

Hepatitis Basics

Keeping
Your Liver
Healthy



Hepatitis B Antigen and Antibody Tests

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There are various blood tests used to identify and manage acute and chronic hepatitis B virus (HBV) infection. The tests are called HBV antibody and HBV antigen tests. This fact sheet will discuss these tests. It is important to know these terms because they are like pieces to a puzzle that will indicate whether someone has an acute infection, a resolved infection (cleared out from the body), immunity to hepatitis B due to vaccination, or chronic infection. Another blood test used measures HBV DNA or viral load, which is discussed in another fact sheet (http://www.hbvadvocate.org/hepatitis/factsheets_pdf/HBV%20DNA.pdf).

HBV Antigens

HBV has three antigens – surface antigen, “e” antigen, and core antigen:

- **Surface antigen or HBsAg** is the first antigen to show up on a test when someone becomes initially infected with HBV. If someone has the surface antigen they are able to infect others. When the antigen is in the body for longer than 6 months then a person has chronic HBV infection.

- **“e” antigen or HBeAg** is the second antigen that appears as a result of the virus replicating in the body. If someone has the “e” antigen it means that HBV is actively infecting and replicating in liver cells. The presence of the “e” antigen also means that the person’s blood and bodily fluids are very infectious.
- **Core antigen or HBcAg** is not found by taking a blood test. It is only found when liver tissue is examined under a microscope.

HBV Antibodies

HBV has three antibodies – “e” antibody, core antibody, and surface antibody:

- **“e” antibody, also written as anti-HBe or HBeAb**, is produced when the body responds to infection by producing antibodies to the “e” antigen. Generally, when the “e” antibody is found it means that the body is fighting HBV, which usually means that there are low levels of HBV infecting and damaging liver cells.

What is an antigen?

The main purpose of a virus is to replicate or make more copies of itself. This is how viruses survive. Antigens are certain proteins that HBV produces when it replicates.

What is an antibody?

When someone becomes infected with a virus, the body responds by producing certain proteins, called antibodies, that attach themselves to the viral invader’s antigens in an effort to control or fight an infection. In some cases antibodies can protect someone from getting re-infected with the same virus – this is called immunity.



Antigen and Antibody Tests

- **Core antibody, also written as anti-HBc or HBcAb**, is the first antibody to appear in the blood (as soon as a few weeks after initial infection). The core antibody can be found in anyone who has ever been infected with the hepatitis B virus.
- **Surface antibody, also written as anti-HBsAg or HBsAb**, is produced to fight HBV. If the body produces large enough quantities, it can clear HBV out of the body.

Putting the pieces together:

Acute infection:

- HBV surface antigen or HBsAg is found in the blood – it can be identified within 4 weeks but it might take as long as 9 weeks to appear.
- HBV “e” antigen or HBeAg is also found in the blood and this means that the virus is replicating in the liver and a person is considered infectious.
- HBV core antibody or HBcAb is found in the blood.
- HBV surface antibody or HBsAb is **NOT** found in the blood.

Resolved or cleared infection:

- HBV core antibody or HBcAb is found in the blood.

- HBV surface antibody or HBsAb is found in the blood.
- HBV surface antigen is **NOT** found in the blood.

Chronic Infection:

- HBV surface antigen or HBsAg is found in the blood (for more than 6 months).
- HBV core antibody or HBcAb is found in the blood.
- HBV core antigen is **NOT** found in the blood.
- HBV surface antibody or HBsAb is **NOT** found in the blood.

Protected by HBV vaccination:

- HBV surface antibody or HBsAb is found in the blood.
- HBV core antibody or HBcAb is **NOT** found in the blood.
- HBV surface antigen or HBsAg is **NOT** found in the blood.

HBeAg-negative hepatitis B:

- HBV “e” antigen or HBeAg is **NOT** found in the blood.
- HBV surface antigen or HBsAg is found in the blood.
- HBV core antibody or HBcAb is present in the blood.

- HBV surface antibody or HBsAb is **NOT** present in the blood.

Note: The “e” antibody may or may not be present in the blood.

If a person has HBeAg-negative hepatitis B, it usually means that the person has been infected with hepatitis B for a long period of time and that the virus has mutated and developed proteins that replace the role of the “e” antigen in replication process. An HBV DNA or viral load test will help to determine how much HBV is infecting and possibly damaging the liver.

Occult Hepatitis B Infection:

Sometimes, a person will have HBV DNA in their bloodstream, but test negative for the hepatitis B surface antigen (HBsAg) and other antigens. This is called a hidden or “occult” infection.

- This can happen when there are co-existing hepatitis B and C infections
- And it can occur when there are mutations in the surface antigen.
- People with occult HBV infections can have liver damage and should be monitored regularly and treated if liver damage occurs.



The information in this fact sheet is designed to help you understand and manage HBV and is not intended as medical advice. All persons with HBV should consult a medical practitioner for diagnosis and treatment of HBV.

For more information about the hepatitis B, visit the following websites.
Hepatitis B Foundation: www.hepb.org • HIVandHepatitis.com

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