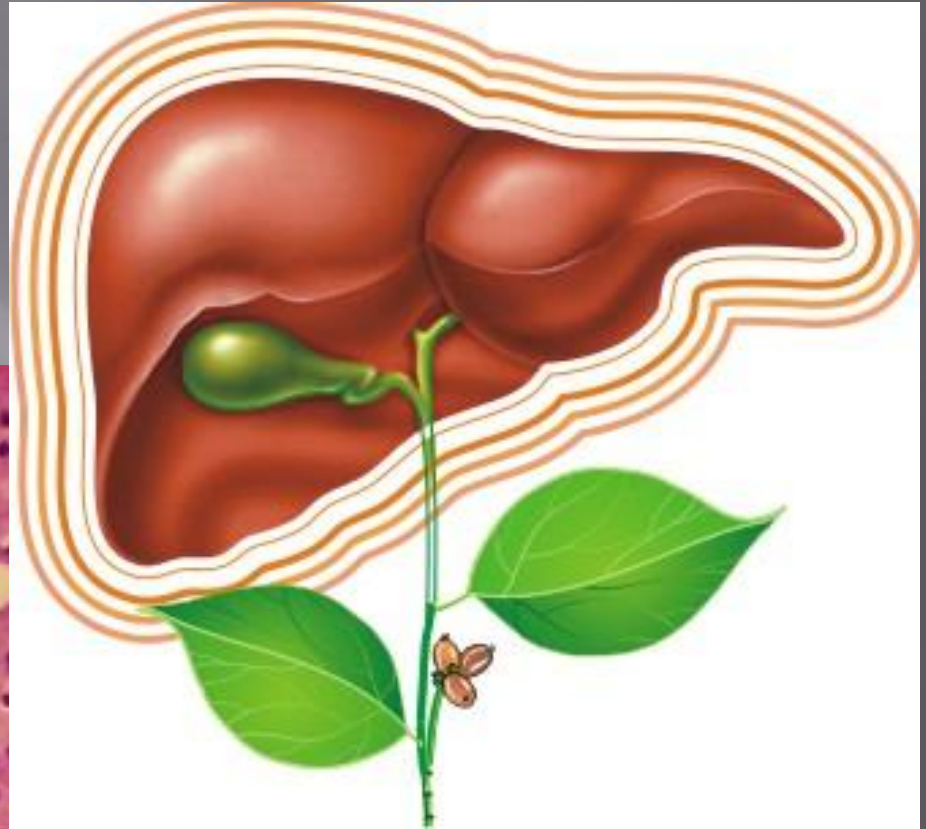
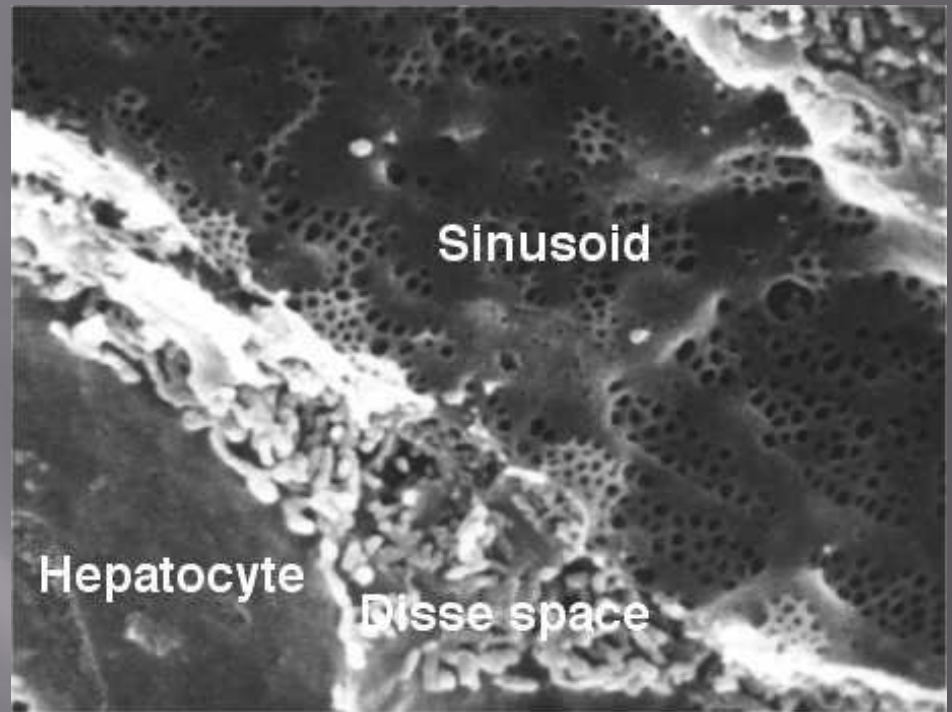


