



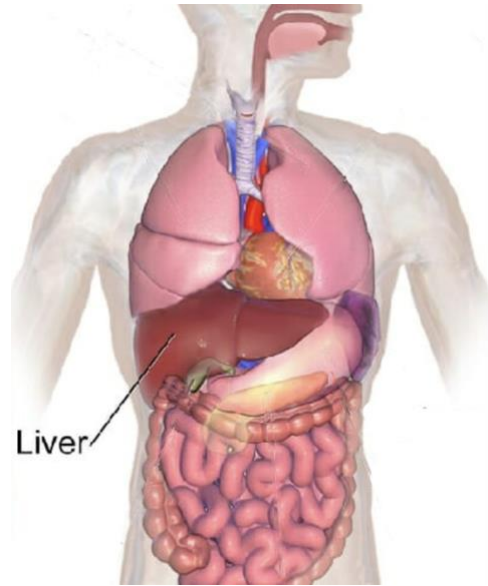
## Fatty Liver Disease

### Your Liver Lets You Live

Your liver, located under your right rib cage, normally weighs about three pounds and is the body's second largest organ. (Your skin is the largest.) It is a complex chemical factory with hundreds of different functions. It produces many important substances such as bile, digestive enzymes, clotting factors, cholesterol, and proteins. It is essential to metabolize fats, carbohydrates, proteins, and various vitamins and minerals.

It helps control the level of blood sugar and fats. It cleanses the blood and detoxifies drugs and potentially harmful chemicals such as alcohol.

The liver is a storehouse for blood, vitamins and minerals, and glycogen - the stored form of sugar - the body's major fuel. The liver is an amazing machine and largely unappreciated - until something goes wrong.



### What is a fatty liver?

Almost all the organs of the body contain some fat. That is not necessarily a bad thing. Fat cells provide insulation and protection and are an efficient way to store extra energy. After a typical meal, dietary fat is absorbed by the intestines and enters the bloodstream, which carries the fat directly to the liver. Normally, this fat is metabolized in the liver and converted to energy. If the amount of fat delivered is excessive, it is stored in the liver and other tissues. The normal liver contains about 5% fat. The rest of the liver is made of liver cells called hepatocytes, which do all the work of the liver. When the amount of fat in the liver exceeds 10%, healthy liver cells are replaced by fat cells.

### How common is a fatty liver?

Recent surveys have shown fatty liver to be much more common than previously recognized. It now affects more than 25% of adult Americans and has become the most common cause of chronic liver disease in the U.S.

### Who gets it?

The typical patient is an older obese adult who may be diabetic, but fatty liver affects both sexes and may occur in those of normal weight. It is also quite common in those who consume excessive amounts of alcohol. Sadly, this condition is now being diagnosed more and more often in children as the incidence of childhood obesity rises.

### Is it serious?

It can be. There are two basic categories of fatty liver - that seen in alcoholics and that which occurs in non-drinkers. It has been recognized for centuries that chronic alcoholism can cause progressive liver failure. The first stage of alcoholic liver disease is a fatty liver. The damage is often reversible at this stage if the individual becomes totally abstinent. But, with continued drinking, the outcome is dismal. Liver cells die and are replaced by scar tissue. When excessive scar tissue develops (cirrhosis), the liver fails. So, a fatty liver in an alcoholic who keeps drinking is quite serious.

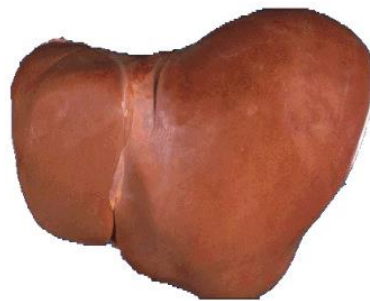
Until recently, it was believed that in non-alcoholics, a fatty liver was just a curiosity - a consequence of being overweight or a diabetic. New scientific studies have identified non-alcoholic fatty liver as a separate disease entity also with potentially serious consequences. It is now believed that 10-20% of non-drinkers with fatty liver will also develop liver cirrhosis. Why this happens is not known. Fatty liver has become the most common cause of cirrhosis in non-drinkers.

### **NASH (Non-alcoholic steatohepatitis)**

In 1980, scientists noted changes in liver biopsies in non-alcoholics that looked very much like the liver damage seen in chronic alcoholics who continue to drink.

In addition to excess fat, there

were signs of dying liver cells (necrosis) and inflammation. They termed this condition non-alcoholic steatohepatitis, commonly referred to as NASH. (The phrase "steato" simply means fat and "hepatitis" means liver inflammation.) The presence of dying liver cells and inflammation makes NASH a more severe form of fatty liver. Patients with NASH are one step closer to developing liver cirrhosis.



**Normal Liver**



**Fatty Liver**

The progression is:

1. normal healthy liver
2. fatty liver (steatosis)
3. inflammation, cell death (steatohepatitis, NASH)
4. scar tissue (fibrosis)
4. excessive scar tissue and liver failure (cirrhosis)

### **What causes a fatty liver?**

As mentioned above, the main cause is excessive fat deposition within the liver. There are many reasons why this might happen including:

1. Alcoholism

More than 15 million people in the U.S. abuse or overuse alcohol. Almost all of them -- 90%-100% -- develop fatty livers. Fatty liver can occur after drinking moderate or large amounts of alcohol. It can even occur after a short period of heavy drinking (acute alcoholic liver disease).

