

Difference Between Kupffer Cells and Hepatocytes

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Key Difference - Kupffer Cells vs Hepatocytes

The [liver](#) is one of the main [organs](#) of our body which is located on the right side of the belly and protected by the rib cage. It functions together with [pancreas](#) and [intestines](#) to digest, absorb and process foods that we consume. The main function of the liver is the [filtration](#) of [blood](#) coming from the digestive tract, before sending it to the other parts of the body. Apart from that, liver functions in the detoxification of chemicals, [metabolism](#) of drugs, and synthesis of [proteins](#) which are important for blood [coagulation](#) and secretion of bile. The liver is made up of four main cell types such as hepatocytes, kupffer cells, stellate (star-shaped) fat-storing cells and liver [endothelial cells](#). **Kupffer cells are specialized stellate macrophages which function in the liver to remove ingested bacterial pathogens that enter from the gut to the blood. Hepatocytes are the majority of the liver cells which make up about 80% of the cells in the liver and they secrete bile.** This is the **key difference** between Kupffer cells and Hepatocytes.

What are Kupffer cells?

Kupffer cells are a type of liver cells that are specialized [macrophages](#) scattered in the sinusoidal endothelium of the liver. They are star-shaped cells. The main function of the kupffer cells is to remove ingested bacterial [pathogens](#) that had entered into the portal blood from the gut. Kupffer cells are able to phagocytize pathogens entering from the portal or arterial circulation. And also kupffer cells act as antigen presenting cells in the adaptive immunity. These cells secrete [chemokines and cytokines](#) which help in inflammatory reactions. And also kupffer cells are involved in removing old or aged erythrocytes from the [systemic circulation](#) and releasing heme groups for reuse. Kupffer cells act as critical mediators of the liver injury and liver repair.