Top-7 about the liver



1. The space of Disse

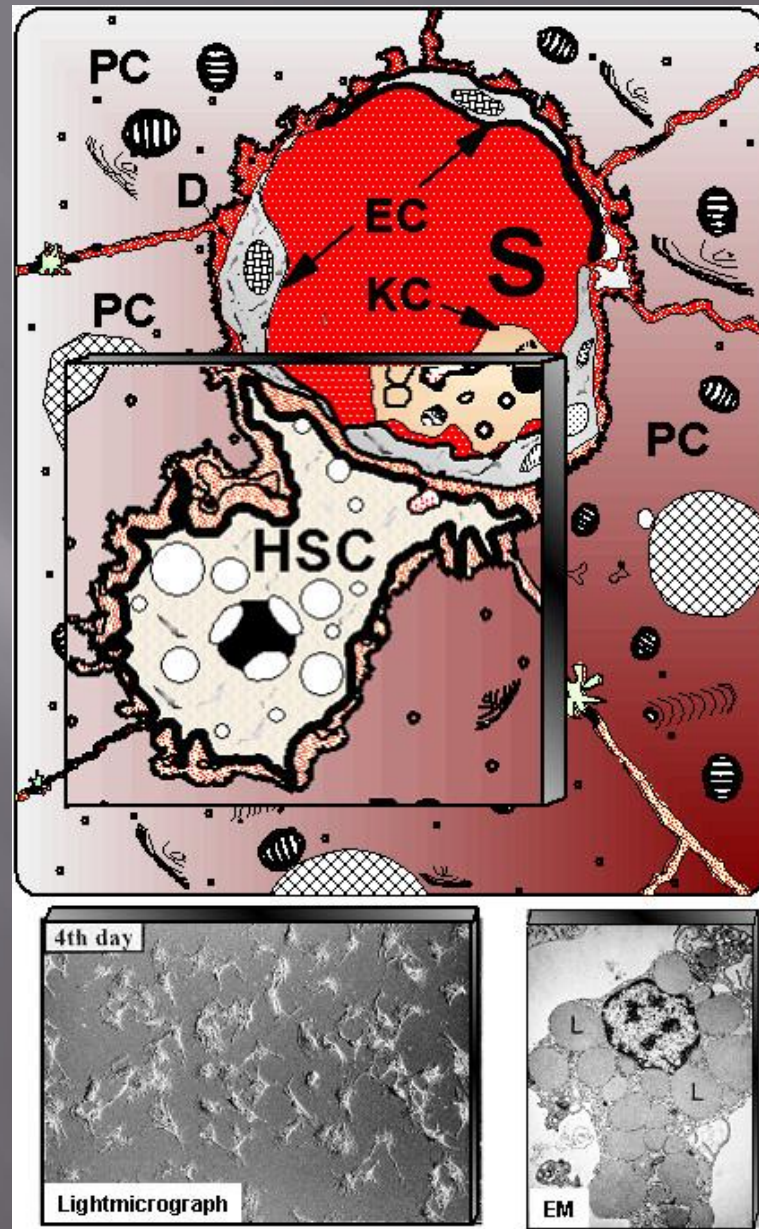
The space of Disse (or perisinusoidal space) is a location in the liver between a hepatocyte and a sinusoid. It contains the blood plasma. Microvilli of hepatocytes extend into this space, allowing proteins and other plasma components from the sinusoids to be absorbed by the hepatocytes. Fenestration and discontinuity of the endothelium facilitates this transport. [1] This space may be obliterated in liver disease, leading to decreased uptake by hepatocytes of nutrients and wastes (like bilirubin, for example).



