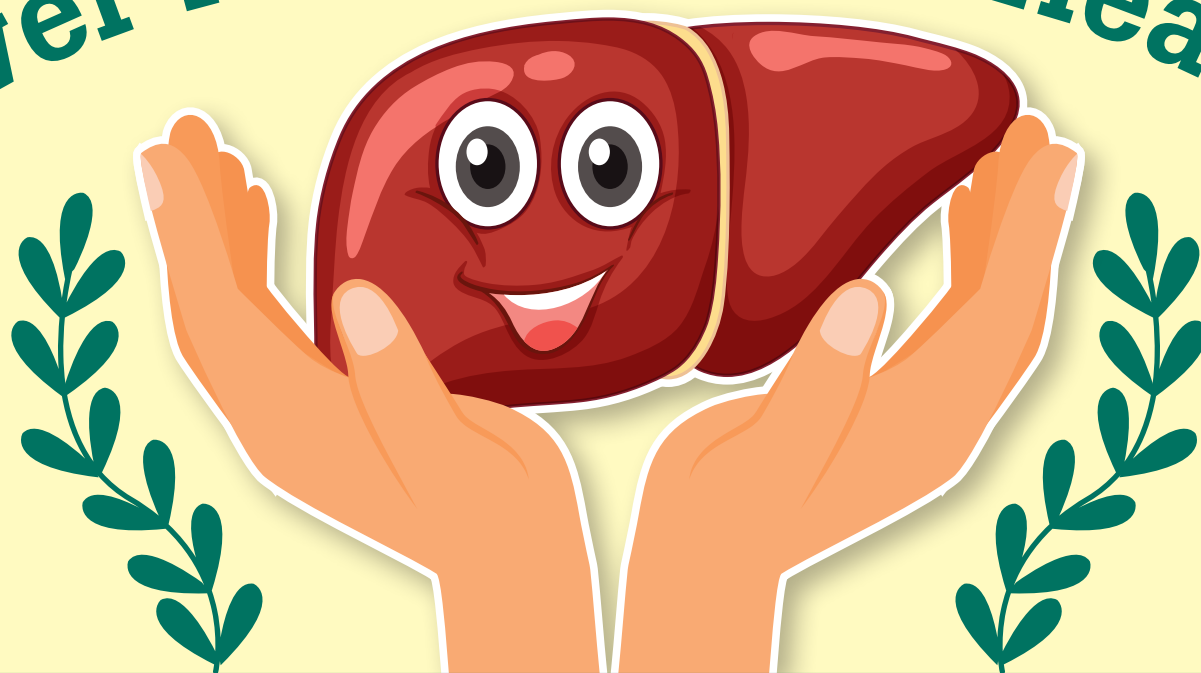


Liver Function and Health



Many people do not think about it but from a metabolic perspective the liver is one of the most important organs in the human body, performing more than 500 essential functions, each critical for maintaining overall health and survival. It plays a central role in digestion, metabolism, detoxification, immunity, and the production of vital proteins and chemicals. One of the primary metabolic functions of the liver is the production of bile, which is used to break down and absorb fats in the digestive tract while also carrying waste products out of the body. The liver is a metabolic processing plant, taking the nutrients from the foods we eat, converting them into usable forms of energy and storing excess glucose as glycogen for later use

to help regulate blood sugar levels to support the brain and metabolic tissues. It also serves as a storage site for important vitamins, including vitamins A, D, E, K, and B12, as well as minerals such as iron. In addition to its metabolic functions, the liver acts as the body's main filtration and detoxification system. It continuously filters the blood, removing toxins, medications, alcohol, metabolic waste products, and other harmful substances so they can be safely eliminated from the body. The liver also breaks down old or damaged red blood cells and recycles their components. Furthermore, it contributes significantly to immune function by housing specialized cells that help identify and destroy bacteria, viruses, and other pathogens circulating in the bloodstream.

The liver is also responsible for producing many essential proteins that support normal bodily functions. These include clotting factors, which help stop bleeding after injuries, and albumin, a protein that helps maintain fluid balance within the bloodstream and transports hormones, vitamins, and other important substances throughout the body. Because the liver is involved in so many vital processes, protecting its health is essential for overall well-being. One of the most important ways to maintain liver health is by limiting alcohol consumption. Since alcohol is metabolized by the liver, excessive intake can damage liver cells, leading to inflammation, fatty liver disease, cirrhosis, liver failure, and an increased risk of several types of cancer. Even moderate alcohol consumption has been associated with increased cancer risk, prompting public health officials to encourage greater awareness of alcohol's potential harm.

Maintaining a healthy body weight is another key factor in preserving liver health. Excess body fat, particularly around the abdomen, increases the risk of developing metabolic dysfunction-associated steatotic liver disease (MASLD), previously known as non-alcoholic fatty liver disease (NAFLD). In this condition, excess fat accumulates within the liver, causing inflammation and impairing its ability to function properly. If left untreated, MASLD can progress to steatohepatitis, fibrosis, cirrhosis, and

eventually liver failure.