2. Non-Alcoholic Fatty Liver

3. Type II diabetes, non-insulin-dependent

4. Obesity - more than 10% over ideal weight

5. High blood fats, especially high triglycerides

6. Certain drugs like prednisone, estrogen, amiodarone, tamoxifen

7. Intestinal bypass for obesity

8. Extensive surgical removal of small intestine •total intravenous nutrition (TPN)

### **Is fatty liver hereditary?**

There is no evidence that genetics or heredity (what is passed down from parent to child) plays a significant role in non-alcoholic liver disease. It is not passed from parent to child. Heredity may play a role in alcoholic liver disease. It may influence how much alcohol you consume and your likelihood of developing alcoholism and may affect how your body metabolizes alcohol.

### **What are the symptoms of a fatty liver?**

A person with a fatty liver is not necessarily ill. In fact, the most common symptom is no symptom at all. Fat accumulation is a gradual process that occurs silently over many years. Eventually, the liver enlarges and may cause a vague discomfort in the right upper abdomen. Rarely, there may be complaints of nausea.

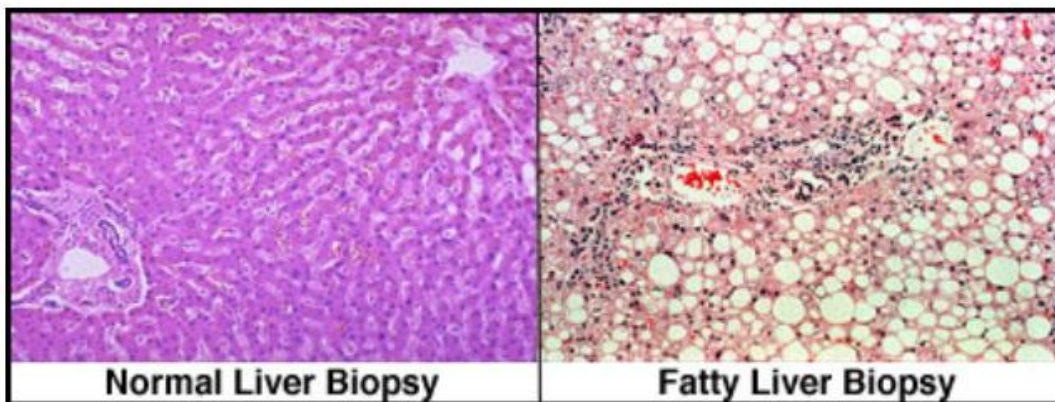
### **How is it diagnosed?**

The typical scenario is a patient who has routine blood tests performed for another reason and is told that the "liver enzyme" reading is unexpectedly elevated. Perhaps they tried to donate blood and were rejected. It may have been an insurance physical or just a routine checkup. The most common abnormality in the blood tests is two to three-fold elevation in liver enzymes - one called AST or SGOT and the other ALT or SGPT. In non-alcoholic fatty liver, other liver blood tests are usually normal. These individuals are usually referred to a specialist to investigate the underlying cause.

If there is a history of chronic alcohol abuse, the underlying cause is usually obvious. In non-drinkers, the investigation usually searches for other potential causes such as viral hepatitis, hemochromatosis (iron overload), gallstones, cancer, or fatty liver. Non-alcoholic fatty liver is suspected in any adult with unexplained elevated liver blood tests and drinks no more than 2 alcoholic drinks daily.

To investigate further, more blood tests are usually required. Imaging studies such as sonograms or CT scans help rule out cancer and gallstones. Blood test algorithms can help predict fibrosis or scar tissue. Special Fibroscans may also be helpful. They can also help determine if the liver contains excessive fat. A needle liver biopsy is sometimes performed if NASH is suspected or the diagnosis is unclear. This test allows the doctor to obtain a small piece of liver tissue to examine directly under the microscope.

Here are two liver biopsies as seen under the microscope. The one on the left is normal. The one on the right shows excessive fat cells, which appear as pale open circles.



### **How is a fatty liver treated?**

There is no proven therapy to reverse a fatty liver directly. Therefore, treatment is usually directed at the underlying cause. Alcohol must be stopped completely. Potentially offending medications may need to be changed. Uncontrolled diabetes must be better controlled. High blood fats need to be reduced. Excessive weight must be lost through a diet and exercise program. Your doctor may recommend that you receive vaccinations against hepatitis A and hepatitis B to help protect you from viruses that may cause further liver damage.

### **New treatments**

Much research is being done to develop new drugs to combat fatty liver disease. With the rise in obesity and metabolic disorders, the need for effective treatments has never been greater. Enter [semaglutide](#) (sold under the brand names Ozempic, Wegovy, and Rybelsus) is a new class of drugs called glucagon-like peptide 1 (GLP-1) receptor agonist inhibitors. It can be taken as a once-weekly injection or daily orally. Approved by the FDA in 2017, semaglutide is an antidiabetic medication used for treating type 2 diabetes and an anti-obesity medication used for long-term weight management. Recently, clinical studies have shown great promise of semaglutide in reversing fatty liver disease, offering hope to those affected.

### **How can I avoid a fatty liver?**

Do not drink excess alcohol. Alcoholism accelerates the process. Non-drinkers usually have a dormant course, but nearly half with NASH develop progressive fibrosis, and as many as one-sixth develop cirrhosis. If you drink, do not exceed 2 drinks per day regularly. Maintain a proper body weight. Eat a healthy diet - overeating and extreme dieting can result in a fatty liver. Diabetes and high blood fats should be aggressively treated.

### **Conclusion**

Fatty liver is a common silent process that can occur both in drinkers and non-drinkers. It should be suspected if liver blood tests are unexpectedly elevated, especially in those who are alcoholics, obese, diabetic, or have high blood fats. Most cases are silent, but some individuals may go on to develop cirrhosis and liver failure. It's essential for patients to consult with their healthcare providers to determine the best course of action for their specific needs. With continued research in drugs like Ozempic and patient education, the future looks bright for those battling fatty liver. For more information, the [American Liver Foundation](#).

## **Center For Digestive Health & Nutrition**

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