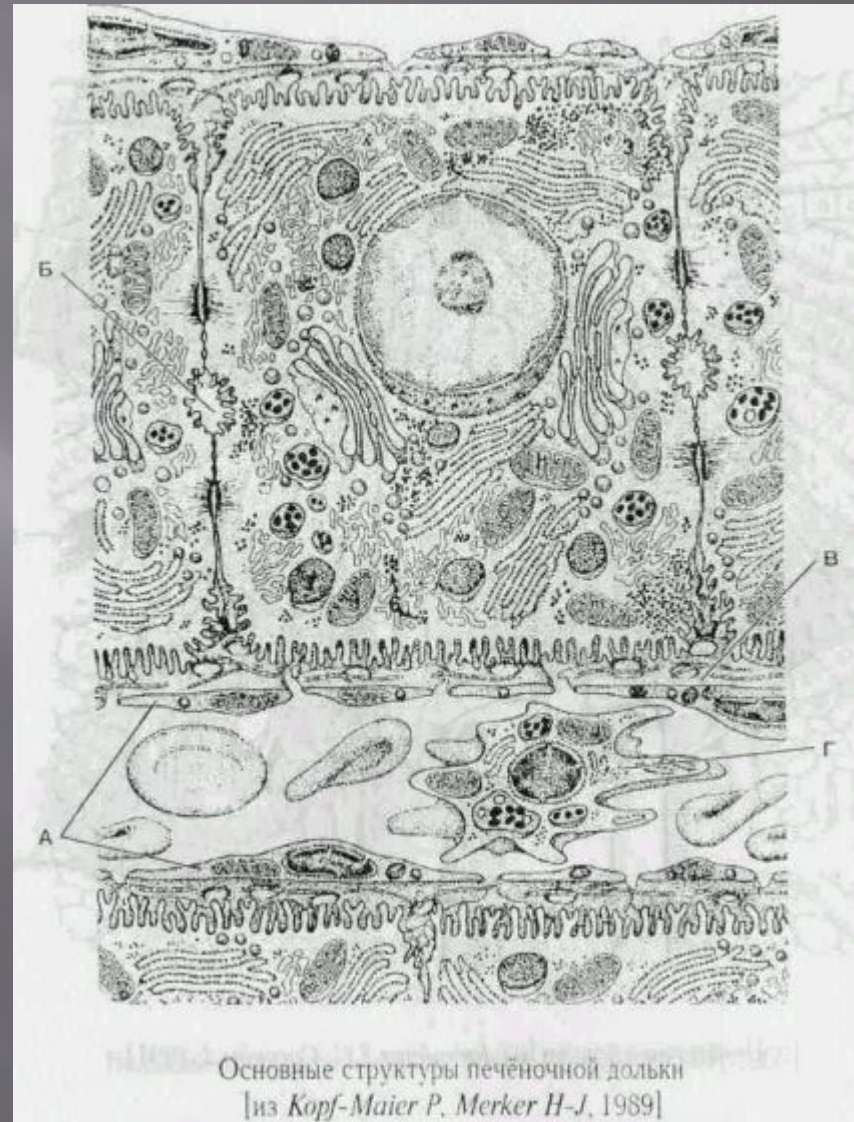
The Space of Disse also contains Ito cells, also called hepatic stellate cells, which store fat or fat soluble vitamins (like vitamin A). A variety of insults that cause inflammation can result in Ito cells transforming to myofibroblasts, resulting in collagen production, fibrosis, and cirrhosis.

2. Hepatic stellate cells

Hepatic stellate cells - also known as perisinusoidal cells or Ito cells (earlier lipocytes or fat-storing cells), are pericytes found in the perisinusoidal space (a small area between the sinusoids and hepatocytes) of the liver also known as the space of Disse. The stellate cell is the major cell type involved in liver fibrosis, which is the formation of scar tissue in response to liver damage.

