TEXAS ONCOLOGY
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Immunotherapy

Immunotherapy uses the body's own defense mechanisms and immune system to fight cancer, infection, and other diseases at the cellular level. This treatment is rapidly evolving, with many research studies and new treatment options in progress.

How Immunotherapy Works

The immune system normally fights infection and disease. Biologic agents that mimic the body's signals to control cell growth or issue an immune response can be grown in a laboratory and given to patients to stimulate a response to cancer cells. Immunotherapy, depending on the type, helps to stop or slow cancer cell growth by boosting the immune system's ability to destroy cancer cells or marking cancer cells to make them easier for the immune system to target.

Types of Immunotherapies

Most immunotherapy treatments fall into five primary categories.

- **Monoclonal Antibodies**
  - Cancer cells have proteins on the surface of the cell called antigens. In the lab, a monoclonal antibody can be created that directly attaches to a certain antigen, which may be specific to that tumor. This attachment can do many things to disrupt the ability of the cancer cell to grow or spread, or it may make the cell more vulnerable to attack by the immune system.
  - Immune checkpoint inhibitors are a type of monoclonal antibody that disrupts the cancer cell defense against the immune system and, in many cases, allows the immune system to destroy these cancer cells.
- **T-cell Transfer Therapy**
  - Tumor-infiltrating lymphocyte (TIL) therapy differs from monoclonal antibodies in that the lymphocytes are directly harvested from the patient and multiplied in a lab. These cells can be modified, augmented, and then administered to the patient as a form of immune cellular therapy against the cancer.
  - Chimeric antigen cell therapy (CAR-T) is a personalized therapy in which a patient's own immune cells are removed from the patient's body, genetically reprogrammed, then infused back into the patient to identify and attack their cancer as a one-time treatment.
- **Cancer Vaccines**
  - Most vaccines are given to prevent a disease (including some viruses that can cause cancer), but cancer treatment vaccines are given after a person has been diagnosed with cancer to help increase the body's ability to fight tumor growth, limit the spread of cancer cells, and reduce the risk of recurrence.
  - Vaccines are another form of immunotherapy, and many are in development. Peptide vaccines are based on stimulating an immune response against a protein commonly present on certain cancer cells. Dendritic cell vaccines are a type of cell-based therapy and require obtaining the cells that present proteins to the immune system (called dendritic cells) by filtering them from the patient's blood. These extracted dendritic cells are activated and programmed to recognize cancer cells based on common cancer proteins, then returned to the patient.
  - Vaccines may be personalized, using tissue from a person's individual cancer combined with substances in a lab to develop a vaccine tailored to their immune system.
- **Non-Specific Immunotherapies (Cytokine Therapy)**
  - Some immunotherapy drugs and proteins don't target cancer cells specifically, but instead boost the immune system, leading it to a better response to cancer cells. Cytokine therapy harnesses cytokines, which are small signaling proteins that play an important role in the body's immune response. The cytokines (interleukins and interferons) are capable of activating a broad array of immune cells with the potential benefit of fighting infections or cancer.
  - Cytokines are given most often in combination with other treatments such as chemotherapy or radiation

therapy, but they can be administered as the primary treatment.

- **T-Cell Promoters**
    - Some immunotherapy drugs restore or promote T-cell activity by blocking the defenses of tumor cells. These include PD-1 and PD-L1 type inhibitors and ipilimumab, which uses a different mechanism, but enhances tumor killing activity of T-cells.

Treatment with Immunotherapy

Immunotherapy is used for many types of cancer. It may be used alone or in combination with other types of cancer treatments such as chemotherapy, radiation therapy, or surgery. It can be given as an IV, oral, topical, or intravesical (directly into the bladder) application.

About Texas Oncology

With more than 530 physicians and 280 locations, Texas Oncology is an independent private practice, a member of The US Oncology Network, that sees more than 71,000 new cancer patients each year. Founded in 1986, Texas Oncology provides comprehensive, multidisciplinary care, and includes Texas Center for Proton Therapy, Texas Breast Specialists, Texas Colon & Rectal Specialists, Texas Oncology Surgical Specialists, Texas Urology Specialists and Texas Infusion and Imaging Center. Texas Oncology's robust community-based clinical trials and research program has contributed to the development of more than 100 FDA-approved cancer therapies. Learn more at TexasOncology.com.

Sources: American Cancer Society, American Society for Clinical Oncology, Cancer Research Institute, National Cancer Institute, and National Library of Medicine

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