Research has shown that even modest weight loss, such as

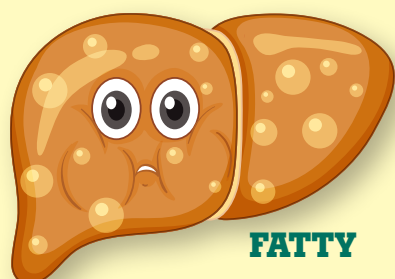
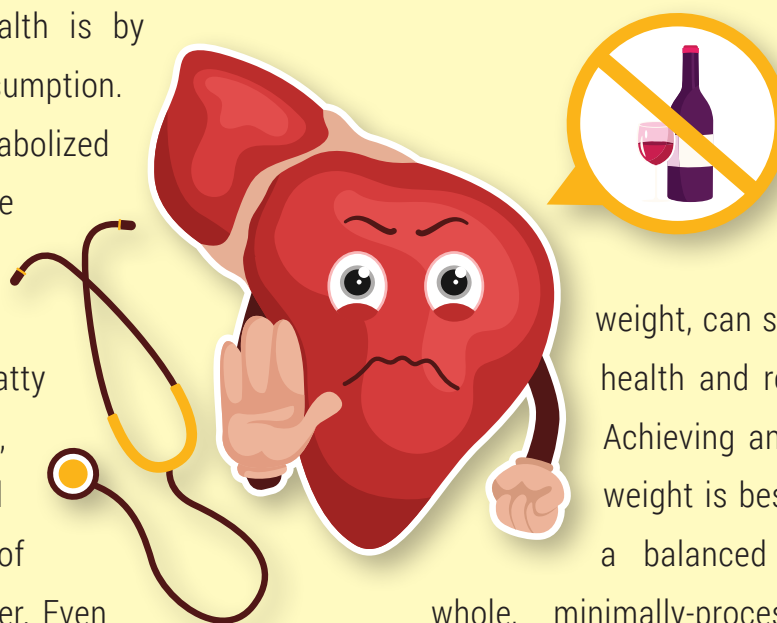
losing 5% of total body

weight, can significantly improve liver

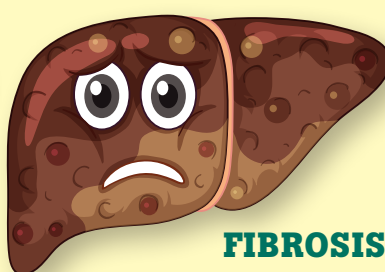
health and reduce fat accumulation.

Achieving and maintaining a healthy weight is best accomplished through a balanced diet that emphasizes

whole, minimally-processed foods such as fruits, vegetables, whole grains, lean proteins, nuts, and seeds -- while limiting added sugars, saturated fats, trans fats, sugary beverages, fried foods, and processed meats. Regular physical



