

Q and A: Immunotherapy and breast cancer

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DEAR MAYO CLINIC: I was recently diagnosed with breast cancer. The doctor mentioned using immunotherapy. What is immunotherapy, and how

does it differ from chemotherapy, which I've traditionally heard about for treating cancer?

ANSWER: Immunotherapy is a newer therapy in the current treatment landscape for breast cancer. It also has been used in treating other cancers, including [lung cancer](#), melanoma and [kidney cancer](#). While chemotherapy directly targets [cells](#) that grow and divide quickly, such as cancer cells, immunotherapy harnesses the body's immune system to help fight cancer.

To understand how immunotherapy works, you must understand the role of the immune system. The immune system is designed to protect the body against any perceived threats, including cancer cells. The immune system is a complex network of cells that is trained to recognize proteins on the surface of other cells as "self," or a part of your body, or as "nonself," or not a part of your body and possibly harmful.

This mechanism is designed to prevent neoplastic cells—cells that have abnormal tissue growth—from developing into tumors by destroying them. However, cancer cells can outsmart these immune cells. One way they do this is by manipulating the immune mechanism to turn off the body's response. Essentially, cancer cells disable the immune checkpoints, thereby preventing attack and hindering destruction of cancer cells.

A specific type of immunotherapy was developed to prevent this. Known as checkpoint inhibitors, or PD-1/PD-L1 pathway inhibitors, this treatment aims to prevent the deactivation and increase the body's anti-tumor immune response.

At this time, immunotherapy is approved primarily for patients with metastatic or locally advanced triple-negative breast cancer, which is an aggressive subtype of breast cancer, representing 10%-15% of breast

cancer, with limited treatment options other than chemotherapy.

Two immunotherapy agents have been approved by the Food and Drug Administration for this subtype of breast cancer: atezolizumab (PD-L1 inhibitor) and pembrolizumab (PD-1 inhibitor), in combination with chemotherapy. To receive immunotherapy at this time, the patient's cancer tissue must express PD-L1, which is detected by a test, or have a high tumor mutation burden, which means a high number of gene mutations in cancer tissue.

My patients often ask about side effects of immunotherapy. Immune-related side effects often occur due to the immune system being "incited." Typical side effects can include fatigue, chills, body aches, injection site pain, infusion-related reaction, headache, flu-like symptoms and gastrointestinal symptoms. Immunotherapy also can affect liver function tests; cause respiratory symptoms, such as shortness of breath, cough and fever; cause symptoms of overactive or underactive thyroid gland, or adrenal gland; and rash. Most of these side effects are mild to moderate and reversible, if detected early and treated in a timely manner.

When patients develop side effects, depending on the severity of the side effects, the immunotherapy drug may need to be withheld, and sometimes oral steroids may need to be given to reduce the immune response and counteract side effects. In severe cases, other immunosuppressant medications may be used.

Researchers also are exploring the benefits of immunotherapy in early stage breast cancer, such as in the preoperative setting in combination with chemotherapy for [triple-negative breast cancer](#). The use of immunotherapy for other subtypes of breast cancer, including hormone-receptor-positive and HER2-positive breast cancer, also is being evaluated. Several clinical trials are underway to investigate the

combination of immunotherapy with targeted agents across breast cancer subtypes.

A cancer vaccine is another type of immunotherapy that is being developed and tested for breast cancer. Cancer vaccines help train the immune system to see and "memorize" antigens, or proteins, found on the surface of [cancer cells](#), so that the [immune system](#) can fight these antigens if encountered in the future. These vaccines are being studied in different [breast cancer](#) settings: treatment of current cancer; prevention of cancer recurrence; or to decrease the risk of [cancer](#) spreading to another part of the body, or metastasis.

The use of immunotherapy to treat patients with certain [breast](#) cancers is promising. Immunotherapy can be a [valuable tool](#) for many patients, but I encourage you to speak with your health care provider about the pros and cons for your situation. You also can learn more about [clinical trials](#) using [immunotherapy](#) from Mayo Clinic's website.

— Dr. Pooja Advani, Hematology/Oncology, Mayo Clinic, Jacksonville, Florida

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