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Review Article

## Immunotherapy: A New Revolutionary Treatment in Cancer

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### Abstract

Immunotherapy is a type of cancer treatment that aids your immune system to fight cancer. The immune system helps your body fight infections and other diseases. It is made up of white blood cells and organs and tissue of the lymph system. Immunotherapy is a uses substance made from living organisms to treat cancer. <sup>1</sup> Immunotherapy is treatment that focuses on boosting the body's own immune response against cancer tumors. Cancer cells can be treacherous targets for both therapeutic agent and the body's natural defense line the immune system. But a new approach to "rewiring macrophages, the body's pathogen and debris eaters, could offer a fresh boost to cancer immunotherapy. <sup>2</sup>

**Keywords:** Immunotherapy, cancer treatment, immune system, natural defense line

### Cancer:

"Cancer is a group of diseases involving abnormal cell growth with potential to invade or spread to other parts of the body" <sup>3</sup>

#### Mechanism of cancer:

The mechanism caused by a faulty placement of essential enzyme in the cancer cells, which causes changes in the proteins on the surface of the cancer cells. This mechanism plays a part in the growth of the cancer cells. <sup>4</sup>

#### Types of cancer:

- Carcinoma- is a cancer that starts in the skin or the tissues that line other organs,
- Sarcoma- is a cancer of connective tissues such as bones muscles, cartilage, and blood vessels.

- Leukemia- is a cancer of bone marrow, which creates blood cells.
- Lymphoma and Myeloma are cancers of the immune system.<sup>5</sup>

#### Treatment of cancer:

- Radiotherapy
- Chemotherapy
- Surgery
- Targeted Therapy
- Immunotherapy.<sup>3</sup>

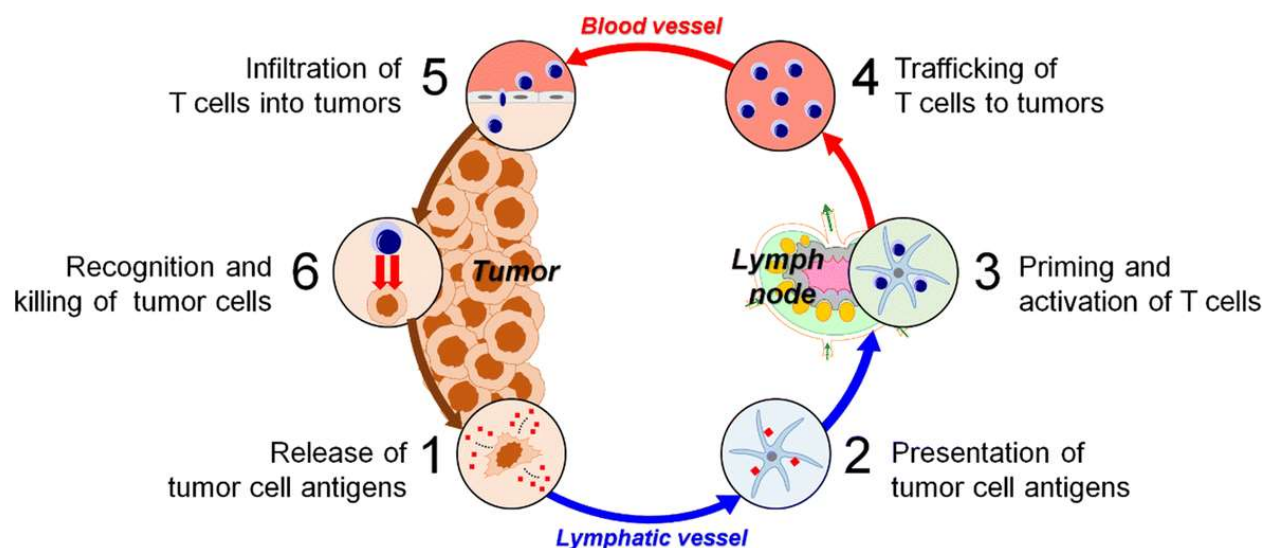


Figure 1: New opportunities for nanoparticles in cancer immunotherapy <sup>6</sup>

### Immune system:

The immune system is the body's defense against infectious organism and other invaders. Through a series of steps called immune response, the immune system attack organisms and substance that invade body systems and cause diseases.

