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Antibody Tests

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What are they?

Antibodies are part of the body's immune system. They are immunoglobulin proteins that help protect us against microscopic invaders such as viruses, bacteria, chemicals, or toxins.

There are five different classes of immunoglobulins (IgM, IgG, IgE, IgA, and IgD). The three most frequently measured are IgM antibodies, which are produced early in an infection; IgG antibodies, which are created later and can remain in the bloodstream for decades; and IgE antibodies, which are primarily associated with allergies.

Each antibody produced is unique. It is created to recognize a specific chemical structure on the invader cell or particle. This target structure is called an antigen. Once the antibody attaches to the invader, it serves as a flag for the rest of the immune system, making it a target for destruction..

The first time someone is exposed to a particular antigen it may take the immune system up to two weeks to make an antibody blueprint and to produce enough of that specific antibody (primarily IgM at this point) to fight the initial infection. After the immediate threat has passed, the body saves the blueprint along with a small supply of the antibody (a mixture of IgM and IgG). This supply, which helps the immune system "remember," can be measured in the blood (or sometimes in the CSF - cerebral spinal fluid) as an IgG antibody titer. The next time the body is exposed to the same antigen it will respond much more strongly and quickly, to provide primarily IgG antibody protection.

Vaccines are useful because they eliminate the normal time delay in initial antibody production. Using either a weakened microorganism, or a protein that the body recognizes as the same antigen, vaccines provide a "safe" initial exposure to the microorganisms that cause common diseases in humans. Vaccines provoke an immune response to create antibodies against these diseases and to stockpile enough of them to provide long-term protection (termed immunity). Additional booster vaccinations are sometimes used to raise the concentration of antibodies in the blood to a level where they are considered to be sufficiently protective. Since antibody concentrations tend to fall over time, boosters may be given several years to decades later to maintain protection. In some infections, antibodies do not destroy the infection, such as HIV or hepatitis C.

Appropriate antibody creation and targeting depends on the body's ability to distinguish between itself and "others" and to correctly identify threats. Sometimes a person's immune system may build IgE antibodies against foreign substances that do not usually cause a response in most people, leading to food, respiratory, or animal allergies. In addition, their system may react to antigens in donated blood that is given during a blood

transfusion, or to antigens on transplanted body organs resulting in rejection.

Normally, a person's immune system learns to identify and ignore the antigens on their own organs, tissues, and cells but sometimes it may mistakenly identify a part of its own body as foreign and create autoantibodies. This autoimmune response can affect a single organ (like the thyroid) or be systemic and it can lead to an autoimmune disorder.

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This article last reviewed on April 8, 2005.

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Why are they done?
The main reasons that antibody concentrations are measured is to:

- Document exposure to an infectious or foreign agent
- Evaluate protection level (immune status) against a particular microorganism
- Diagnose an autoimmune condition
- Diagnose the reason for a transfusion reaction or a rejection of a transplanted organ
- Diagnose an allergy
- Monitor the course of an infection or autoimmune process

There is not a single "umbrella" test that will determine all of your various antibody levels; antibodies are as individual as the diseases they target. Antibody tests are ordered singly or in combinations, depending on your symptoms, and on what information your doctor is trying to gather. If he suspects a current infection, two samples (called acute and convalescent samples) may be taken (a few weeks apart) to look for rising antibody levels.

Testing may involve the measurement of individual antibody IgM and/or IgG concentrations. In the case of allergies, individual IgE antibody levels are measured (such as an IgE test for a peanut allergy or a ragweed allergy) to determine whether or not you are allergic to that substance.

There really isn't a "normal" antibody concentration. People produce antibodies at different rates, and may store them at variable levels for decades. The result that is reported out and its interpretation by your doctor depends on the particular antibody being tested and your specific circumstances. Results may be reported as "detected" or "not-detected" in the case of antibodies causing chronic infections (such as HIV), where any amount of antibody is considered meaningful. They may be reported out as "greater than" a particular cutoff level if immunity is being checked (above that level - which varies depending on the microorganism involved - a person is usually considered to be protected), or as "immune" or "non-immune". Or they may be reported out as a number, a concentration that may indicate a current or previous infection. High amounts of IgM and low amounts of IgG indicate recent exposure to infection whereas low IgM and high IgG indicate exposure some time ago.

Antibody titers are sometimes used to determine how significant a positive antibody level is. These titers involve increasing (serial) dilutions of the sample being tested. The highest dilution that is still positive is reported out as a "1 to dilution rate" ratio (for instance 1:40 or 1:320, etc.). This is still used to report out some antibody levels, especially in the case of

autoimmune conditions. ["Antibody titer" is a term that is also sometimes used generically to refer to antibody concentrations.]

High levels of individual IgE antibodies may help diagnose an allergy but they do not necessarily correlate to the severity of the symptoms the patient may be experiencing.

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