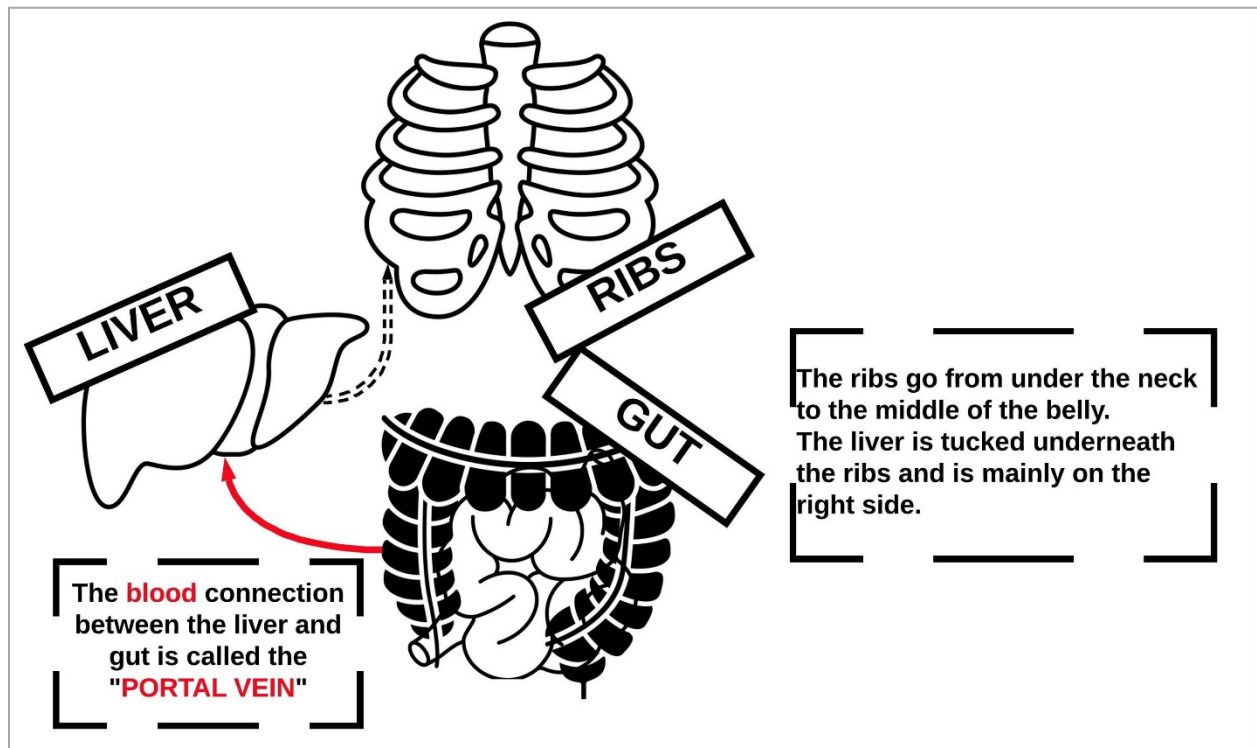


## Where is the liver?

The **liver** is located under the ribs on your right side (figure 1). It is connected to your digestive system (gut) by a blood vessel that is called the **portal vein**.

Figure 1



## What does the liver do?

The body cannot survive without the liver. The liver does many important things:

- Makes things that help the body function properly
- Cleans the blood
- Stores important things for the rest of the body to use as needed

## What are the functions of the liver?

Liver function:	Example:	What this does:
Makes things	Bile	Helps digest food
	Albumin protein	Does many things, including keeping water from leaking out of blood vessels
	Clotting proteins	Prevents bleeding after a cut
	Anti-clotting proteins	Prevents clots in blood
	Hormones (many)	<ul style="list-style-type: none"> <li>• Helps make platelets (part of blood)</li> <li>• Keeps blood pressure regular</li> <li>• Keeps bones and muscle healthy</li> <li>• Keeps iron level normal for blood making</li> </ul>
	Cholesterol	Different types of cholesterol affect the heart in different ways, both good and bad. Cholesterol is also needed to build hormones made by other organs.
	Glucose	A sugar that powers your body (your liver has to make it if you have not eaten for a few hours)
Cleans blood	Ammonia removal	The body's digestion or breakdown of protein makes a toxin (ammonia) which is toxic to your brain and muscle
	Bilirubin removal	Comes from breakdown of old red blood cells and the liver usually disposes (too much bilirubin happens when liver is not functioning properly, causing jaundice)
Stores things	Vitamins	Vitamins A, D, E, K, and B12
	Minerals	Iron, copper
	Energy	Sugar, fat

## What is cirrhosis?

**Cirrhosis** is scarring in the liver due to liver disease. Many things can cause liver disease:

- Viruses - like hepatitis B or C
- Toxins like alcohol or a buildup of liver fat that is often associated with diabetes or being overweight.
- Something inherited through your genes or caused by the body's immune system hurting the liver cells.

Basically, all liver diseases cause inflammation. **Inflammation** is redness, swelling, pain or heat. It is a protective reaction to injury, disease or irritation. It's like if you burn your skin and it becomes red (**inflamed**). When the redness fades, you are left with a scar. In the liver, the same thing happens. Inflamed liver cells get replaced by scar. This is called **fibrosis**. When fibrosis becomes severe, cirrhosis develops. A liver with cirrhosis is hard, bumpy, and often shrinks.

