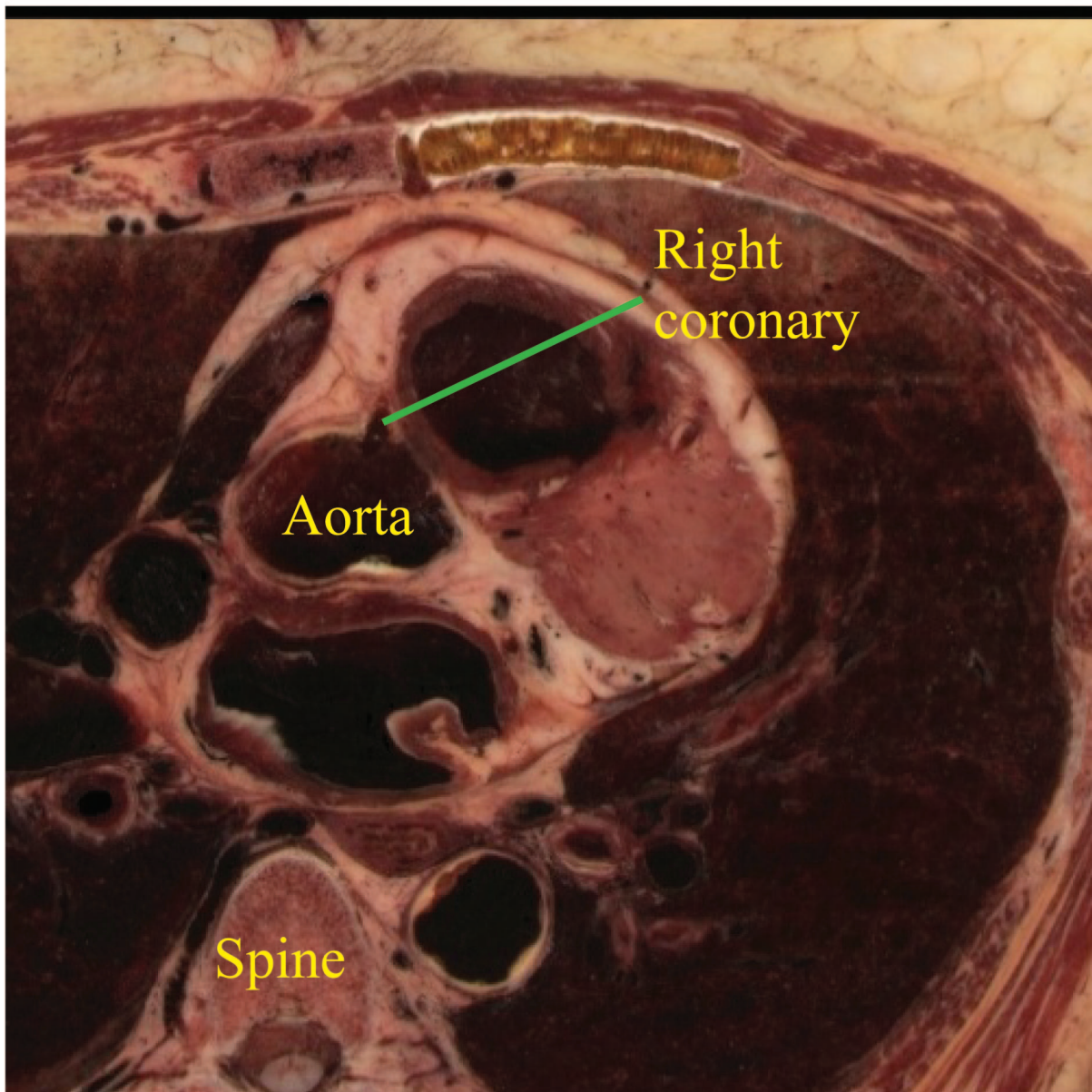
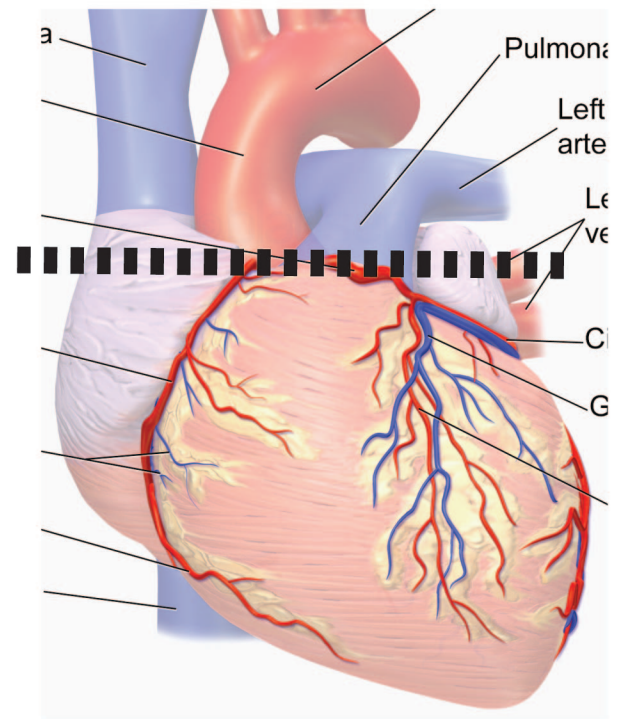


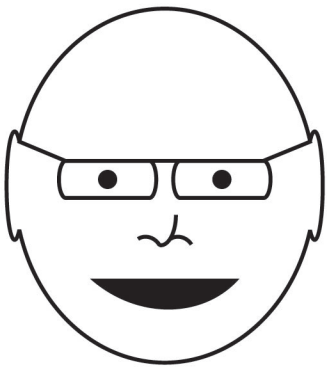
If you take the cross section shown at right, you'll include the coronary sinuses and the coronary artery origins. Real life is less cooperative, so we got the image below which shows the normal short left main coronary dividing into the circumflex and left anterior descending arteries.