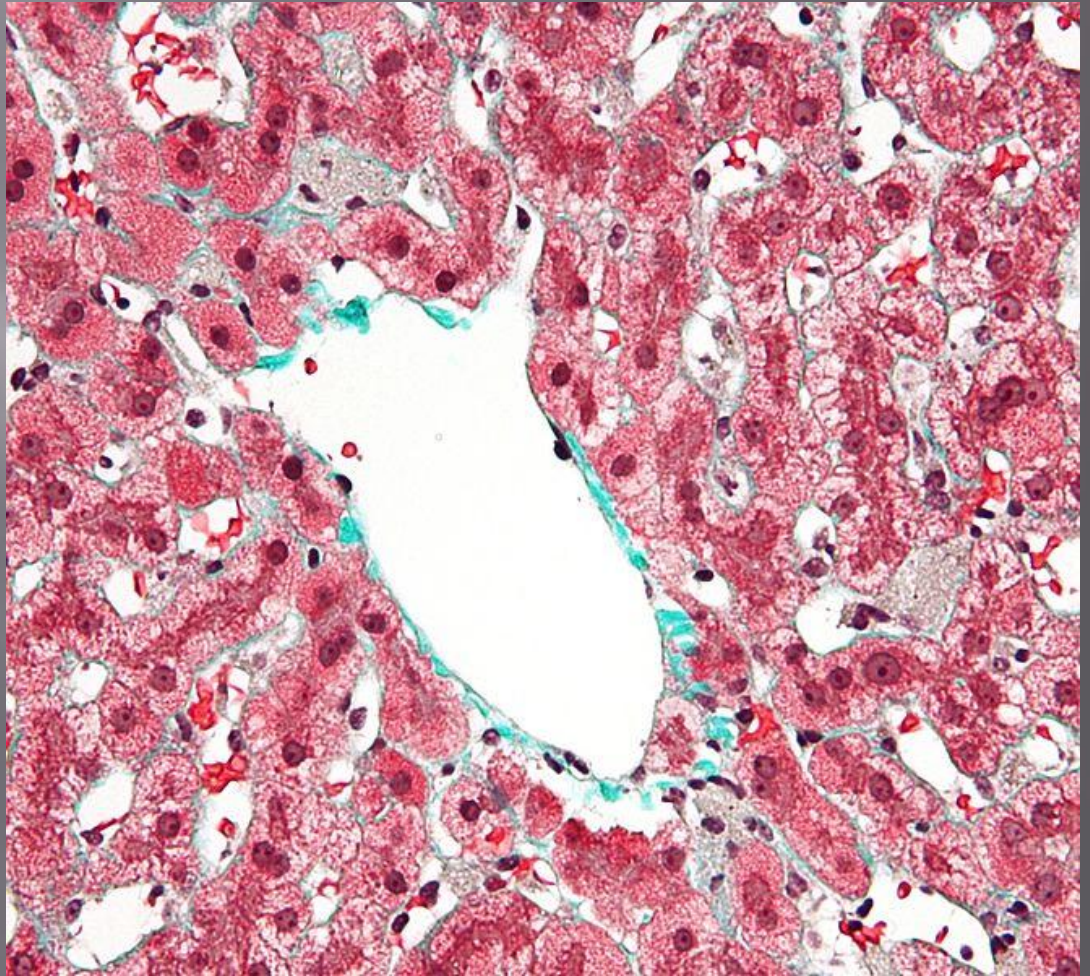


- ◆ In normal liver, stellate cells are described as being in a quiescent state. Quiescent stellate cells represent 5-8% of the total number of liver cells.
- ◆ The lipid droplets in the cell body store vitamin A as retinol ester.
- ◆ The function and role of quiescent hepatic stellate cells is unclear. Recent evidence suggests a role as a liver-resident antigen-presenting cell, presenting lipid antigens to and stimulating proliferation of T-killers.
- ◆ The activated stellate cell is also responsible for secreting collagen scar tissue, which can lead to cirrhosis.

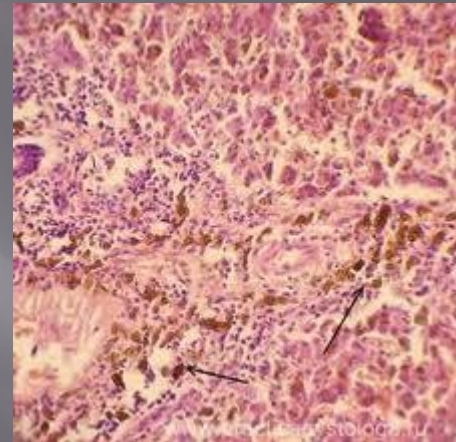


3. Kupffer cells

Kupffer cells, also known as Browicz-Kupffer cells and stellate macrophages, are specialized macrophages located in the liver lining the walls of the sinusoids that form part of the reticuloendothelial system.

