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## Liver Disease: The Silent Threat

by Lane Lenard, PhD

Besides the skin, the liver is the largest organ in the human body. Nevertheless, it is one of the least appreciated or understood. Unlike many other vital organs, the liver does its work in silence. For example, we readily note changes in heartbeat or digestive function—and we deal with the direct results of kidney activity several times a day. Our senses provide us constant feedback. And while we can't feel brain function, we are aware that our thoughts and behavior are manifestations of what goes on inside our skulls.

But the liver is different. Despite its size (it weighs about three pounds and is about the volume of a football) we'd probably never know it was there unless something went wrong with it. It doesn't beat; it doesn't rumble; it doesn't relax or contract; it does secrete various substances, but nothing we'd be immediately aware of. And yet the liver's many complex functions are absolutely essential to good health. The liver's multiple functions fall into three general categories: (1) vascular; (2) secretory; and (3) metabolic (Table 1). In addition to these vital functions, the liver possesses an amazing ability to regenerate itself if cells become damaged. This is important because, in the everyday process of neutralizing toxins, the liver produces potent free radicals that can and will injure the liver tissue itself. It is essential that the liver has the ability to replace those cells that give up their lives in the cause of detoxifying the blood.

Diseases of the liver are almost always serious and can often be life-threatening. In the United States, more than 25,000,000 people (about 1 person in 10) are afflicted with diseases of the liver or gallbladder (which stores bile produced by the liver), and each year more than 43,000 die from liver-related disorders. The most common liver disorders include:

### Fatty Liver

Fatty liver is an abnormal accumulation of fat, primarily triglycerides, in liver tissue, often associated with heavy long-term alcohol use. Fatty liver is usually asymptomatic and invisible on standard liver function tests, although it can sometimes manifest as tenderness or pain in the upper right abdominal region. Most cases are diagnosed when the doctor palpating the area notices the liver enlargement. Diagnosed early enough, most cases of fatty liver can be treated (primarily by stopping alcohol consumption) and reversed. Untreated, fatty liver can progress to fatal liver disease.

Table 1

#### Vascular

- Storing blood
- Regulating blood clotting
- Cleansing the blood and discharging waste products into the bile
- Aiding immune function by filtering the blood to remove bacteria and by adding immune factors.

#### Secretory

- Aid digestion by synthesizing and secreting bile.
- Keeping hormones in balance.

#### Metabolic

- Manufacturing new proteins
- Producing quick energy on demand
- Regulating fat storage
- Controlling the production and excretion of cholesterol
- Storing certain vitamins, minerals, and sugars
- Neutralizing, detoxifying, and destroying xenobiotic substances, such as drugs, chemicals, and pollutants.
- Metabolizing alcohol
- Metabolizing carbohydrates, fats, proteins

### Hepatitis

Hepatitis is an inflammatory condition of the liver tissue usually caused by a virus, either Type A, Type B, or Type C hepati-

tis virus. Hepatitis can also be caused by alcohol, drugs, or occasionally by other viruses, such as Epstein-Barr, yellow fever, and cytomegalovirus. All types of hepatitis are potentially fatal, although Type A usually has the best prognosis.

Type C hepatitis infection has raised alarms in recent years because it seems to be spreading so rapidly. About four million people in the US are thought to be chronically infected with hepatitis C. It is estimated that 30,000 people are becoming infected each year, although 70 to 75% of these are not being diagnosed. Currently, hepatitis C kills about 12,000 people annually, a figure that is expected to triple over the next decade. Hepatitis C is the primary reason people need liver transplants. Once the hepatitis C virus gets into the liver, it is extremely difficult to eradicate. There are no effective drug treatments, and unlike Types A and B, no vaccine has been developed to prevent it. Like HIV, hepatitis C is transmitted by intimate contact with the blood of an infected person, such as through needle stick, body piercing/tattooing, blood transfusion, or sexual contact.

### Fibrosis and Cirrhosis

Fibrosis and cirrhosis can be caused by a wide variety of agents, but it is usually chemical exposure or excessive long-term alcohol use that does the damage. Fibrosis is a scarring of liver tissue in response to injury. Fibrotic regions do not function like normal liver tissue and, depending on the location, may block important ducts or blood vessels. Cirrhosis is basically widespread fibrosis. As scar tissue progresses, blood flow through the liver falls, leading to further liver damage. There is no cure for advanced cirrhosis.

### Xenobiotic Liver Damage

While the liver is a highly effective detoxification factory, too heavy a load can overwhelm its abilities to neutralize free radicals and other toxic byproducts of

metabolism. High levels of environmental toxins, combined with the use of drugs (including many common prescription and over-the-counter drugs), alcohol, and other everyday chemicals, are believed to be at least partly responsible for the current rise in liver disorders, up to and including liver cancer. The liver has ample resources for metabolizing many drugs and toxins, usually by oxidation, reduction, or conjugation. Damage to liver tissue is common during the metabolism of many drugs, environmental toxins, or other xenobiotic (foreign to the body) substances. Such damage may be caused directly by the toxicity of the substance, or indirectly due to the actions of potent free radicals released during the metabolism of these substances.