## What happens when you have cirrhosis?

### Compensated cirrhosis

The earliest stage of cirrhosis is called **compensated cirrhosis**. At this stage you may have no symptoms. In fact, a person may live many years with cirrhosis without knowing it. If your liver disease is treated, the cirrhosis could stay 'compensated' for many years. But if nothing is done about the cause of cirrhosis the liver's condition may worsen. For example, if you continue to drink alcohol, or if hepatitis or other causes of cirrhosis are not treated. Liver function can improve if the cause of liver disease is treated, such as stopping alcohol, or treating hepatitis. The liver can regenerate but recovery takes time.

## Symptoms of cirrhosis

Symptoms of cirrhosis may include things such as:

- Severe itch
- Muscle cramps
- Sleep problems
- Falls
- Sex trouble and/or dysfunction

As cirrhosis progresses, more symptoms may develop. These include:

- Low energy
- Poor appetite
- Weight loss
- Loss of muscle

Cirrhosis does two things:

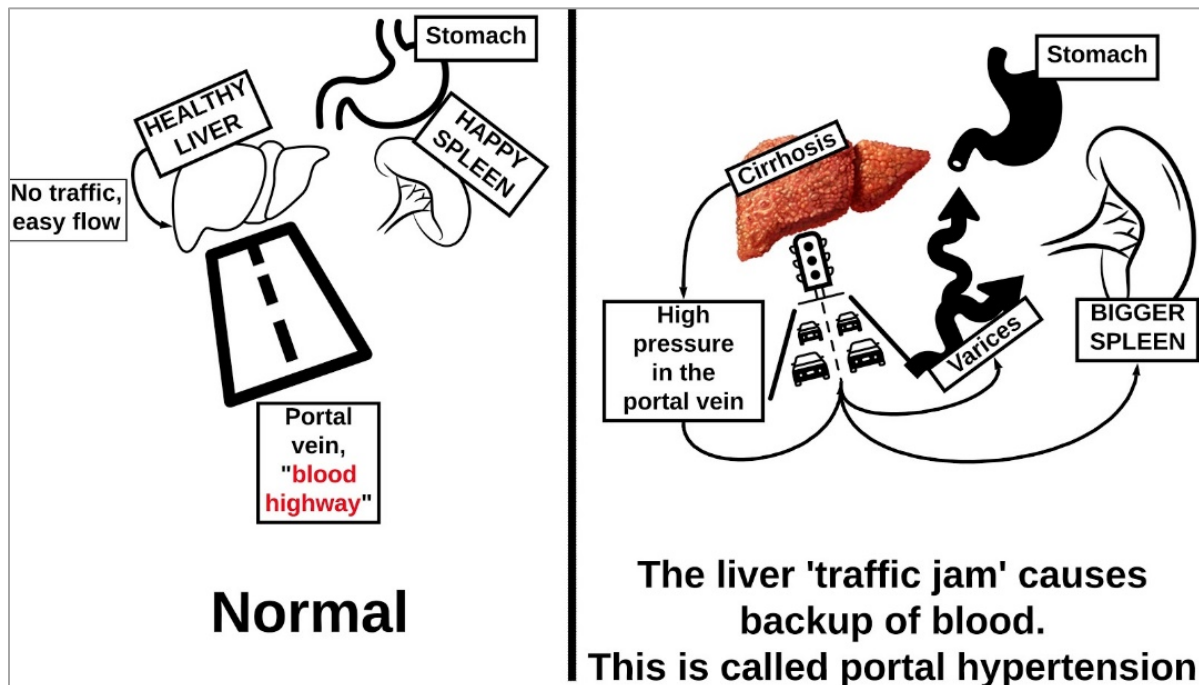
1. Decreases the liver's ability to do the things it needs to do.
2. Changes the way the blood flows through the body.

All blood flows from your gut to your liver. Blood normally flows through the liver like an open road, but cirrhosis causes a traffic jam for the blood flow (see figure 2). As blood flows more slowly, it causes a buildup of pressure in the **portal vein**, the connection between the gut and the liver. This is called **portal hypertension**. The result is a backup of blood that causes many problems:

- It can reroute blood through veins called “**varices**”. Some varices can be found in the tube that carries food from your mouth to your stomach (the esophagus) or in your stomach itself. Sometimes varices bleed, we are going to talk more about this later.
- Causes the spleen to grow big as it fills with blood. The spleen takes on so much blood, it ends up soaking up things like platelets, lowering the amount of platelets that can be found on blood tests.

- If blood is being routed away from the liver, it means that blood is not being cleaned by the liver. This causes toxins to flow freely in the blood.
- By directing blood away from the liver, it causes less blood to go to the heart. This can stress the body, particularly the kidneys.
- Increased pressure in the portal vein also causes fluid to build up in the abdomen (ascites) (pronounced “a-sigh-tees”) causing the belly to swell.

Figure 2



There may come a point when the stage of cirrhosis becomes “**decompensated cirrhosis.**” At this stage you can also develop the following serious problems:

- **Bleeding varices** - Internal bleeding from swollen blood vessels in the esophagus
- **Ascites** - a buildup of fluid in the belly
- **Encephalopathy** (pronounced “en-sef-a-lop-a thee”) - confusion from the buildup of toxins in the blood
- **Jaundice** - yellowing of the eyes and skin

Sometimes even in this late stage, if the cause is removed (such as alcohol), the liver can slowly heal. Other times, the only way to cure cirrhosis is to replace the sick liver with a healthy liver – this is called liver transplantation.

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