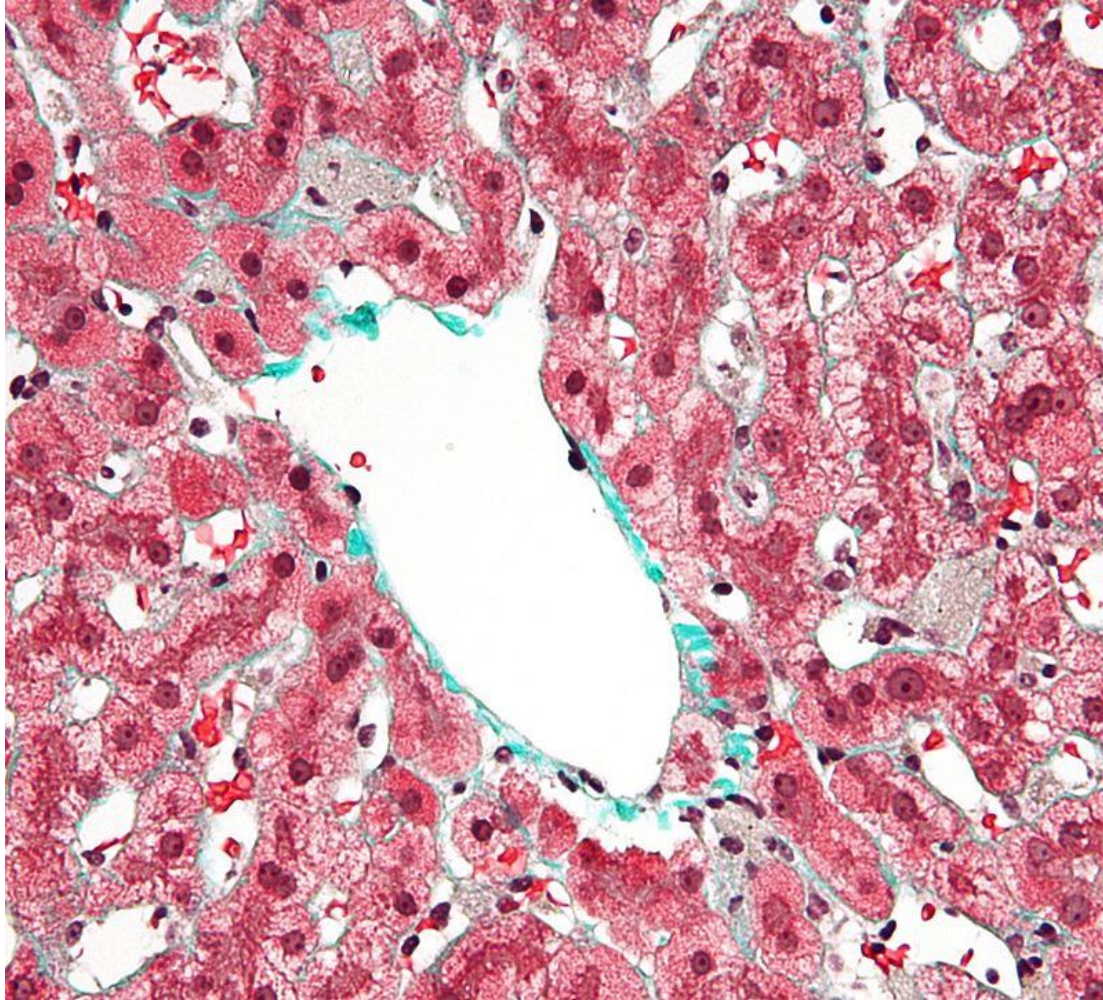


Figure 01: Kupffer Cells

The malfunctioning or the changes in the kupffer cell functions can cause drug-induced liver injury and toxin-induced [fibrosis](#) which may lead to [chronic inflammation](#) in the liver, including alcoholic and nonalcoholic fatty liver diseases. Therapeutic manipulation of kupffer cells can promote the resolution of inflammation and enhance wound healing of liver diseases.

What are Hepatocytes?

Hepatocytes are a type of parenchymal cells that reside in the liver. They are the most abundant cells in the liver which accounts for 80% of the liver cells. Hepatocytes are large polyhedral cells with large round centrally located nuclei. Hepatocytes are responsible for several functions of the liver. They are the cells which play key roles in metabolism, detoxification, and protein synthesis in our body. And also they activate the innate immunity in our body by synthesizing innate immunity proteins against invading pathogens. Hepatocytes produce proteinase inhibitors including antitrypsin, antichymotrypsin, α 1-cysteine [proteinase](#) inhibitor (thiostain), and α 2-macroglobulin to destroy [proteases](#) secreted by pathogens or dead or dying cells and support for

activating innate immunity system. Moreover, hepatocytes produce several chemokines to activate innate immune cells.

[Fibrinogen](#) is the key factor which is responsible for blood [coagulation](#). Fibrinogen is mainly produced by hepatocytes in the liver and also by the serum [albumin](#), prothrombin group clotting factors are produced by hepatocytes. Another main function of hepatocytes is detoxification of exogenous and endogenous compounds. Drugs, [insecticides](#), alcohols, [ammonia](#), and [steroids](#) are metabolized and detoxified by hepatocytes. As a result of detoxification of ammonia, ammonia is converted into urea for excretion. Hepatocytes are the main cells that synthesize [lipoproteins](#), ceruloplasmin, transferrin, complement, and [glycoproteins](#). These cells participate in the regulation of [cholesterol](#) level in the blood and the secretion of bile in our body. Some anti-inflammatory functions are also shown by hepatocytes in the liver.