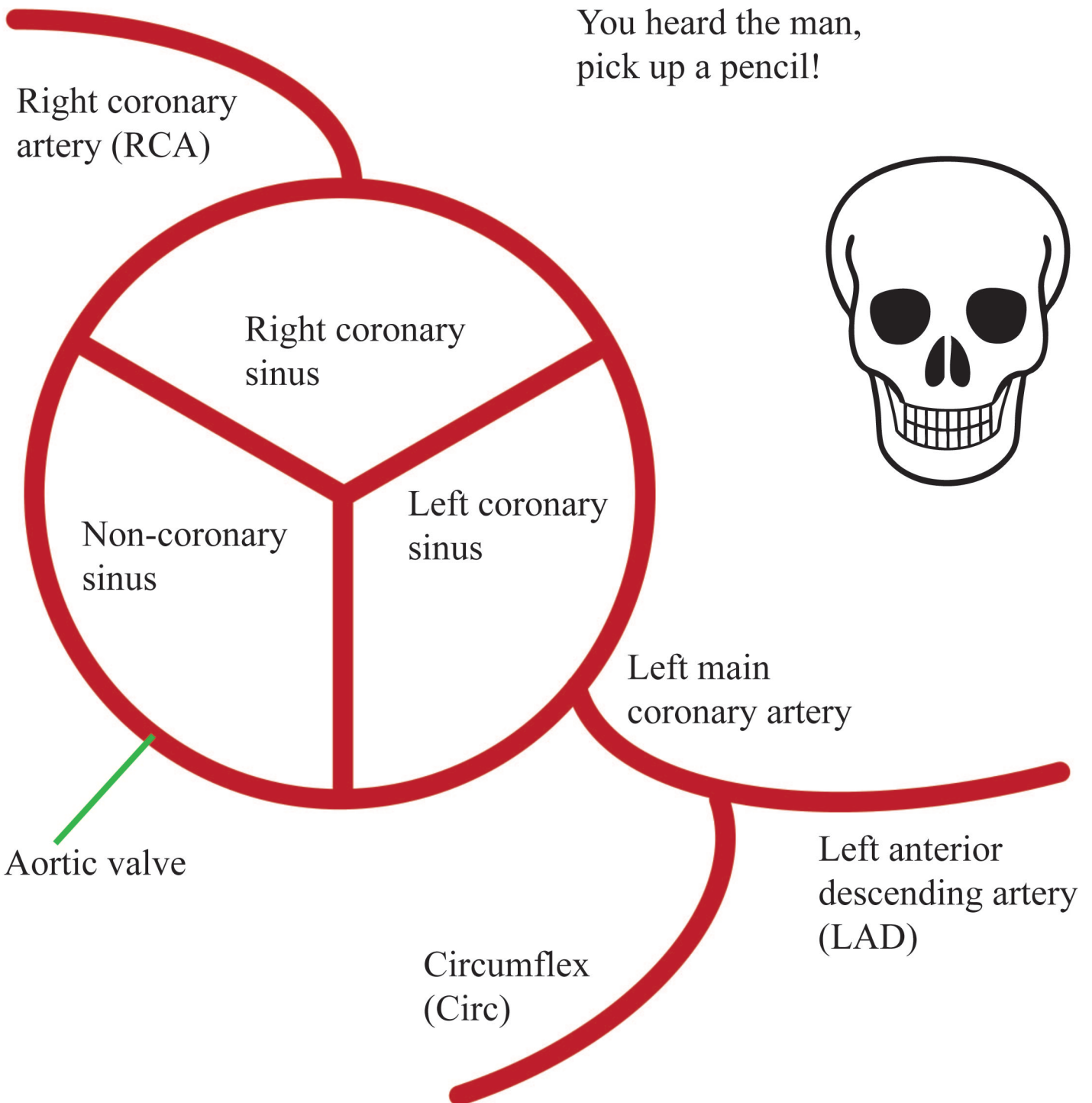
If you take a cross section slightly higher than on the previous panel, you'll get the right coronary artery origin.

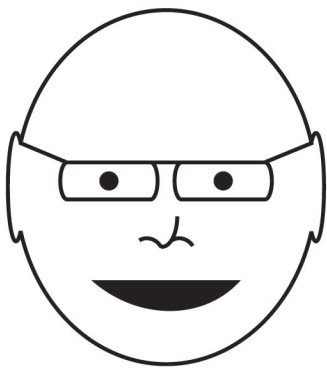




All right, let's do our first drawing of the coronaries, starting with their origins. When we finish with that, we'll move on the courses of these vessels.

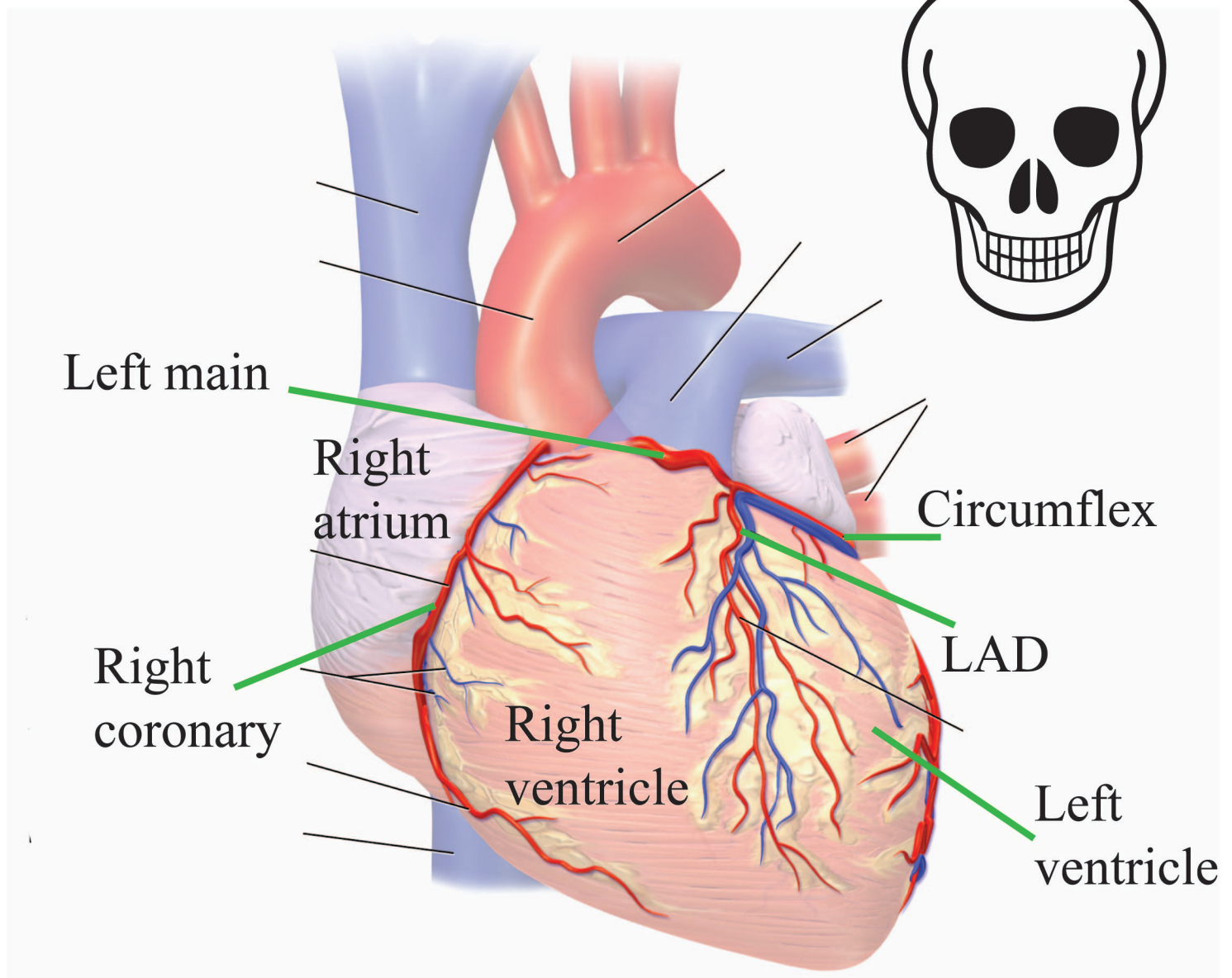
You heard the man,
pick up a pencil!