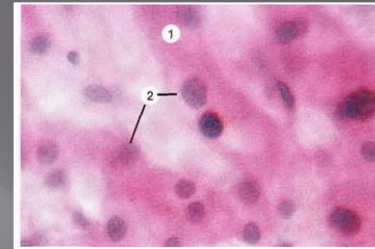


- ❖ Their development begins in the bone marrow with the genesis of blood monocytes, completing their differentiation into Kupffer cells
- ❖ Kupffer cell activation is responsible for early ethanol-induced liver injury, common in chronic alcoholics.
- ❖ Red blood cells are broken down by phagocytic action, where the haemoglobin molecule is split. The globin chains are re-utilized, while the iron-containing portion, heme, is further broken down into iron, which is re-utilized, and bilirubin, which is conjugated to glucuronic acid within hepatocytes and secreted into the bile.

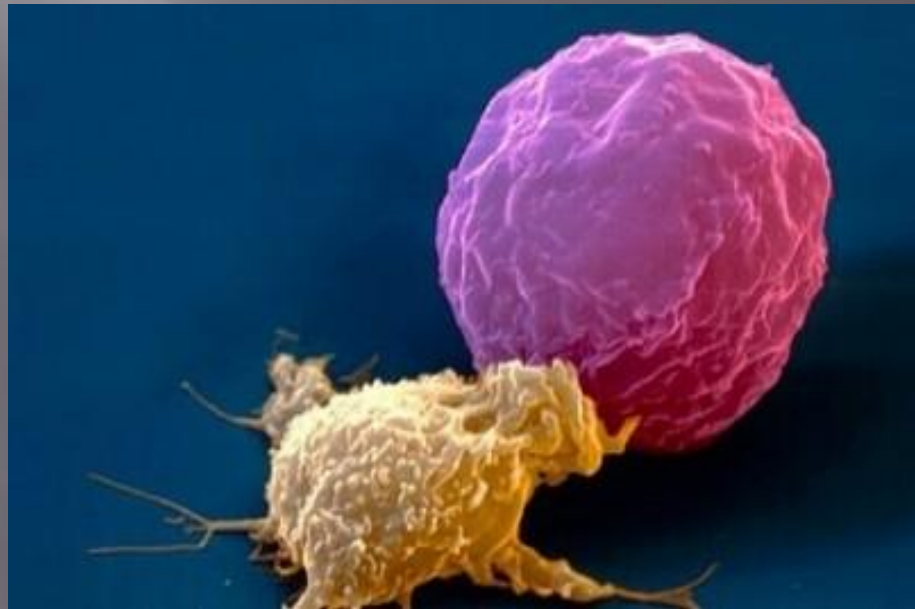
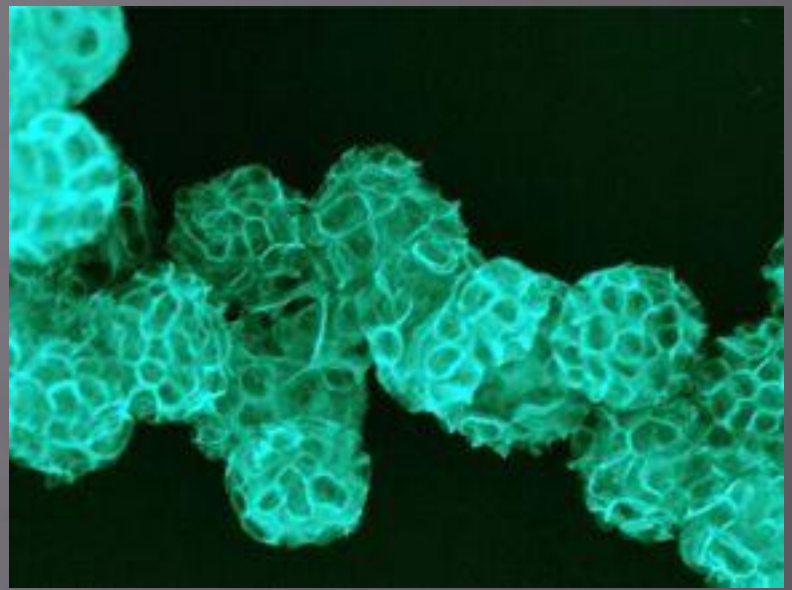


4. Pit-cells

Pit cells are liver-specific natural killer cells and belong to the group of sinusoidal cells, together with Kupffer, endothelial, and fat-storing cells. Pit cells are lymphoid cells containing specific granules, classifying them also as large granular lymphocytes .