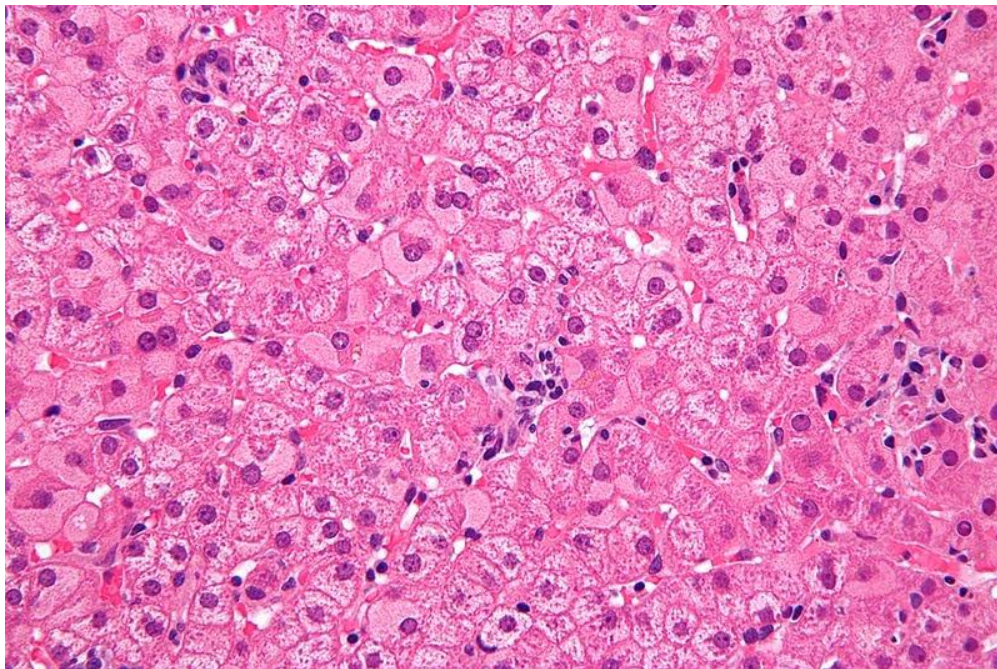


Figure 02: Hepatocytes

Malfunctioning of hepatocytes may cause acute liver failure and chronic liver failure. The liver is an attractive organ for gene therapy since the hepatocytes possess the machinery to express therapeutic genes which facilitate the production of the bioartificial liver to support patients with liver failure.

What are the Similarities Between Kupffer Cells and Hepatocytes?

- Both types of cells are liver cells which support the liver function.
- Both cells function as cells supporting our [immunity system](#).
- Both types of cells secrete chemokines.
- Both cells are involved in inflammation.

What is the Difference Between Kupffer Cells and Hepatocytes?

| Kupffer Cells vs Hepatocytes | |
|--|---|
| Kupffer cells are the specialized macrophage cells in the liver. | Hepatocytes are the parenchymal cells in the liver. |
| Shape | |
| Kupffer cells are star-shaped (stellate). | Hepatocytes are polygonal in shape. |
| Function | |
| Kupffer cells play a major role in clearing the blood from ingested bacterial pathogens. | Hepatocytes play a major role in detoxification, protein synthesis, innate immunity and bile secretion. |
| Abundance | |
| Kupffer cells are the most abundant macrophages in our body. | Hepatocytes are the most abundant parenchymal cells in our liver. |

Summary - Kupffer Cells vs Hepatocytes

Kupffer cells and hepatocytes are two types of liver cells which involve the functions of the liver. Hepatocytes are the most abundant cell type in the human liver and play a key role in several functions of the liver such as detoxification, protein synthesis, drug and lipid metabolism, innate immunity system and blood coagulation. Kupffer cells are the specialized stellate macrophages in the liver which clears the blood from ingested bacterial pathogens from the gut. This is the difference between kupffer cells and hepatocytes.

Reference:

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3. Gao, Bin, et al. "Hepatocytes: a key cell type for innate immunity." *Nature News*, Nature Publishing Group, 21 Dec. 2015. [Available here](#)

Image Courtesy:

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2.'Ground glass hepatocytes high mag 2'By Nephron - Own work, [\(CC BY-SA 3.0\)](#) via [Commons Wikimedia](#)

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APA:Difference Between Kupffer Cells and Hepatocytes.(2017 November 24). Retrieved (date), from <http://differencebetween.com/difference-between-kupffer-cells-and-vs-hepatocytes/>

MLA: "Difference Between Kupffer Cells and Hepatocytes" Difference Between.Com. 24 November 2017. Web.

Chicago: "Difference Between Kupffer Cells and Hepatocytes". Difference Between.Com. <http://differencebetween.com/difference-between-kupffer-cells-and-vs-hepatocytes/>accessed (accessed [date]).



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