

Types and Methods Involved in Targeted Therapy to Tackle Cancer

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Commentary

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DESCRIPTION

Targeted therapy involves the use of drugs that targets specific genes and proteins that regulates the growth and survival of cancer cells. It serves as the cornerstone of precision medicine. Molecularly targeted therapy, also known as targeted therapy, is one of the main forms of pharmaceutical therapy used to treat cancer, along with hormone therapy and cytotoxic chemotherapy. Targeted therapy (a sort of molecular medicine) inhibits the proliferation of cancer cells by interfering with specific targeted molecules required for carcinogenesis and tumour growth. Since biopharmaceuticals make up the majority of targeted therapy medicines, the term biologic therapy which is used to describe cancer treatment and to distinguish it from chemotherapy can be used interchangeably with targeted therapy in some cases.

The chemical agents that specifically or preferentially target a protein or enzyme that bears a mutation or other genetic alteration that is particular to cancer cells and not present in healthy host tissue are the most effective targeted therapies. Imatinib, also known as Gleevec, is one of the most effective molecularly targeted therapies. It is a kinase inhibitor with high affinity for the oncofusion protein BCR-Abl, which is a major stimulator of carcinogenesis in Chronic Myelogenous Leukemia. Imatinib is most successful when used to treat BCR-Abl, while being used for other indications. The molecular targeted therapy PLX27892, which targets mutant B-raf in melanoma, is another example of a therapy that targets oncogenes that have undergone mutation.

Types

Small-molecule medicines and Monoclonal antibodies are the two main types of targeted therapeutics.

- Small-molecule medications are used if the targets are present inside the cells as they can easily enter cells due to their small size
- Monoclonal antibodies, commonly referred to as therapeutic antibodies, are proteins made in a laboratory. These proteins are made to bind to particular targets present on cancer cells. Some monoclonal antibodies label cancer cells to help the immune system recognize and eliminate them. Other monoclonal antibodies directly inhibit cancer cell growth and cause their destruction. Others transport toxins to cancer cells.

Actions of targeted therapy on cancer cells

The majority of targeted cancer therapies work by obstructing particular proteins that aid in the growth and dissemination of malignancies throughout the body. Chemotherapy, in contrast, frequently destroys all rapidly dividing cells. The many modes of action of targeted therapy for cancer are described here.

Aid the immune system in eliminating cancerous cells: The ability to evade immune system is one factor in the survival of cancer cells. Cancer cells may be marked by specific targeted therapies, making it simpler for the immune system to locate and eliminate them. Other targeted treatments strengthen the immune system and make it more effective against cancer.

Induce cancer cells to die: Once healthy cells are injured or no longer required, they die in a controlled manner. However, there are ways for cancer cells to evade this process of death. Apoptosis, a mechanism of cell death, can be used by some targeted medicines to kill cancer cells.

Signals that aid in the development of blood vessels: Angiogenesis, a process that tumors must go through in order to develop past a particular size, is required. Angiogenesis begins as a result of signals sent by the tumor. Angiogenesis inhibitors are some targeted treatments that interfere with these signals to stop the formation of a blood supply. Tumors don't grow larger without a blood supply. Alternatively, if a tumor already has a blood supply, these treatments may induce the tumor blood vessels to degenerate, which will lead the tumor to lessen in size.

Deliver compounds that kill cells to cancerous cells: In some cases, monoclonal antibodies are combined with cellular-destructive substances like radiation, chemotherapy drugs, or toxins. The cancer cells absorb the cell-killing substances when these monoclonal antibodies bind to particular regions on their surface. Cells won't incur any harm if the target is absent.

Preventing release of hormones that promote cancer: Specific hormones are needed for the growth of several breast and prostate cancers. Hormone therapies are a kind of targeted therapies which prevent the body from producing hormones that stimulate cancer.