International Journal of Histology and Cytology ISSN 2756-3707 Vol. 8 (2), p. 001, September, 2021.
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Perspective

Liver cytology and hepatocytes

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Accepted 21 September , 2021

DESCRIPTION

Liver cytology is the department of cytology that researches liver cells and their functions. The liver is a critical organ chargeable for nearly all the body's metabolism. The important liver cells are hepatocytes, Kupffer cells, and liver stellate cells; each with a selected role. Cytology is the department of biology that offers with the development, shape and characteristic of cells. Liver cytology makes a speciality of inspecting liver cells.

The most important liver cells are called hepatocytes; however, there are other cells that can be seen in a liver sample, such as Kupffer cells (macrophages). The liver is the largest gland in the body. It has a wide variety of functions ranging from destroying old blood cells to controlling the entire metabolism of macromolecules. In the fetus, the liver acts as the main center for hematopoiesis, a function that is then replaced by the bone marrow. This hematopoietic function is generally not seen after birth; however, under certain pathological conditions, this function can still be seen. It is important to note that the liver is a vital organ and is the only organ in the body that has the ability to regenerate after surgery or damage.

Hepatocytes are the parenchymal cells of the liver that form lobules. They are closely related to the sinusoids, which are a network of capillaries. Since these are metabolically active cells, their cytoplasm has many organelles.

Hepatocytes are the main cells of the liver. They are large polyhedral cells with six surfaces, three of which have a relevant function. The three relevant types of surfaces are sinusoidal, canalicular, and intercellular. These surfaces are involved in the exchange of substances between hepatocytes, vessels, and the bile ducts. The sinus surfaces are separated from the sinusoids due to the perisinusoid space. They represent 70% of the total surface of hepatocytes. They are covered by microvilli that emerge into the perisinusoid space. These surfaces are the place where the exchange of substances takes place between the hepatocytes and the sinusoids. Canalicular surfaces are those through which bile drains from the hepatocytes into the canaliculi. They make up 15% of the cell surface. The cytoplasm of hepatocytes near the canaliculi is rich in actin filaments, which can probably change the diameter of the canaliculi and thus influence flow; however, this has yet to be tested. Intercellular surfaces are those that lie between two neighboring hepatocytes and do not have contact with sinusoids or canaliculi. These are simple surfaces that specialize in cell adhesion and communication between hepatocytes through gap junctions.

Hepatocytes measure between 20 and 30 µm in each dimension. They are responsible for the development of all liver functions, such as the metabolism of fats, carbohydrates and proteins, as well as the processing of hormones and drugs. Hepatocytes make up about 80% of the liver cell population, the other 20 are taken up by Kupffer cells, liver star cells, endothelial cells, and mesothelial cells, which are not exactly characteristic of the liver but are present. in liver samples.

From a histological point of view, hepatocytes have specific properties. Their nuclei are large and spherical and occupy the center of the cell. There is at least one nucleolus in each nucleus. In the adult liver, most cells are binuclear and most hepatocytes are tetraploid, which means they have four times the amount of normal DNA. Their average lifespan is about five months, and hepatocytes have a significant ability to regenerate after loss of parenchyma through toxic processes, disease, or operations. Its cytoplasm is mainly acidophilic. The basophilic regions correspond to the RER and free ribosomes. Mitochondria are abundant in hepatocytes, 800-1000 per cell. They can be detected with Janus green B or enzymohistochemistry. Hepatocytes have several Golgi complexes and a large number of peroxisomes that can be detected immunohistochemically. The smooth endoplasmic reticulum can be extensive and contain enzymes involved in the breakdown and conjugation of toxins and drugs, as well as other enzymes involved in the synthesis of cholesterol and lipoproteins.

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