Immune Checkpoint Inhibitors

The immune system helps protect the body from infection and other diseases, including cancer.

Immune checkpoint inhibitors are cancer treatment drugs that prevent immune cells from being turned off by cancer cells.

How Does the Immune System Work?
During an immune response, the immune system turns on to attack potentially harmful agents. The immune system also has ways to turn off. This limits the immune response and prevents damage to healthy tissues.

T lymphocytes, or T cells, are immune system cells that can kill cancer cells. A T cell has special locations on its surface called receptors. Other cells or molecules attach to these receptors and turn the T cell on (activation) or off.

How Do Immune Checkpoint Inhibitors Work?
Some cancer cells bind to receptors on activated T cells and turn them off. Immune checkpoint inhibitors are drugs that prevent cancer cells from turning off T cells. This allows T cells to infiltrate a tumor and stop it from growing.

Conventional chemotherapy drugs often shrink a tumor within weeks, but immune checkpoint inhibitors can take several months to work. These drugs can initially cause the tumor to swell, making it appear that the tumor is growing. This is called pseudoprogression. It occurs because of the large number of activated T cells and other immune system cells and substances that enter the tumor. The brief increase in tumor size may be followed by shrinking or eradication of the tumor.

The US Food and Drug Administration has approved several immune checkpoint inhibitors for the treatment of metastatic melanoma. These approved drugs include ipilimumab (Yervoy; Bristol-Myers Squibb), nivolumab (Opdivo; Bristol-Myers Squibb), and pembrolizumab (Keytruda; Merck Sharp & Dohme Corp). These drugs are also being tested for treatment of many other cancers.

Possible Immune-Related Side Effects
Because immune checkpoint inhibitors prevent T cells from being turned off, these drugs affect the balance of the immune system. In addition to infiltrating tumors, activated T cells can attack the body’s own cells. This is called an autoimmune reaction and occurs in about 10% of patients taking these drugs.

Immune-related side effects usually occur 6 to 12 weeks after starting treatment and may include
• Diarrhea
• Rash
• Difficulty breathing
• Eye irritation

How do immune checkpoint inhibitors work?

Tumor cells turn off activated T cells when they attach to specific T-cell receptors.

Immune checkpoint inhibitors prevent tumor cells from attaching to T cells so T cells stay activated.

Immune checkpoint inhibitors target either T cells (T) or tumor cells (Y).

Response to immune checkpoint inhibitor treatment with brief increase in tumor size (pseudoprogression)

- Yellowing of the skin (jaundice)
- Change in energy level

Be sure to let your doctor know if you develop any new symptoms while taking an immune checkpoint inhibitor. Your doctor might temporarily stop the drug or prescribe a steroid to decrease the immune response.

For More Information

- Immunotherapy Patient Forum

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Author: Howard (Jack) West, MD
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