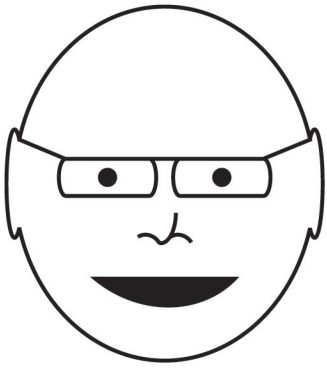




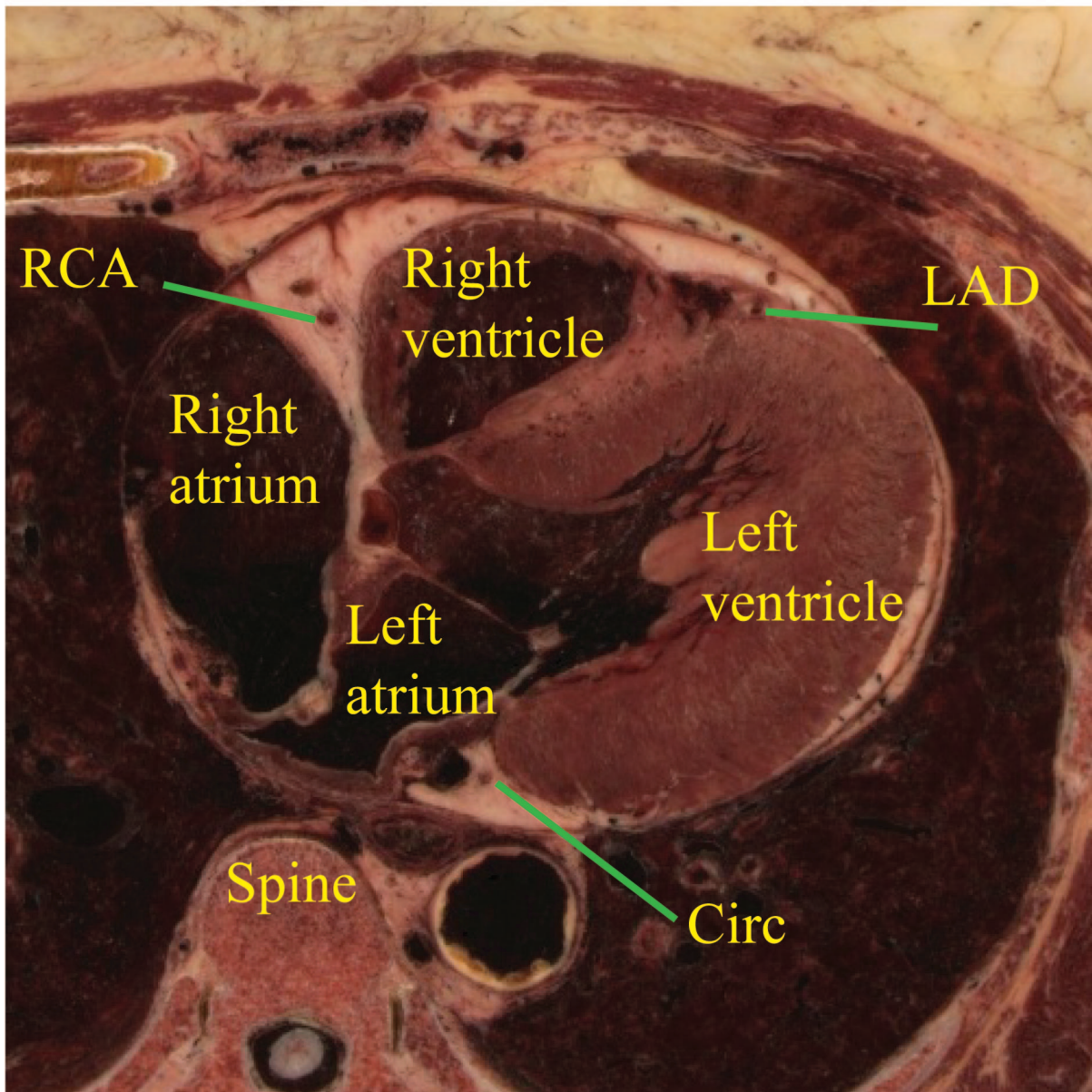
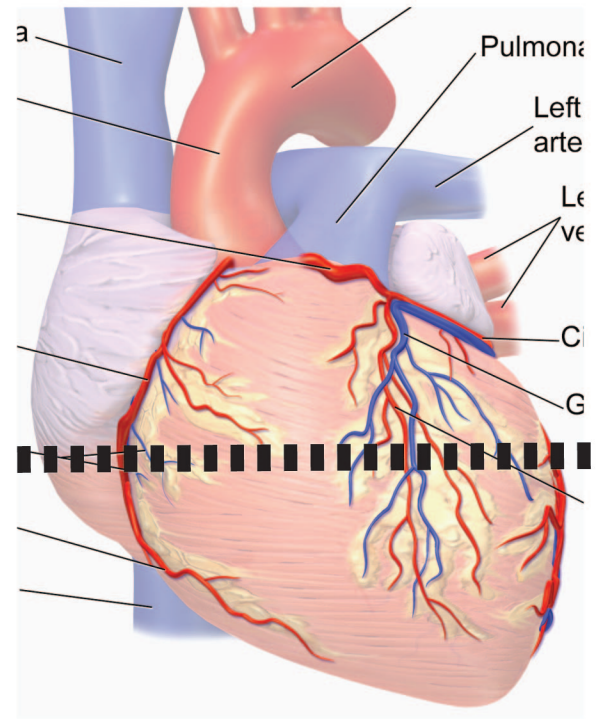
Let's go back to your fancy Wikipedia drawing and look at the course of the coronaries. The RCA runs between the right atrium and the right ventricle in something called the the right atrioventricular (AV) groove. The circ is the left sided analogue to the RCA and runs in the left AV groove. The LAD runs down the front of the heart in the groove between the left and right ventricles, the anterior interventricular groove. The left main is super short, we already saw it's entire course.