FATTY



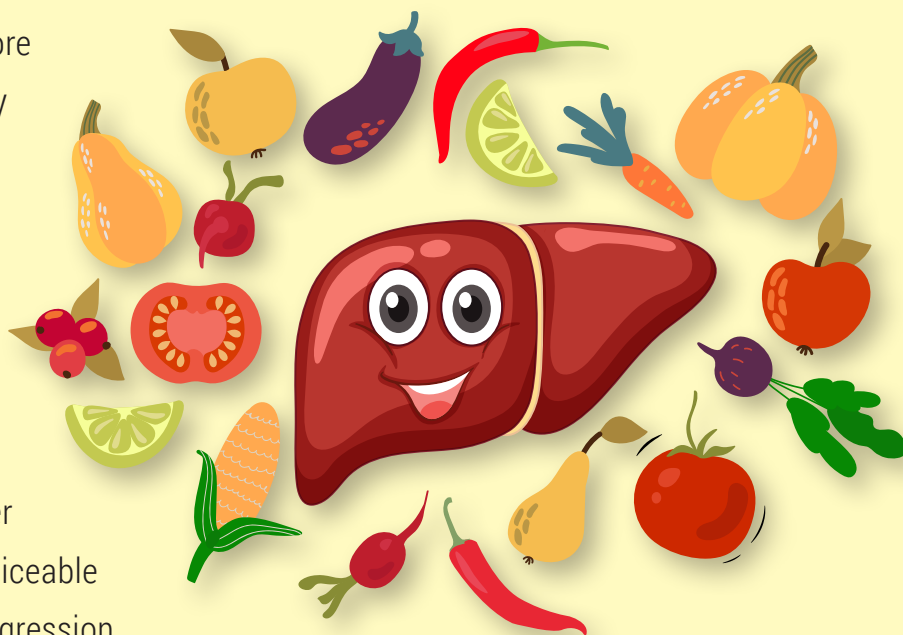
FIBROSIS



CIRRHOSIS

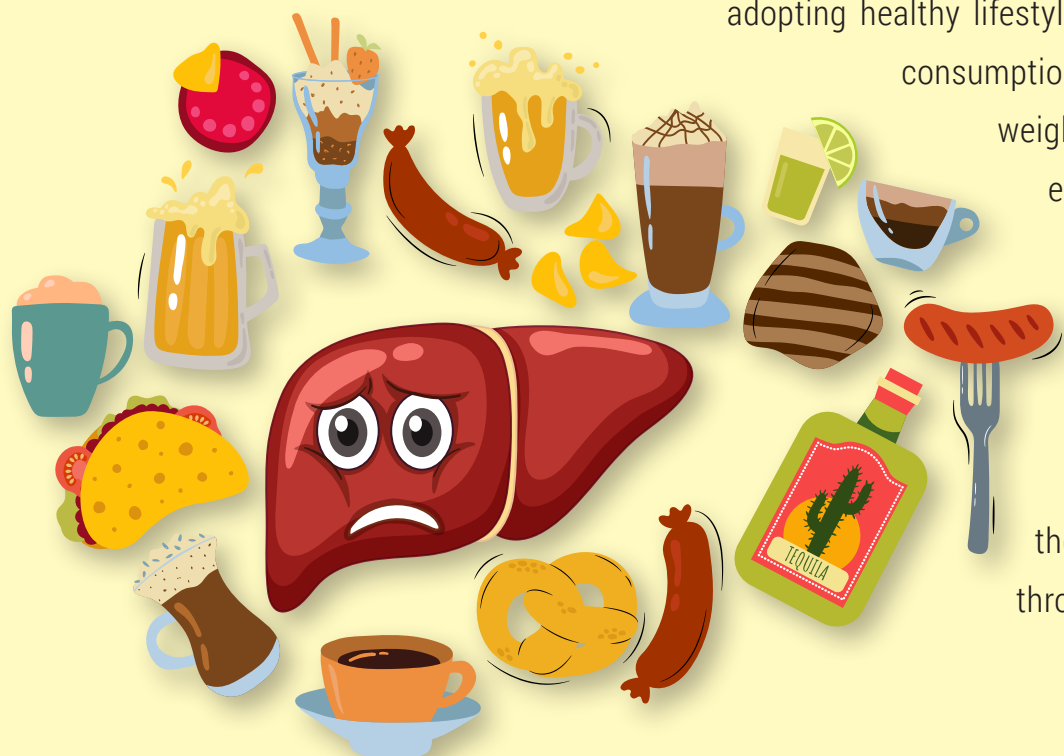
activity, with a goal of 150 or more minutes of moderate-intensity exercise per week, further supports healthy liver function and overall metabolic health.

Another challenge in protecting liver health is that liver disease often develops silently. In its early stages, liver damage may cause few or no noticeable symptoms, allowing disease progression to go undetected for years. Symptoms such as jaundice (yellowing of the skin and eyes), severe fatigue, nausea, abdominal discomfort, and swelling of the legs or abdomen typically appear only after significant liver damage has occurred. For this reason, routine medical evaluations and



liver function testing can be valuable, especially for individuals with risk factors such as obesity, diabetes, high alcohol intake, or a family history of liver disease. Early detection and intervention can help prevent progression to more serious liver conditions and improve long-term outcomes. By adopting healthy lifestyle habits, limiting alcohol

consumption, maintaining a healthy weight, engaging in regular exercise, and seeking appropriate medical screening when needed, individuals can support optimal liver function and reduce their risk of liver disease throughout their lives.



A standard liver panel assesses liver injury, bile flow, and liver function using several tests:

ALT AND AST:

Enzymes released when liver cells are damaged or inflamed.

ALP:

An enzyme that often rises when bile ducts are blocked or bile flow is impaired.

BILIRUBIN:

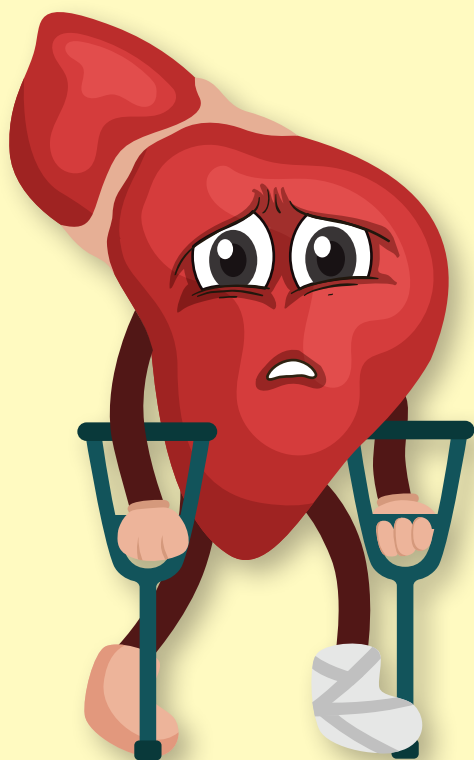
Waste product processed by the liver; elevated levels can indicate liver dysfunction or bile duct obstruction.

ALBUMIN AND TOTAL PROTEIN:

Proteins made by the liver; low levels may suggest reduced liver synthetic function.

PT/INR:

Measures blood clotting; prolonged clotting times can indicate impaired production of clotting factors by the liver.



Doctors interpret these tests together because different patterns can indicate liver cell injury, bile duct problems, or reduced liver function.

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