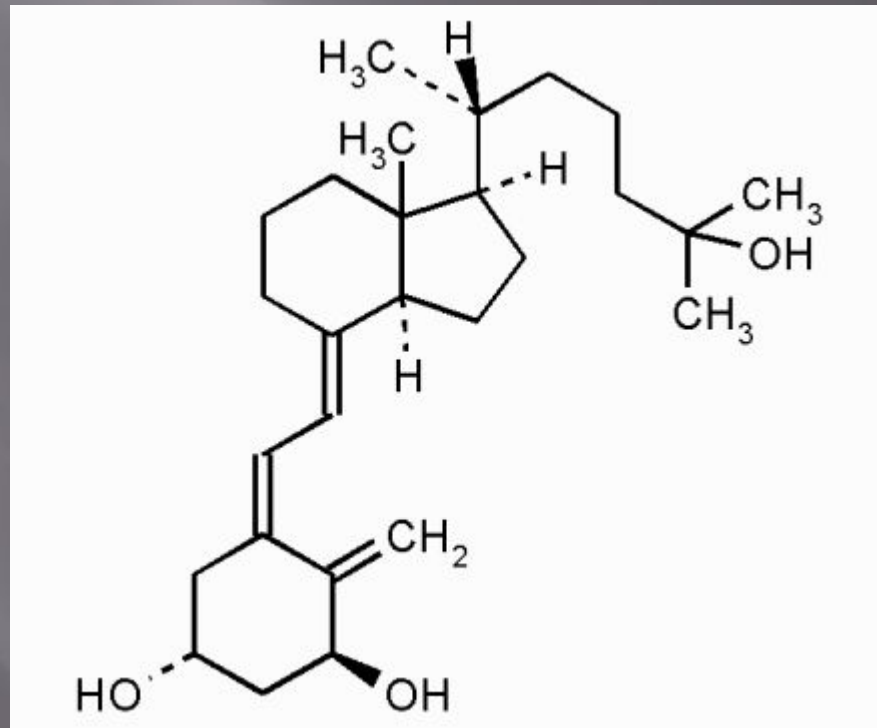
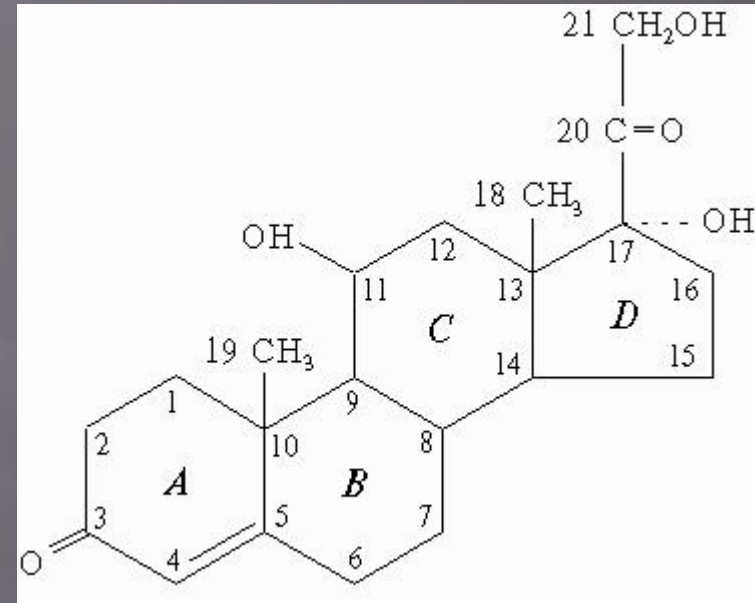


They probably originate from the bone marrow, circulate in the blood, and marginate in the liver, where they develop into pit cells by lowering their density and increasing the number of granules, which decrease in size. Pit cells remain in the liver about 2 weeks and are dependent on Kupffer cells. Pit cells also proliferate locally, when stimulated with interleukin-2, biological response modifiers, or other agents. Pit cells adhere to tumor target cells during killing. They possess a high level of natural cytotoxicity against a variety of tumor cell lines, which is comparable to the cytotoxicity level of lymphokine-activated killer (LAK) cells. Tumor cell killing is synergistically enhanced when pit cells attack tumor cells together with Kupffer cells.