When does it get easier?

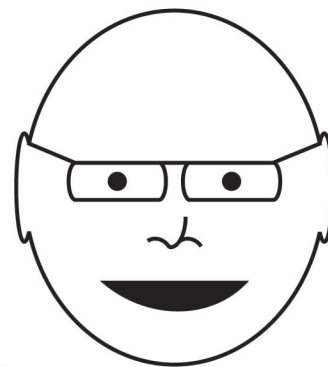




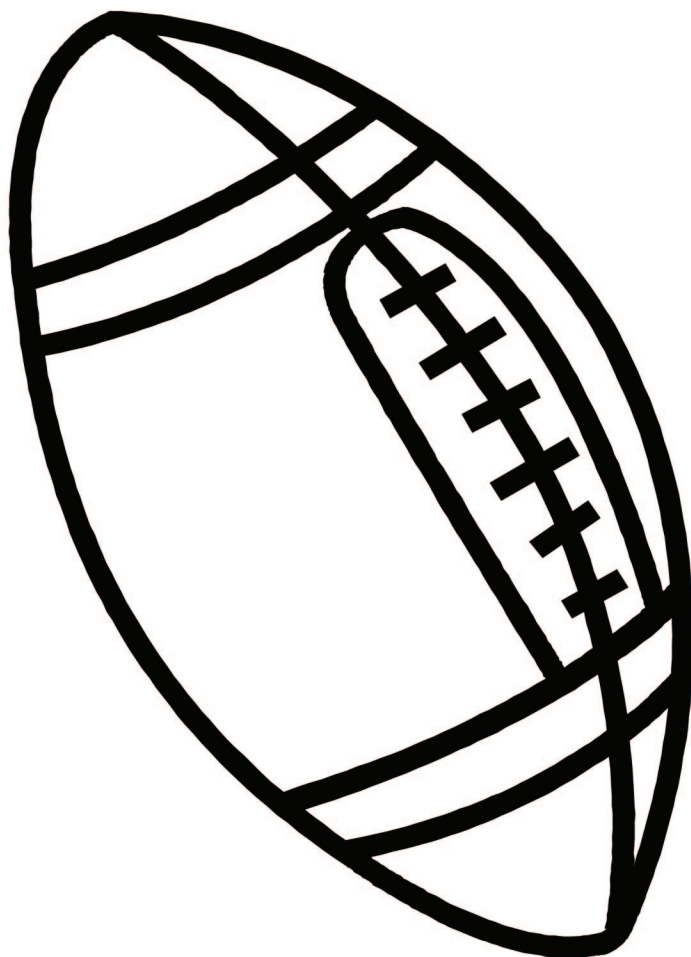
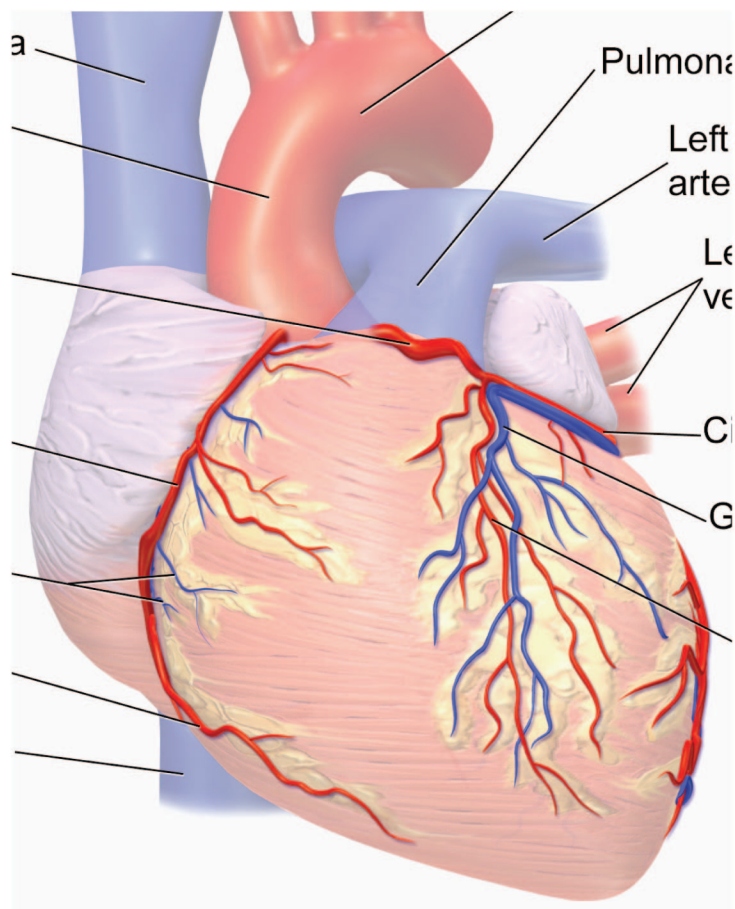
This time we cut in the plane shown at right by the dotted line and got the image shown below. Note that the RCA runs in the right AV groove, the circ runs in the left AV groove and the LAD runs in the anterior interventricular groove.