The normal liver can usually handle this xenobiotic assault by throwing a variety of powerful antioxidants, enzymes, and other substances at the foreign intruders. And even when some liver cells give up their lives in the defense of the body, the liver can usually regenerate fresh replacements. Problems arise when the toxic load exceeds the liver's ability to compensate and regenerate itself. Exposure to high levels of hydrocarbons such as carbon tetrachloride (used as a cleaning fluid) over a long period of time can promote severe necrosis and fatty infiltration of liver tissue—a direct toxic effect. More common, though, are indirect insults, such as those caused by drugs like acetaminophen (Tylenol). High doses of acetaminophen deplete the liver of the important antioxidant glutathione, which the liver produces in order to neutralize free radicals that would otherwise damage liver tissue. With many drugs, the normal process of detoxification may release large numbers of dangerous free radical species.

One reason excessive alcohol use is so dangerous is that it can lead to destruction of the liver's glutathione-producing tissue, reducing glutathione levels, not just in the liver, but all over the body. At the same time, free radicals generated by alcohol consumption can depress the enzyme that converts the amino acid methionine to S-adenosylmethionine (SAME), which is a potent promoter of liver regeneration, thus inhibiting the liver's ability to repair itself.

### Cholestasis

Cholestasis (blockage of bile flow), is not so much a liver disease in itself, as a

manifestation of other liver disease processes. Bile, which is essential for digesting fats, is produced by special cells in the liver and stored in a pouch called the gallbladder, which is located outside the liver. Cholestasis may result from hepatitis or alcoholism, or any other condition which damages bile-producing liver tissue or clogs the intrahepatic ducts that transport bile. The most commonly known form of Cholestasis is due to gallstones. In this condition, rock-hard stones formed in the gall bladder from cholesterol and other substances impede the flow of bile from the gallbladder. It has been estimated that 20 million people in the U.S. have gallstones, related in large part to a low fiber diet.

**Table 2**

#### Potential Causes of a Sluggish Toxic Liver

- Alcohol ingestion
- Drugs: Acetaminophen, aminosalicylic acid, chlorothiazide, erythromycin estolate, phenylbutazone, sulphadiazine, thiouracil, thyroxine, Phenobarbital, imipramine, methotrexate, hydrazines.
- Steroid hormones: Anabolic steroid drugs, estrogens, oral contraceptives
- Chemical pollutants: Aromatic hydrocarbons, phthalic acid esters, polychlorinated biphenyls, dioxins, phenolic herbicides and pesticides, chlorinated drinking water, vinyl chloride.
- Molds
- Spoiled foods
- High fat/low fiber diet
- Diseases: Hereditary disorders such as Gilbert's syndrome, hyperthyroidism
- Endotoxins: Gram-negative bacteria, parasites, viruses
- Pregnancy

### The Congested, Sluggish, Toxic Liver

Although these are the most widely recognized liver ailments, it is possible that your liver may malfunction without your knowledge and, in the process, create scores of seemingly unrelated problems. This minimal loss of liver function, or sub-clinical liver dysfunction, known as sluggish liver or toxic liver is the result of the combined actions of different factors that impair the liver's numerous metabolic processes. These actions can have profound effects on the state of your health

One important cause of a sluggish/toxic liver is diminished bile flow within the liver. The most common cause of a diminished bile flow is gallstones.

Another major factor is the ingestion of alcohol and drugs. In some individuals, as little as an ounce of liquor can damage the liver and cause fat deposition. Finally, the constant onslaught of exogenous toxic chemicals and endotoxins that the liver is responsible for detoxifying can cause a toxic liver. Free radicals generated during the process of detoxification produce toxic effects on liver cells. Table 2 lists some of the agents responsible for a congested, sluggish and toxic liver.

Millions of Americans are suffering from subclinical stages of liver disease. Their livers are congested, sluggish and toxic. Yet their laboratory values of liver function, liver enzymes (SGOT, SGPT, GGTP), BSP, serum bile acid values, and other tests of hepatic function may all appear normal or only slightly askew. These people often complain of fatigue, allergies, chemical sensitivities, constipation, elevated cholesterol, post-meal discomfort, intolerance to fatty foods, and weight gain or weight loss (Table 3).

**Table 3**

#### Signs of a Sluggish Toxic Liver

- Fatigue and malaise
- Allergies and chemical sensitivities
- Discomfort in the right abdomen
- Constipation
- Intolerance to eating fatty foods
- Weight gain or weight loss
- Elevated cholesterol and triglyceride levels
- Skin blemishes and poor complexion
- Intolerance to alcohol
- Darkish urine

Every day, more than 100 Americans die from liver-related illness. At the slightest indication that you may have a liver disorder, see your doctor immediately. There are a number of safe and natural therapies that can protect and restore liver function, but it is wise to first see your health care professional. Once you have a "snapshot" of your liver's health, then you can begin to construct a sound and proactive hepato-protective plan. Remember that the liver has a tremendous capacity to heal itself.

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