



# HEPATITIS C LABORATORY TESTS

Several laboratory (blood) tests are used for hepatitis C (HCV). These include liver function tests, HCV viral load, genotype tests, the IL28B genetic test, and blood clotting tests.

## LIVER FUNCTION TESTS

The lab tests called "liver function tests" do not measure how the liver functions. Instead, they measure the levels of enzymes found in the liver, heart, and muscles. Enzymes are proteins related to chemical reactions in living organisms.

High enzyme levels can indicate liver damage caused by medications, heavy alcohol intake, viral hepatitis, toxic fumes or recreational drug use. Liver enzyme test results can be difficult to understand. People with serious liver damage sometimes have normal liver enzyme levels.

Different patterns of these enzymes – when some are elevated and others are normal – are part of the information your health care provider uses to monitor liver health.

Liver function tests include:

- **Albumin.** Serum albumin is the most common protein in the blood. It is essential for proper distribution of body fluids. Albumin helps move many small molecules around the body. Because it is made by the liver, decreased serum albumin may be a sign of liver disease, kidney disease, or malnutrition.
- **ALT** (alanine aminotransferase). It is used together with the AST test to monitor liver health. Sometimes the ALT test is used to see if treatment is improving liver function. This test used to be called serum glutamate pyruvate transaminase or SGPT.
- **AST** (aspartate aminotransferase). It is usually used with the ALT test to monitor liver health. This test used to be called serum glutamic-oxaloacetic transaminase or SGOT.
- **Bilirubin** is a yellow fluid produced when red blood cells break down. High levels can cause jaundice, a condition where the whites of the eyes and sometimes the skin turn yellow. High levels of bilirubin can indicate liver disease but might also be unimportant if caused by the

antiretroviral drugs indinavir (Crixivan) and atazanavir (Reyataz).

- **Alkaline Phosphatase.** Damaged liver cells release increased amounts of alkaline phosphatase into the blood. High levels can also indicate bone disease.
- **Ferritin** is a protein that binds to iron. High levels of ferritin or of iron in the blood can indicate an accumulation of iron (hemochromatosis) or other liver disease.
- **GGT** (gamma glutamyl transpeptidase) results can show whether other abnormal test results are due to liver problems or bone problems. AST and ALT are not increased, then a GGT test may be ordered to help determine whether the source of high alkaline phosphatase is a bone disorder or liver disease. GGT levels increase with heavy alcohol intake.
- **LDH** (lactic dehydrogenase) is an enzyme found in many body tissues. Elevated levels usually indicate some type of tissue damage. The ALT, AST, and Alkaline Phosphatase tests help determine which organs are involved.

## VIRAL LOAD TESTS

The viral load test counts how many HCV particles are in your blood. This is similar to the HIV viral load test (see fact sheet 125) but there are some important differences:

- HCV viral loads are measured in International Units (IUs). One International Unit is approximately 3 copies of HCV.
- HCV viral loads are much higher than HIV viral loads. HCV viral load can be several million. Less than about 400,000 to 600,000 IUs per milliliter (IU/mL) is considered low.
- The HIV viral load is used to predict disease progression. However, this is not the case with HCV viral load. Higher hepatitis viral loads do not indicate faster disease progression. However, they predict response to HCV treatment: the lower the viral load, the more likely HCV treatment is to work.
- The viral load is used to see if HCV treatment is working, and how fast the viral load becomes undetectable. When the viral load becomes undetectable during HCV treatment and stays that way for 6 months after treatment is stopped, it is called a Sustained Virologic Response or SVR.

This usually persists for 10 years or more, and is considered a cure.

## HCV GENOTYPE TESTS

There are more than six different types of HCV, identified by a number. There are also subtypes, which are given a letter. For example, there are genotypes 1a and 1b. They are identified by analyzing a blood sample to determine the genetic code of the virus. The most common type of HCV in North America is genotype 1. Genotypes 2 and 3 are much less common in North America.

The HCV genotypes and subtypes give health care providers important information for choosing treatments. For example, genotypes 2 and 3 are the easiest to treat with interferon.

## IL28B GENETIC TEST

Researchers have recently discovered a link between a patient's genetic code and their response to standard treatment. The genetic code of a large group of patients with HCV genotype 1 was analyzed. Patients with a particular variety of the IL28B gene were more than twice as likely to respond well to the standard HCV treatment of interferon and ribavirin. The IL28B test may become an important tool to guide HCV treatment.

## BLOOD CLOTTING TESTS

Some tests might be used if you are going to have a liver biopsy (see fact sheet 672.) With a biopsy, there is a risk of bleeding. Blood clotting tests measure how quickly the blood forms clots, which stop bleeding. Abnormal values on these tests may indicate advanced liver disease.

- **PT/INR** or **Prothrombin Time and International Normalized Ratio** is the most common clotting test. A small sample of blood is tested in the laboratory to see how long it takes for a clot to form.
- **Platelet count** indicates the number of platelets in the blood. People with advanced liver disease may have fewer platelets and may be more likely to bleed after a liver biopsy.

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