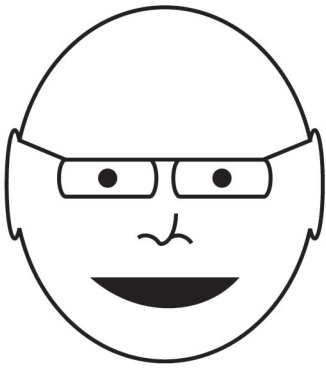


So when does the easy stuff begin?

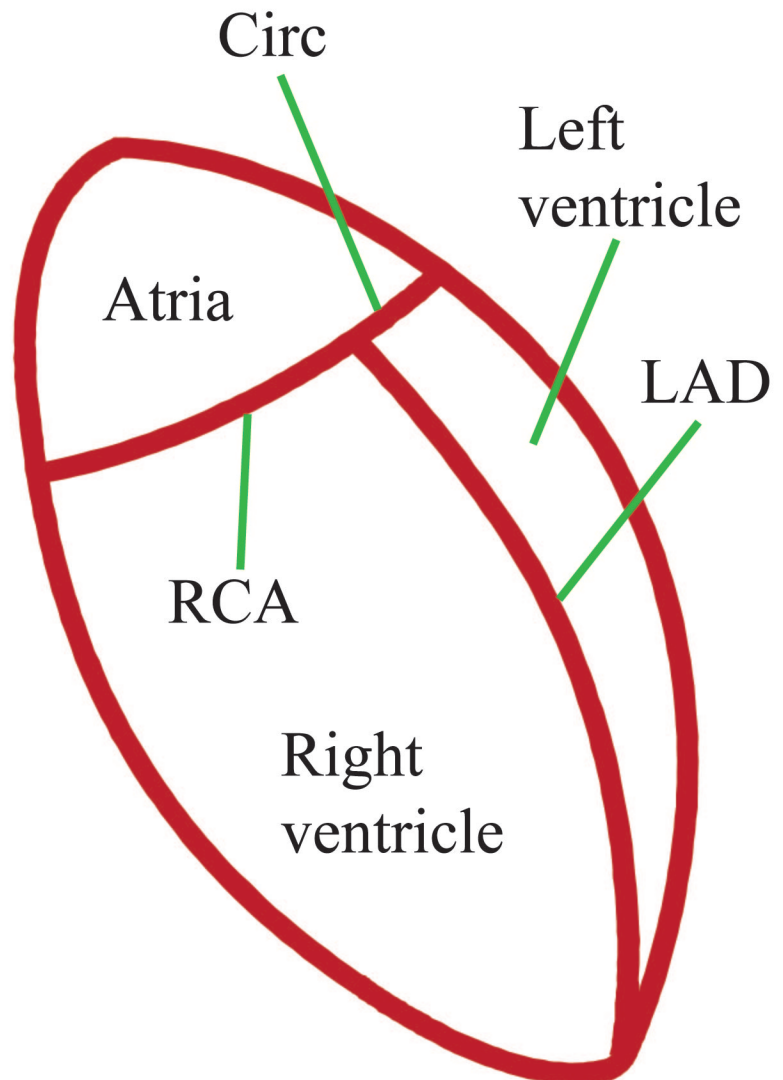
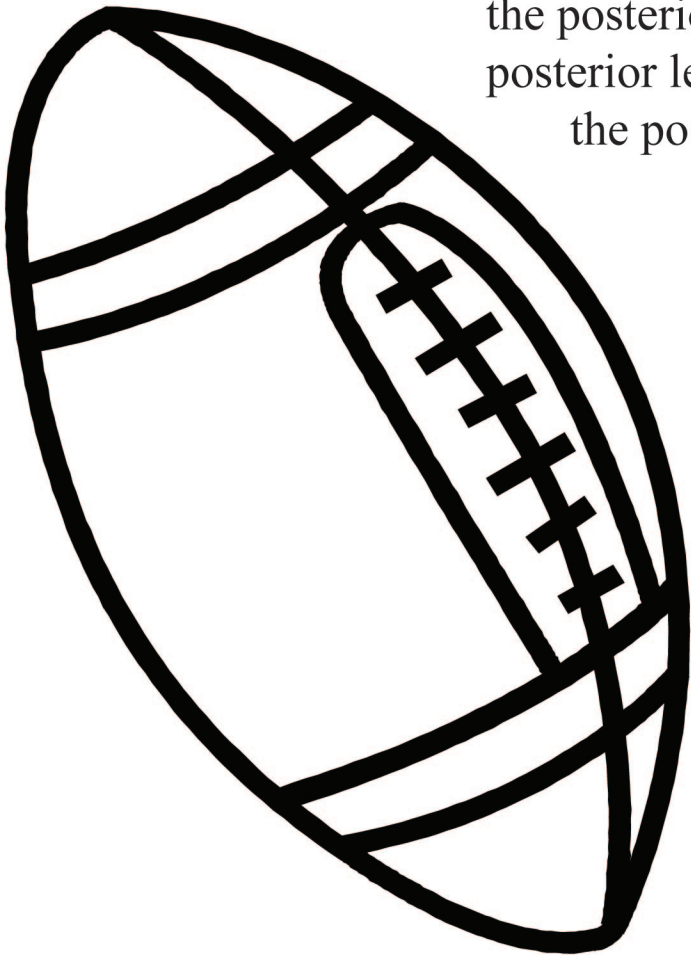


Right now.
I'll give you
what I hope
is a memorable
way of remembering
the course of the vessels. I'll start by
asking you to believe that the heart
looks kind of like a football and that
some of the football seams resemble
those grooves we talked about.

