

Cancer Immunotherapy

Backgrounder

Cancer immunotherapy is a new class of investigational treatments (sometimes referred to as therapeutic cancer vaccines) designed to stimulate the immune system, the body's natural mechanism for fighting disease, in the hope that it may overcome many of the limitations of traditional cancer therapies such as surgery, radiation, chemotherapy and hormone treatments.

Cancer is characterized by abnormal cells that reproduce uncontrollably at a local site and become harmful growths known as tumors. The cancerous cells eventually metastasize, or spread, throughout the body, depositing themselves as new tumors, or metastases. As tumors grow, they cause tissue and organ failure and ultimately, death.

To be effective, cancer therapies must eliminate or control the growth of the cancer both at the original site and at sites where the cancerous cells have spread. Current therapies, such as surgery, radiation, chemotherapy and hormone treatments may not always have the desired therapeutic effect and may result in severe side effects.

Active Cellular Immunotherapy

Active cellular immunotherapies (ACIs), unlike vaccines for infectious diseases such as the measles that are injected into healthy people, are injected after a patient has been diagnosed with cancer. ACIs focus on overcoming the limitations of the immune system and directing it to mount an attack against cancer cells. Once a cancer-related target protein has been selected, an ACI is used to stimulate a patient's immune system to recognize and destroy cells that express the target protein.

A person's immune system is composed of a variety of specialized cells that recognize foreign antigens, the chemical structures that are found on disease-causing agents. In a healthy body, the immune system will treat the agent carrying the unfamiliar antigen as a foreign invader and fight to remove it from the body.

Tumors, however, frequently display characteristics of antigens that are also found on normal cells, perhaps making it difficult for the immune system to distinguish between them and mount a strong anti-cancer response. Tumors may also actively prevent the immune system from working correctly.

Researchers believe that one key to directing the immune system to fight cancers is to modify, or engineer, tumor antigens so that the immune system can recognize and destroy cancer cells. The modified antigen is combined in the laboratory with antigen presenting cells taken from a cancer patient, which then activates the cells. The activated cells are re-administered to the patient to stimulate their T-cells to recognize and attack cancer cells that carry the target antigen.