Cancer Immunotherapy FAQs

What is immunotherapy?

Immunotherapy is a cancer treatment that uses a patient's own immune system to recognize and destroy cancer cells. It's also called biologic therapy or biotherapy.

Is it new treatment?

As far back as the late 1800s, doctors suspected that the immune system had an effect on specific cancers. But the technique was soon overshadowed by radiation and, later, what emerged as chemotherapy. As researchers continued learning about the immune system and in the last few decades, immunotherapy has proven useful in treating several types of cancer. Critical progress has been made in this field in recent years. Newer treatments that seem to work better than conventional therapies are now being tested and, ultimately, they may have a greater impact on the outlook for cancer patients.

What does the immune system do?

The immune system is a collection of organs, special cells, and molecules that help protect patients from some infections and diseases**.** How the immune system responds to antigens, or foreign bodies, is a highly coordinated process that uses many types of cells. Most tumors are thought to express such antigens.

How does immunotherapy work with the immune system?

Immunotherapy either boosts the patient's own immune system or uses man-made versions of the normal parts of the immune system. Active immunotherapies stimulate the body's own immune system to fight the disease. Passive immunotherapies instead use immune system components generated in the laboratory.

The key cells of the immune system are lymphocytes, a type of white blood cell. Several types of lymphocytes work together to attack cancer cells:

- B cells (B lymphocytes) – B cells are made in the bone marrow. They move to the lymph nodes, which are bean-sized collections of immune system cells found throughout the body. B cells play an important role in immune defenses by making antibodies, which are large, sticky proteins with a high degree of specificity. Each antibody is made to attach to a certain antigen, or foreign body, and help eliminate any cells that have the antigen.
- T cells (T lymphocytes) – T cells gather in the lymph nodes and spleen, where they work together with other immune system cells. Special proteins on their surfaces allow T cells to recognize and react to parasites, cancer cells, and cells infected by viruses, much like antibodies do. The three types of T cells have different functions: Killer T cells destroy unwanted cells in the body. Helper T cells release substances that help B cells and killer T cells work better. Regulatory, or suppressor, T cells help keep the immune system in check so it does not overreact and attack other healthy parts of the body.
- Natural killer (NK) cells – These attach to cancer cells and release substances that split the cells open, killing them. They then look for other cancer cells to attack.

Other immune system cells that help fight cancer include antigen-presenting cells (APCs). APCs work by taking part of the foreign cell and carrying it to where other immune cells can "see" it, which helps stimulate the immune reaction. The two main groups of antigen-presenting cells are macrophages and dendritic cells.

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Is there more than one type of immunotherapy?

Yes. They include monoclonal antibodies, used either alone or combined with toxins, that target cancer cells (both are regarded as passive immunotherapies). Other types include cancer vaccines and other active immunotherapies, and non-specific immunotherapies and adjuvants, which are immune stimulants.

Which types of cancers are now being treated by immunotherapy?

Currently, monoclonal antibodies are the most widely used form of cancer immunotherapy. They have been approved for use in treating several types of leukemia and lymphoma, as well as some types of breast, colorectal, head and neck cancers. Cytokines are a second type of immunotherapy, which are hormone-like molecules that regulate immune cells. Interferon and interleukin-2 are two cytokines used commonly to treat patients with melanoma and kidney cancer.

Cancer vaccines have been studied for several decades, but until recently, advances in this field have been slower than for other forms of immunotherapy. For example, new vaccines against the human papilloma virus (HPV) help prevent women from getting cervical, vaginal, and vulvar cancer. Vaccines against hepatitis B virus (HBV) may lower some people's risk of getting liver cancer. These vaccines don't target cancer cells; they target the viruses that can cause these cancers.

What does the future hold?

Immunotherapy research has made great strides in the past decade. It is widely expected that many future advances against cancer will come from this field.

Sources: The American Cancer Society and the International Society for Biological Therapy of Cancer (iSBTc)