Cardiac Muscle Encyclopedia Article

Cardiac Muscle

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Cardiac Muscle

Cardiac muscle is found only in the **heart**. The middle layer of the heart, the myocardium, is composed entirely of cardiac muscle. The myocardium is composed of interconnected bundles of branching muscle fibers arranged in a spiral around the heart. This spiral shape is due to the complex twisting of the heart during development.

Functionally and structurally, cardiac muscle shares characteristics of both skeletal and **smooth muscle**. Like **skeletal muscle**, it contains an abundance of **mitochondria** and myoglobin, because of the tremendous energy requirements of the heart. In addition, like skeletal muscle, it has a striated appearance. This is due to a regular banding pattern made up of thin and thick filaments.

The individual cardiac muscle cells are joined end to end by intercalated disks. These disks contain two types of specialized junctions. One, the desmosomes, acts like a spot rivet to hold the cells together. These types of adhesion junctions are found in great quantities in tissues that are subject to considerable mechanical stress. The other type of junction is called a gap junction. Its function is to allow the passage of the **action potential** (the electrochemical propagation of a nerve signal) to spread from one cell to another.

Cardiac muscle is capable of generating a spontaneous electrochemical signal without stimulation from the nerves. This self-excitable capacity is shared with smooth muscle. The action potential then spreads to adjoining cells. This allows contraction of the cells as a single coordinated unit. These groups of interconnected cells that function mechanically and electronically together are referred to as a functional syncytium. Two other histological properties of cardiac muscle are a central nuclei (often football shaped) and a high cytoplasm to nucleus ratio.