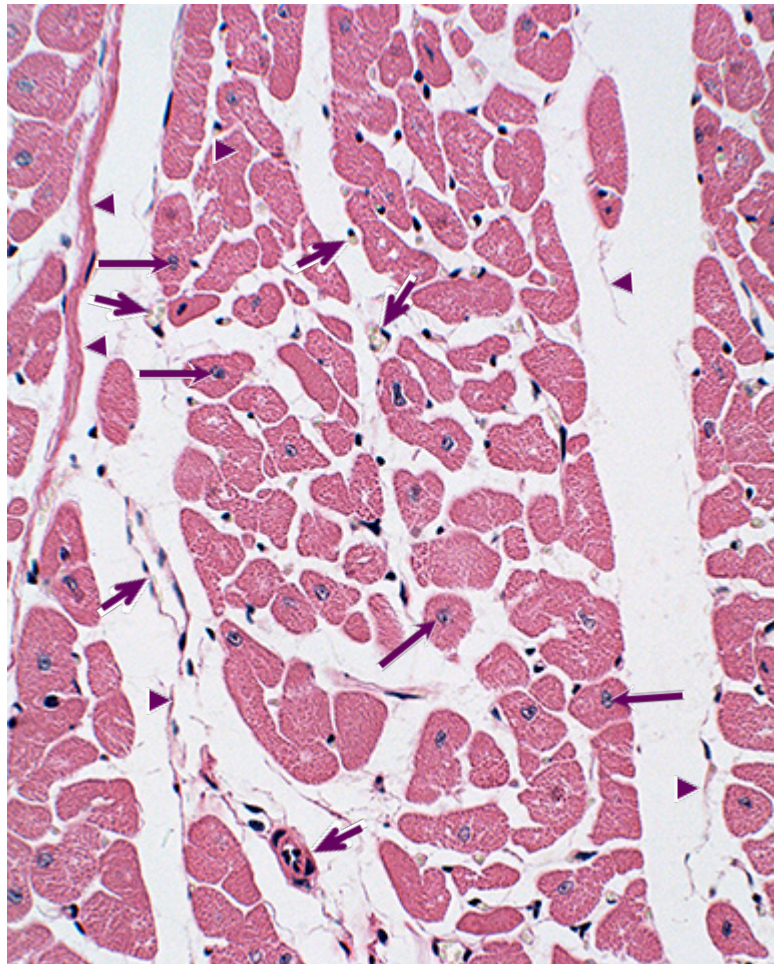


PST-musc-6: Cardiac Muscle Cross-Section Visual Microscopy Kit



This is cardiac muscle tissue from the heart cut in cross-section, stained using hematoxylin and eosin. The hematoxylin typically stains nuclei purple because it stains nucleic acids and proteins, while the eosin typically stains cytoplasm pink. In cross-section it is possible to see that individual muscle cells and that each has its nucleus centered within it. Since the nucleus is much shorter than the entire cell and the section is only slightly thicker than the size of the nucleus, the nucleus is not in this section for many of the cells.

- Indicates a nucleus cut in cross-section
- ▶ Indicates invested connective tissue
- Indicates blood vessels (from arterioles to capillaries to venules)

Cardiac muscle is highly vascularized, and the endothelial cell nuclei are much more compact than cardiac muscle nuclei so they appear blackish. Blood vessels run in connective tissue, and many can be seen invested in this cardiac muscle tissue. Note that this tissue section is looser than most cardiac muscle tissue sections, but it revealed the cells beautifully for understanding cardiac muscle in cross-section.

For all Cell Zone[®], Inc. posters

General Instructions:

- Move from room to room or maintain in one location
- Hang on any permanent or removable hook by the grommet
- Use a dry erase marker on the frame; erase the same day to ensure clarity
- Store multiple posters by stacking so that the grommet cannot scratch the front of a neighboring poster

Advantages with using posters:

- Hanging real cell micrographs makes your classroom or lab space look like a place where real science is done
- The posters can be hung as art or for learning
- The posters can be paired with microscopy or used separately
- You will always have a good example of what you want your students to see

Lessons for this specific poster

1. Have your students identify the type of tissue this is (epithelial, connective, muscle, nervous). Then have them identify the specific type of muscle tissue visible (skeletal, cardiac, smooth). This can be difficult because striations are not visible in cross-section, but they should be able to recognize that myofibrils (like dots in the cytoplasm) are visible, the nuclei are in the center, there is only one nucleus in any cell, and there is a lot of cytoplasm around the nuclei (unlike in smooth muscle). Then ask them to explain where this type of muscle tissue is found.
2. Have your students identify the characteristics of cardiac muscle and find as many as they can in this image. Note that both striations and intercalated disks are only visible in longitudinal sections. They should be able to recognize a central nucleus, a single nucleus per cell, ample vascularization, and cut ends of myofibrils.
3. Hand your students a dry erase marker and have them make cell outlines, label cardiac muscle nuclei, and identify blood vessels and/or other connective tissue
4. When pairing the use of the poster with microscopy, you can do each of the following:
 - Set up numbered microscopes with pointers on specific muscle tissues and cells and have them match the number to the entire poster or to specific items in the poster. Microscopes could show low power or high power views of different muscle tissues, some cardiac, some not cardiac. Have students put the microscope numbers onto the poster with a dry erase marker, where those microscopes that have high power cardiac muscle views have arrows to specific items in the poster.
 - Use a dry erase marker on the frame to indicate a part of the cell or the field. Have your students, each working on their own microscopes or in pairs, put their pointer on a similar structure in their microscope fields. You can check their choices, or have them check on each other.