5. Hormones

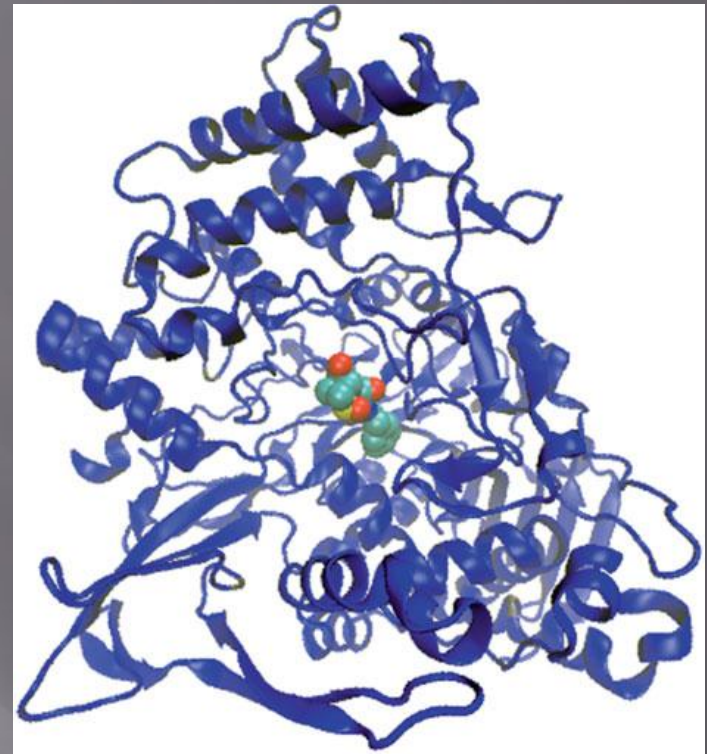
Steroid hormones (androgens, estrogens, aldosterone) form outside the liver, but liver plays a major role in their inactivation and breakdown. Liver inactivates enzymes and provides conjugation of steroid hormones with glucuronic and sulfuric acids. The liver is an active influence on the homeostatic regulation of the level of glucocorticoid hormones. It also produces a specific transport protein of blood - transkortin that binds hydrocortisone, making it temporarily inactive. Inactivation of serotonin and histamine is performed by oxidative deamination of MAO and histaminase. Increasing concentrations of histamine may be the reason of itching and ulceration in the gastrointestinal tract.



6. Enzymes

All metabolic processes in the liver are impossible without relevant enzymes, which are contained in hepatocytes. Production of enzymes is one of the most important functions of the liver, and the dynamic consistency of enzymes in the liver is a necessary condition for its normal functioning.

Indicator enzymes perform specific intracellular function. Some of these (lactate dehydrogenase, alanine and aspartate aminotransferase, aldolase) are constantly present in the blood plasma, in physiological conditions in small quantities



and other are identified in the serum only in deep liver damage. The physiological role of enzymes, always present in the plasma, is unclear. Suggest that the output of enzymes in the blood under physiological conditions associated with the state of the cell membrane.

7. Vitamins

Besides the glycogen, liver is the storage for many vital substances such as vitamins & minerals:

Vit.A (1-2 years supply) – is needed for normal vision & general development in children

Vit. D (1-4 months supply) – is needed for Ca²⁺ absorption & synthesis of steroid hormones

Vit. B12 (1-3 years supply) – plays important role in blood clotting (anti-anaemic factor) & metabolism of aminoacids

Vit.K – responsible for composition of blood clotting factors

Vit. E – antioxidant

Iron – component of haemoglobin

Copper – component of many enzymes