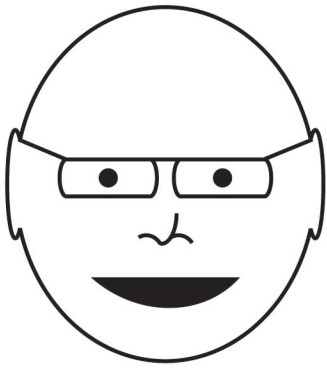




After we get rid of those extraneous seams, we end up with the picture below, with the RCA and circ in the right and left AV grooves respectively and the LAD in the anterior interventricular groove. There is also a posterior interventricular groove. In most people, the RCA divides into two large vessels just proximal to the posterior interventricular groove, the posterior descending artery (PDA) and the posterior left ventricular branch. The PDA runs in the posterior interventricular groove.

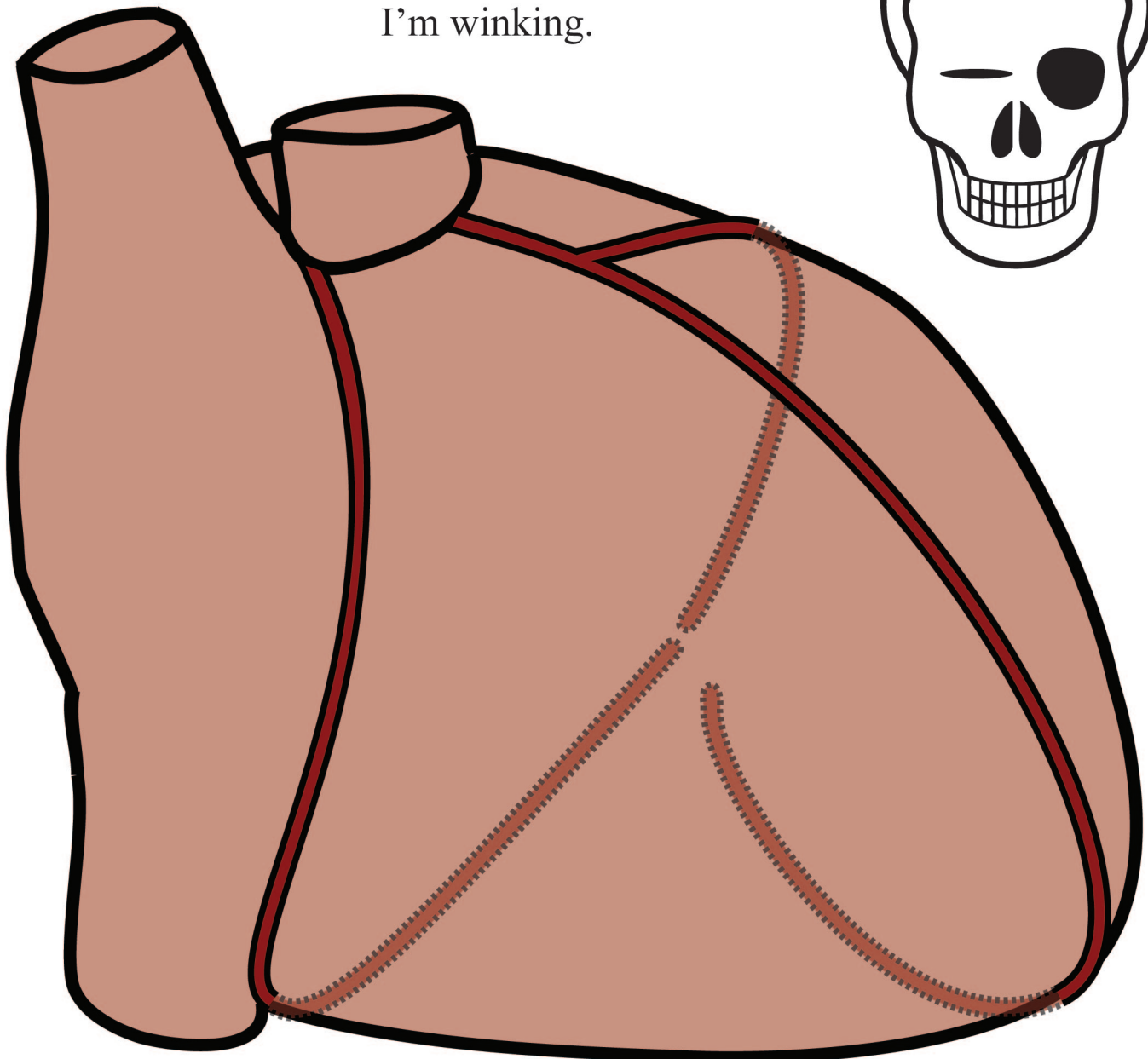


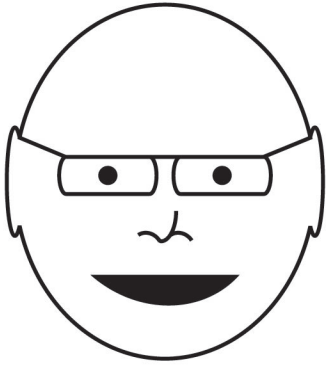
All right,
start drawing.