#### Immune therapy:

Immunotherapy is a type of cancer treatment to boost the body's natural defenses to fight the cancer. It uses material either made by the body or in a laboratory to improve, target or restore immune system function. It is not entirely clear how immunotherapy treats cancer. However, it may work in the following ways:

- Stopping or slowing the growth of cancer cells.
- Helping the immune system work better at destroying cancer cells.
- Stopping cancer from spreading to other parts of the body.<sup>7</sup>

Until recently, it's been thought that immune cell transplants wouldn't work as the body would simply reject the new cells and the immunosuppressant drugs required would cause side effects that outweighed the benefits. However, researchers discovered that the transplanted immune cells actually survive surprisingly well in the body, making the transplants a viable option. "We're seeing impressive results with cells called natural killer cells," explained Hayday. "It's very early days but there are patients receiving them in this next year and the year after, and the nice feature is, unlike other immunotherapy, these cells aren't rejected."

Clinical trials on these natural killer cells will soon take place in the US. After this, in 2020, Hayday's own research will go to clinical trial. His team uses immune cells called gamma delta T cells in place of natural killer cells. In November, they published a study in Nature Immunology showing that these T cells can be used to identify and kill dangerous cells within the body.

"If [these] transfusions work, as the early trials suggest they may, then establishing and maintaining donor cell banks is a realistic concept, albeit practically challenging," Hayday told IFLScience. Scientists hope that we might one day have "immune banks" that store immune cells ready to be transplanted into patients, just as we have blood banks to body.<sup>8</sup>

### Type of cancer immunotherapy:

These are different types of immunotherapy. Some of these are also called targeted therapies or biological therapies. These are different types of immunotherapy. Some of these are also called targeted therapies or biological therapies.

#### ❖ Monoclonal antibodies (MABs)-

Some MABs have an effect on the immune system. So as well being a targeted cancer drug, they are also a type of immunotherapy.

#### ❖ Checkpoint Inhibitors –

Checkpoint inhibitors are used to treat cancers such as melanoma skin cancer and lung cancer. Researchers are also looking at them in clinical trials for other types of cancer.

#### ❖ Cytokines-

Cytokines are group of proteins that are found naturally in the body. They help to boost the immune system. Manmade versions of these proteins have been developed as a treatment for cancer.

#### ❖ Vaccines to treat cancer-

Cancer vaccines are type of immunotherapy. Research in this area is at an early stages and vaccines are mainly available as part of clinical trials.

#### ❖ Adoptive cell transfer-

This type of immunotherapy is still quite new and researchers are looking into how well it works as a treatment for cancer. You might have it part of a clinical trial.<sup>9</sup>

### Importance of immunotherapy:

The immune system is a very important component of health. It helps promote wellness, prevent illness, and fight disease. It is though that cancer may develop if immune system breaks down or it's not functioning adequately. This theory is still being actively explored and researched.

Immunotherapies represented important progress in cancer research and treatment. Immunotherapy may one day be considers a fourth modality in conventional cancer treatment along with surgery, radiation, and chemotherapy. Today, immunotherapy is sometimes given in combination with other conventional cancer treatment and sometimes as the primary therapeutic modality.

Immunotherapy is used in two major ways:

### Anticancer activity:

An important goal of immunotherapy is to help the immune system recognize cancer cells as non- self instead of self.

In immunotherapy, some immune cells kills cancer directly, and others help activate specific immune cells to kill cancer cells. Research indicates that, more than any other system in the body, a major mechanism of regulation by the immune system is apoptosis, or the programmed death of cancer cells.

### Supportive treatments:

Immunotherapy is also used to lessen certain side effects that may be caused by some cancer treatments.<sup>10</sup>

### Conclusion:

Immunotherapy may be the next great hope for cancer treatment. It also stimulates the immune system to destroy cancer causing cell by using antibodies.

The effect of any of the aforementioned strategies in combination with more traditional cancer therapies is another avenue as benefits in terms of duration with chemotherapy.

In future scientist hope “immune banks” that store immune cells ready to be transplanted into patients ,just as we have blood banks today.

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