

Cardiac Muscle Cells And Cardiomyocytes

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Cardiac muscle cells or cardiomyocytes (also referred to as myocardiocytes or cardiac myocytes) are the muscle cells (myocytes) that structure the heart muscle (heart muscle). Each myocardial cell contains myofibrils, which are specialized organelles consisting of long chains of sarcomeres, the elemental contractile units of muscle cells. Cardiomyocytes show striations almost like those on striated muscle cells. Unlike multinucleated skeletal cells, the bulk of cardiomyocytes contain just one nucleus, although they'll have as many as four. Cardiomyocytes have a high mitochondrial density, which allows them to supply ATP (ATP) quickly, making them highly immune to fatigue.

Structure

There are two sorts of cells within the heart: the cardiomyocytes and therefore the pacemaker cells. Cardiomyocytes structure the atria (the chambers during which blood enters the heart) and therefore the ventricles (the chambers where blood is collected and pumped out of the heart). These cells must be ready to shorten and lengthen their fibers and therefore the fibers must be flexible enough to stretch. These functions are critical to the right form during the beating of the guts. Cardiac pacemaker cells carry the impulses that are liable for the beating of the guts. They are distributed throughout the guts and are liable for several functions. First, they are liable for having the ability to spontaneously generate and send electrical impulses. They also must be ready to receive and answer electrical impulses from the brain. Lastly, they need to be ready to transfer electrical impulses from cell to cell. All of those cells are connected by cellular bridges. Porous junctions called intercalated discs form junctions between the cells. They allow sodium, potassium and calcium to simply diffuse from cell to cell. This makes it easier for depolarization and repolarization within the myocardium. Due to these junctions and bridges the guts muscle is in a position to act as one coordinated unit. Cardiomyocytes are about 100µm long and 10-25µm in diameter.

Development

Humans are born with a group number of cardiac muscle cells, or cardiomyocytes, which increase in size as heart grows larger during childhood development. Recent evidence suggests that cardiomyocytes are literally slowly turned over as we age, but that but 50% of the cardiomyocytes we are born with are replaced during a traditional lifetime. The expansion of individual cardiomyocytes not only occurs during normal heart development, it also occurs in response to extensive exercise (athletic heart syndrome), heart condition, or cardiac muscle injury like after a myocardial infarct. A healthy adult cardiomyocyte features a cylindrical shape that's approximately 100µm long and 10-25µm in diameter. Cardiomyocyte hypertrophy occurs through sarcomerogenesis, the creation of latest sarcomere units within the cell. During heart volume overload, cardiomyocytes grow through eccentric hypertrophy. The cardiomyocytes extend lengthwise but have an equivalent diameter, leading to ventricular dilation. During heart pressure overload, cardiomyocytes grow through concentric hypertrophy. The cardiomyocytes grow larger in diameter but have an equivalent length, leading to heart wall thickening.