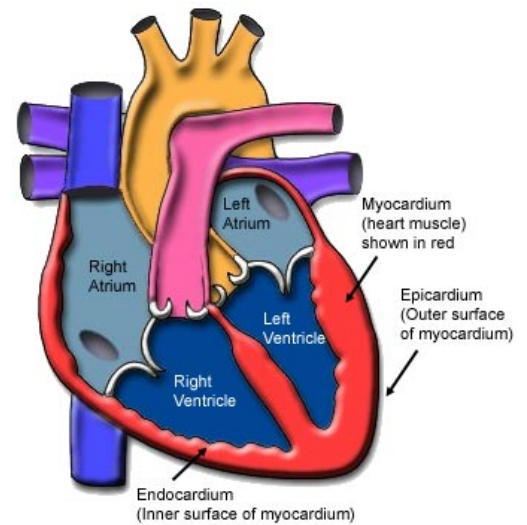


HEART NOTES

Myocardium – heart muscle

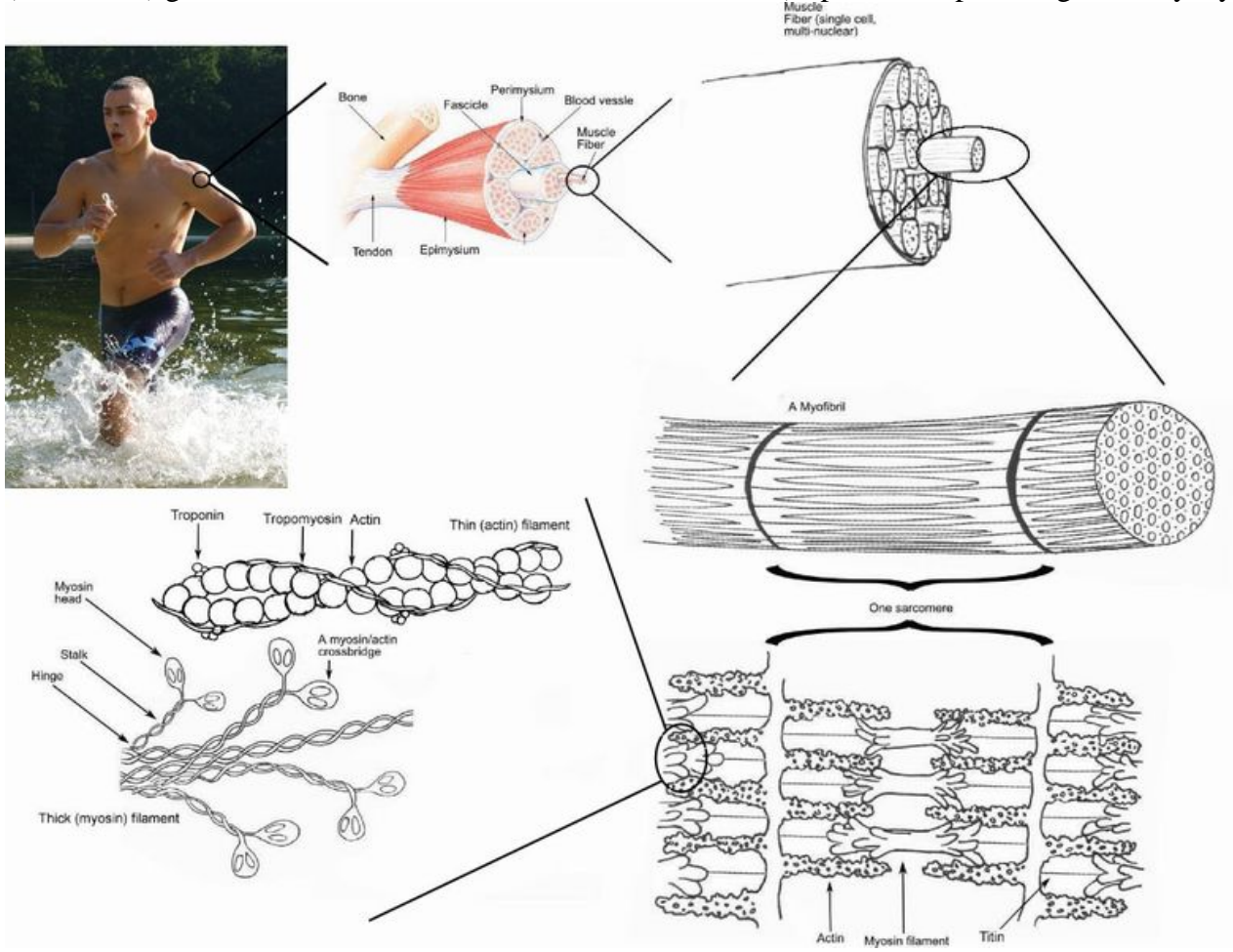
Cardiac – of the heart

Myocytes are muscle cells and are multinucleated (have multiple nuclei). They start as more immature, single nuclei myoblasts that fuse as the cells differentiate). Muscle tissue has what is called a striated (striped) appearance due to the bands of contractile machinery. Myocytes contain numerous sarcomeres, which are the basic contractile unit. Contraction is a carefully orchestrated event during which calcium enters the cells and activates the actin/myosin contractile machinery.



Cardiac myocytes stimulate each other to contract via electrical signals that pass through their specialized cell-cell junctions (connections) called intercalated discs. Intercalated discs in turn contain junctions called adherens junctions, desmosomes, and gap junctions. Some important molecules involved in these cell-cell junctions are cadherins, ZO-1, and connexins.

(Somewhat) generic schematic of how skeletal muscles work (<http://en.wikipedia.org/wiki/Myocyte>):



A nice site on some more specific details of cardiac myocyte physiology is <http://www.anaesthetist.com/icu/organs/heart/myocyte.htm>.

Scaffold – support for the cell, often a synthetic polymer, often can be made in some desired shape.
Ultrafoam collagen sponges are a porous scaffold made from collagen. Matrigel is another ECM (mix).

Construct – word often used for engineered tissues in culture

Myocardial infarction – heart attack

Hypertrophy – Increase in size of a tissue due to increase in cell size, not number (that's hyperplasia).

Morphometric – quantifying something about morphology (form, shape, or appearance of something)

Additional Questions

The heart article has movies and supplemental data (which are both increasingly common) and PNAS is a free journal online. Find the movies and watch them.

Read the introduction of the liver perfusion device article carefully, they try to explain how and why they are building this device they way they are. What are the considerations and how do they implement them?

Look up one of the techniques, reagents, or cell markers used/investigated in these papers and be prepared to tell the class a little bit about it.

Pay attention to what kinds of cells people are using and where they come from. Think about the advantages and disadvantages of the choices being made.