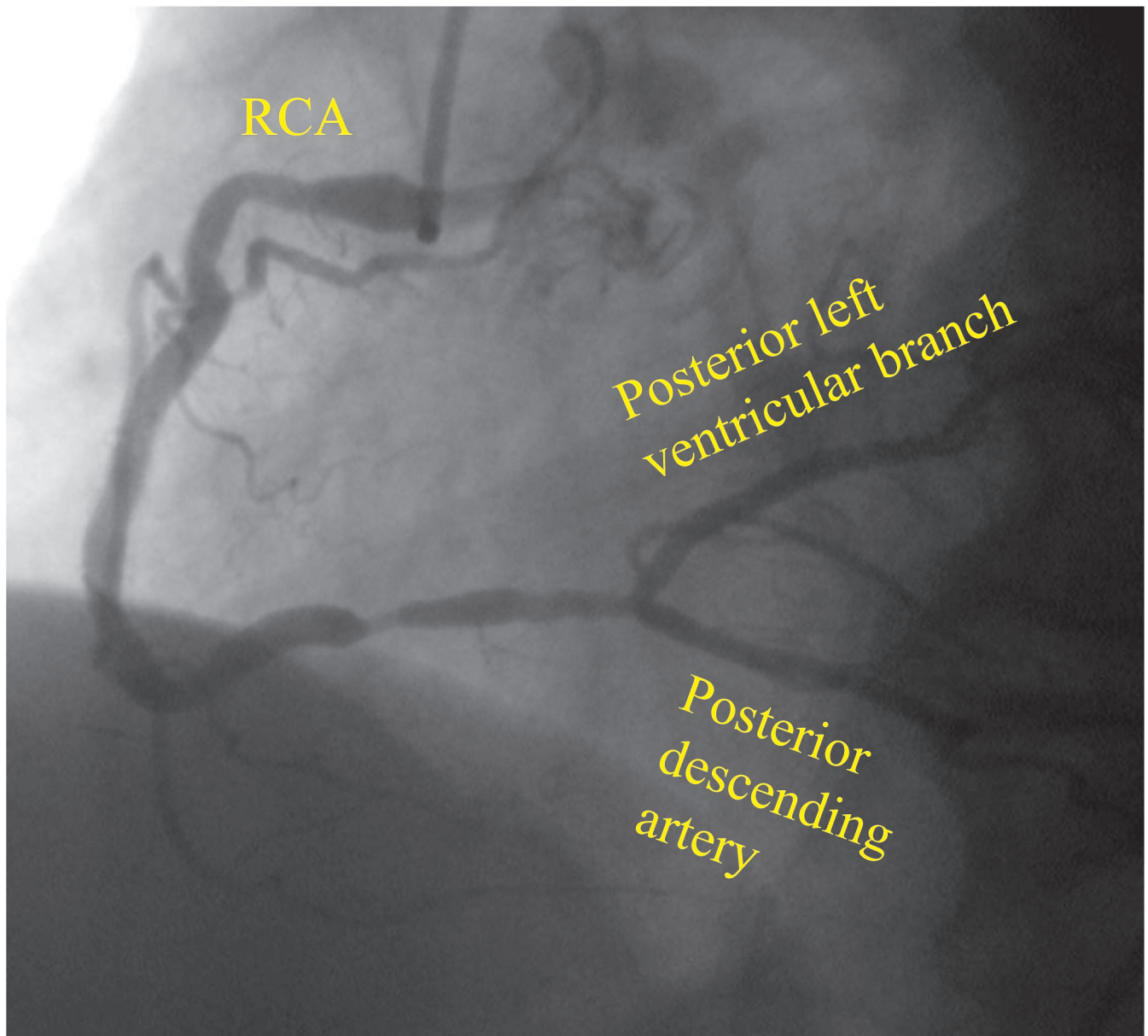
Below is a more complex picture that you should also try drawing. I attempted to show the vessels continuing in their respective grooves to the back of the heart. I kept things simple and didn't include the distal RCA branches, we'll have a look at those in a second. I'll leave all of the labeling to you, I'm sure that by now, you've got this!

The only reason I'm in this panel is to provide some sorely needed eye candy! And no I didn't lose an eye, I'm winking.





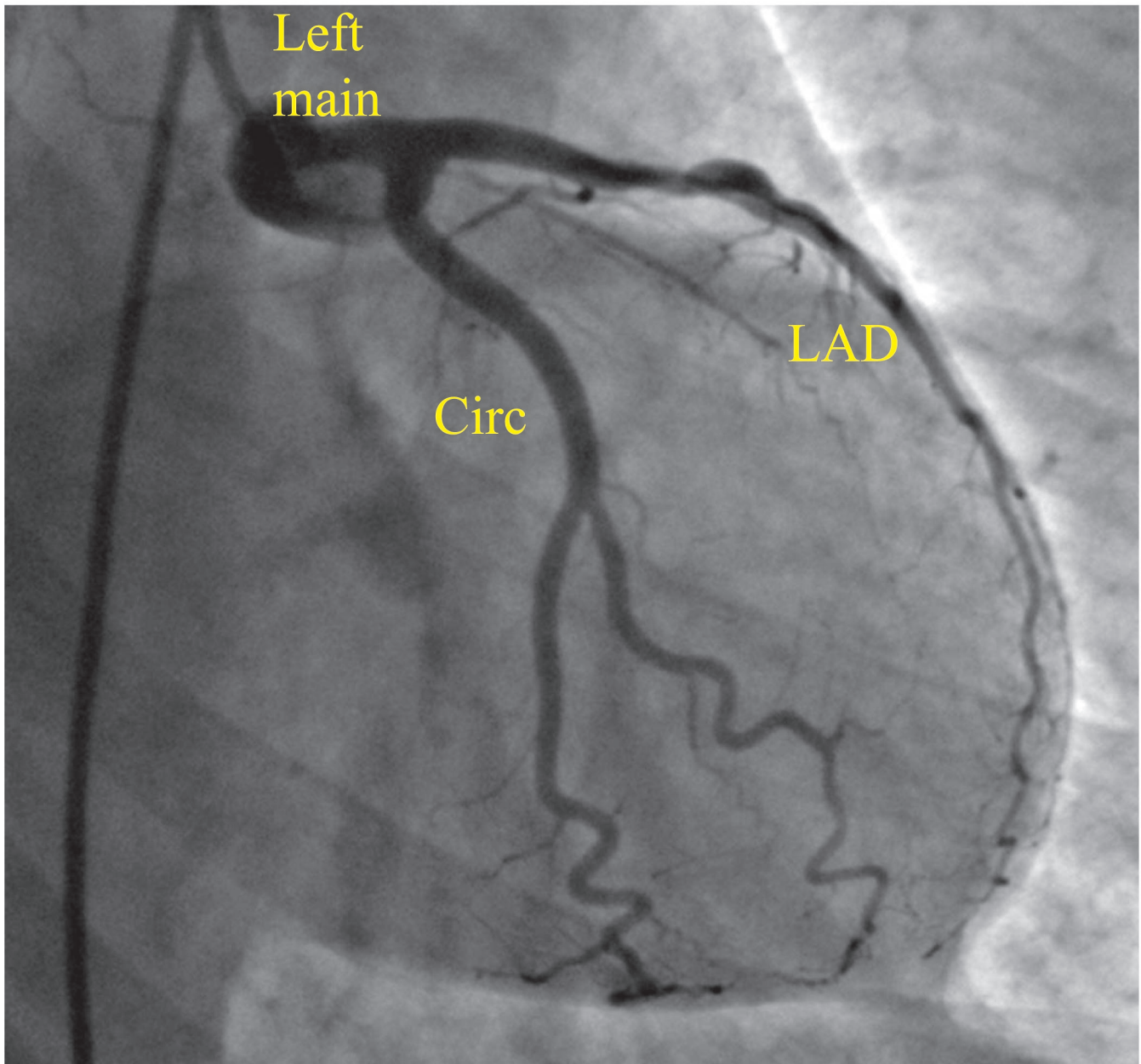
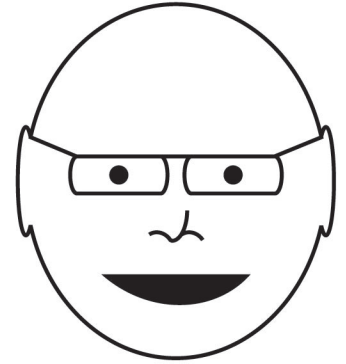
The RCA is usually easily identifiable because it starts as a large vessel that doesn't divide into two large vessels until you get very distal. Just like the RCA and the circ are right and left analogues, the PDA is the posterior analogue of the LAD and runs in the posterior interventricular groove.



