

## Normal Function of the Liver

The largest internal organ in the body, the liver is also the only organ capable of regenerating itself. For example, a heart attack can create permanent damage to the heart muscle. By contrast, heavy alcohol consumption can damage the liver, but abstaining from alcohol gives the liver a chance to repair itself. You could think of the liver as a kind of industrial processing plant for the body, performing a wide range of critical functions for physical maintenance and repair.

Let's take a look at some of the different departmental functions of the amazing liver.

### **Warehouse and Shipping Depot for Nutrients.**

When you eat, foods are broken down into component nutrients by the process of digestion, absorbed, and transported by the blood to the liver. The liver receives the nutrients and assigns some to the storage while others are "packaged" and shipped to parts of the body to fill their needs. As another kind of "shipping and receiving" function, the liver helps to regulate normal blood sugar levels in response to the action of hormones produced by the pancreas.

**Protein Manufacturing Plant.** The liver assembles amino acids into essential proteins needed for the immune system's antibodies, blood clotting, and many other bodily functions.

**Waste Treatment Plant.** When blood enters the liver, it carries not only nutrients, but also a wide range of other substances absorbed through our skin, through our lungs, and through our digestive systems. Any compound the body doesn't need for nutritional supplies is identified as "foreign" and targeted for "disassembly" and disposal. Specialized liver enzymes perform the function of changing the chemical structure of foreign compounds so they can be excreted.

**Hazardous Waste Transport and Disposal.** Once the liver has broken down toxic substances, they can be excreted by the kidneys in urine or transported to the intestines in bile, which is manufactured by the liver and stored in the gallbladder. When needed, bile is released into the intestines where it works along with dietary fiber to bind toxins and facilitate their elimination from the body as part of fecal waste.

## Challenges to Liver Function

There is a wide range of foreign compounds the liver may be called upon to detoxify, including:

**Benzopyrenes** — tobacco smoke or smoke from grilling foods

**Acetone** — nail polish remover, paints, varnishes, thinners

**Heterocyclic amines** — lighter fluid, hydrocarbon solvents, barbecued or broiled meats

**Nitrosamines** — processed foods

**Polycyclic hydrocarbons** — car exhaust, fumes from burning fossil fuels

**Insecticides, herbicides, and fertilizers**

**Ammonia** — and other household chemicals

**Alcoholic beverages**

**Some over-the-counter and prescription drugs** — antiulcer, analgesic, antiinflammatory, anticonvulsant, antihyperlipidemic

When the structure of these compounds is changed in the liver, free radicals are released. Free radicals then attack the cell membranes of liver cells. If their attack is successful, the integrity of the cell is impaired leading to cell damage and even cell death.

Despite the liver's amazing ability to regenerate itself, if too many liver cells are destroyed or damaged by free radical-induced oxidation, the liver's ability to perform important functions may be decreased.

### **Bile, One of the Body's Essential Workers**

Bile is manufactured by the liver and stored in the gallbladder. It is necessary for fat digestion and the absorption of fat-soluble nutrients. In fact, eating fats stimulates the release of bile from the gallbladder to perform these crucial functions.

Bile is an emulsifier, which acts like a detergent to break down fats. Just like dishwashing detergent breaks up greasy foods on a plate so you can rinse them away, bile breaks up the fat from foods you eat into smaller bits. This increases the surface area on which digestive enzymes can work to further break down fats for absorption.

Bile also serves as a vehicle for transporting toxins from the liver to the gastrointestinal tract for elimination from your body.

And a special commendation for fiber: Bile doesn't perform the whole job of detoxification by itself. Dietary fiber is an essential "coworker," because it binds toxins transported in bile and helps carry them quickly out to the body before they can damage healthy cells in the gastrointestinal tract.