

VACCINES AND BIOLOGICS

WHAT YOU SHOULD KNOW

Individuals are considered to be immune compromised if some part of their immune system does not function as expected. In some cases, such as during treatment for cancer, the period may be relatively short, but in other cases, the condition can be lifelong. Further, because of the generality of this definition, it covers a wide range of people who may have very different health conditions. People can be immune compromised because they lack parts of their immune system, such as a spleen. Or, they take medicines that dampen immune responses, such as to prevent rejection following an organ transplant. Or, they take medications, called *biologics*. Biologics are drugs that target specific parts of the immune system, for example to control certain autoimmune or inflammatory diseases. Often when people are taking biologics, questions arise about whether or not they can get vaccinated.

WHAT ARE BIOLOGICS?

Biologics are a group of medications that target a specific part of the immune system to treat certain diseases, such as rheumatoid arthritis or inflammatory bowel disease, while leaving the rest of the immune system intact. Biologics can be made from living organisms, such as plants and animals, or in the laboratory, such as synthetic monoclonal antibodies (mAbs) and interleukins. Biologics have become popular because many previous treatments suppressed the whole immune system, leaving patients more vulnerable to infections.

HOW DO BIOLOGICS WORK?

Biologics target specific parts of the immune system in a “lock and key” manner by matching their shape to that of proteins on the surface of the targeted type of cell. These treatments have been important in controlling conditions caused when cells of the immune system attack a person’s own body, such as lupus, or respond with too much vigor, such as rheumatoid arthritis. By targeting cells that are responsible for a disease, biologics can diminish the impact these cells have; however, because different cells cause different diseases, many biologics exist. Groups of biologics target B cells (e.g., rituximab, belimumab), T cells (e.g., abatacept, alefacept, efalizumab) and cytokines (e.g., adalimumab, anakinra, tocilizumab, ustekinumab).

CAN THOSE AROUND PATIENTS RECEIVING BIOLOGICS BE VACCINATED?

In general, it is recommended that people close to patients that are immune compromised receive all vaccinations according to the recommended schedule. Getting vaccinated not only protects the person receiving the vaccine, but it also helps protect the immune-compromised patient, who may be more susceptible to an infection. Since inactivated vaccines do not replicate, they are safe to give to close contacts of patients receiving biologics. While live weakened vaccines replicate in the vaccinated person to induce a protective immune response, the virus does not replicate at high enough levels to spread to others. However, because babies who get rotavirus vaccine can have the virus in their feces for up to a month after vaccination, it is recommended that people carefully wash their hands after changing the diaper of an infant who recently got that vaccine.



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CAN I RECEIVE VACCINES IF I AM TAKING BIOLOGICS?

Many vaccines are safe to give to individuals taking biologics. However, because of the wide array of medical conditions and medications that can be involved and because people who are immune compromised may be at greater risk from vaccine-preventable diseases, individuals should talk to their healthcare provider to ensure they are safely kept up to date on vaccines. Often, inactivated, or killed, vaccines, as well as vaccines that only contain parts of an organism, are safe because they cannot cause disease. However, their effectiveness may be reduced, depending on how the biologic a person takes affects the immune system. Because weakened live viral vaccines reproduce to generate immunity, someone with compromised immunity may experience prolonged viral replication; therefore, the risks and benefits need to be carefully assessed. In some cases, these vaccines may not be recommended while a person is taking biologics. In general, it is recommended that people are up to date with their vaccinations before beginning treatment with biologics whenever possible.

Some guidelines related to current research on specific vaccines are offered below. However, individual recommendations can change depending on a person's complete medical history, current use of biologics, and other factors, so it is important to discuss the risks and benefits of vaccinations with a healthcare provider familiar with each individual's medical situation.

Inactivated vaccines

General information related to inactivated vaccines

Inactivated vaccines should be administered two weeks before starting biologics, when possible. Also, treatment should not be interrupted to give vaccines.

Influenza vaccine

The immune response to influenza vaccination may be lower in people being treated with biologics that target T cells or a cytokine called tumor necrosis factor alpha (TNF-alpha).

People taking biologics that target B cells may develop lower levels of antibodies and, therefore, less protection following influenza vaccination. If possible, people should get vaccinated against influenza four weeks before starting B-cell-targeted therapy.

While there is a live weakened influenza vaccine, it is recommended that patients who are immune compromised receive the killed influenza vaccine given as a shot.

Pneumococcal vaccine

People being treated with biologics that target B cells or TNF-alpha may have lower immune responses to the pneumococcal polysaccharide vaccine.

Some versions of pneumococcal vaccine, called conjugate pneumococcal vaccine, rely on helper T cells to generate protective antibody responses, so biologics that target T cells or B cells, as well as those that target TNF-alpha, may cause lower immune responses compared with those of individuals not taking biologics.

Hepatitis B vaccine

People taking biologics that target TNF-alpha may have dramatically reduced immune responses to hepatitis B vaccination, compared to those not on these medications.

Hepatitis A vaccine

People taking biologics that target TNF-alpha may have dramatically reduced immune responses to hepatitis A vaccination, compared to those not on these medications.

Tetanus-containing vaccine

Because the immune response to tetanus vaccine can be significantly lower, people who took biologics that target B cells in the six months prior to vaccination should receive a mixture of tetanus antibodies, called immunoglobulin, at the time of vaccination.

Tick-borne encephalitis vaccine

Although a vaccine against tick-borne encephalitis, or TBE, is not used in the U.S., some other countries offer a vaccine against this disease. Studies have shown that people taking biologics targeted to TNF-alpha have lower antibody responses, compared with those who are not taking this medication.

Weakened live viral vaccines

General information related to weakened live viral vaccines

When live weakened viral vaccines are administered, the start of biologics should be delayed until the vaccine virus is done replicating. The length of time that the vaccine virus replicates varies depending on the vaccine. For example, the measles vaccine virus may replicate for up to two weeks after vaccination. However, rotavirus vaccine virus can replicate for up to four weeks after vaccination. For this reason, it is important to talk to a healthcare provider to be sure that the timing of vaccination is safe for use with biologics.

Yellow fever vaccine

People being treated with biologics are currently not recommended to get this vaccine due to a lack of safety data.

ADDITIONAL READING

Centers for Disease Control and Prevention. Epidemiology and prevention of vaccine-preventable diseases, 13th Ed. Washington D.C.: Public Health Foundation, 2015; 20-22.

Furer, CR et al. (2019). Efficacy, immunogenicity and safety of vaccination in adult patients with autoimmune inflammatory rheumatic diseases: a systematic literature review for the 2019 update of EULAR recommendations. *RMD open*, 5(2), e001035.

Papp, K A. et al. (2019). Vaccination guidelines for patients with immune-mediated disorders on immunosuppressive therapies. *J Cutan Med Surg*, 23(1), 50-74.

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