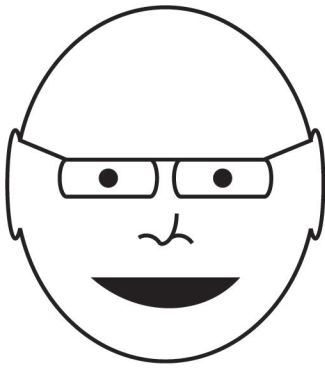


The left coronary starts off as a short left main that rapidly divides into the LAD and the circ. This image was obtained from the side with the LAD coursing forward.

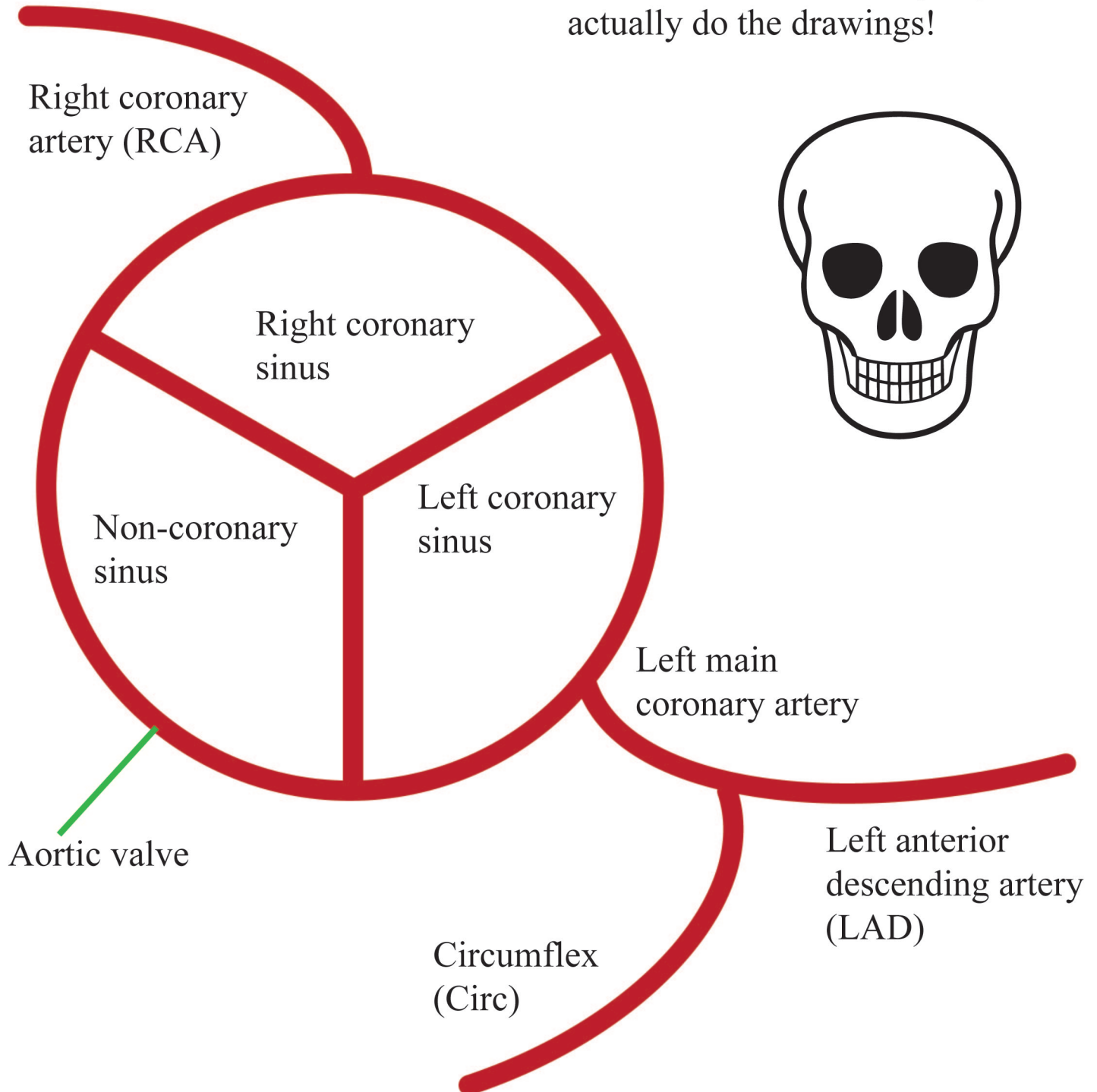
Yep.



That's all for now kids, see you again soon for another action packed edition of Anatomy Comics!



And remember, you will learn this material more effectively if you actually do the drawings!



Right coronary artery (RCA)

Right coronary sinus

Non-coronary sinus

Left coronary sinus

Left main coronary artery

Aortic valve

Left anterior descending artery (LAD)

Circumflex (Circ)

