



TIME TO TALK IMMUNO-ONCOLOGY™



Bristol-Myers Squibb

REGENERON | SANOFI GENZYME

IMMUNE CHECKPOINT INHIBITORS

HOW IMMUNE CHECKPOINT INHIBITORS WORK AND WHAT TO EXPECT

Chemotherapy works by trying to poison rapidly dividing cancer cells in the body.

Immune checkpoint inhibitors work in a different way. They use your body's own immune system, which protects you from infections, to treat cancer. These immune checkpoint inhibitors are also called *immunotherapy*.

Your immune system is made up of specialized immune cells, called T cells, that ignore normal cells (**Figure 1**) but recognize and kill harmful cells like viruses and bacteria (**Figure 2**). The T cells know the difference between a normal cell and a harmful invader because the body places checkpoints in front of normal cells.

You can think of these checkpoints as stop signs that tell the immune system *not* to destroy a cell (Figure 1).

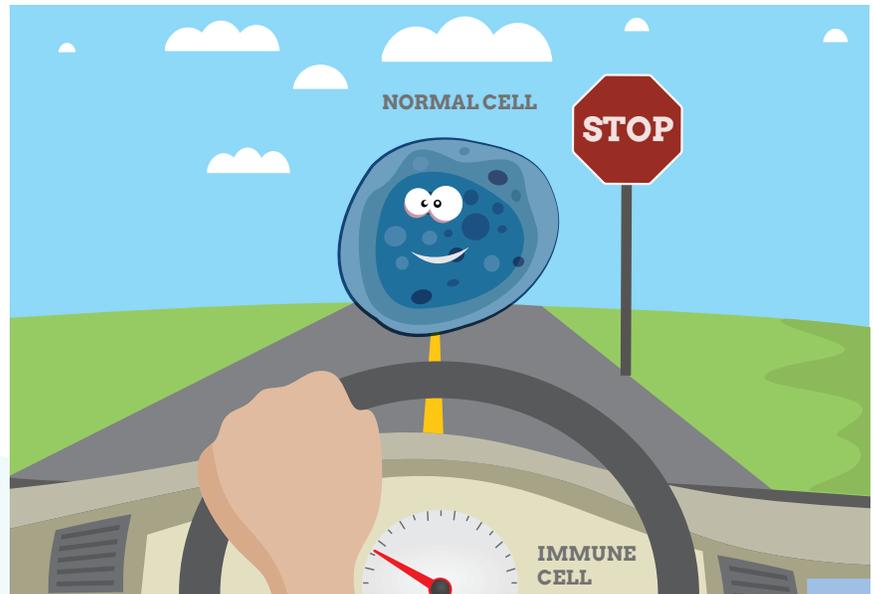


Figure 1. Immune cells ignore the body's normal cells.

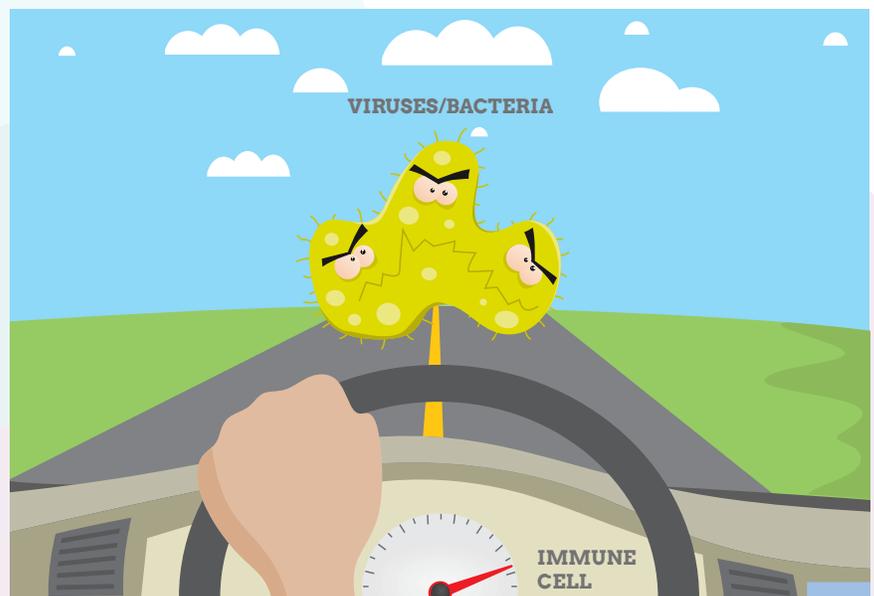


Figure 2. Immune cells recognize and kill harmful cells.

How Do Cancer Cells Escape Attack by the Immune System?

Normally, your body uses checkpoints to prevent immune cells from attacking normal cells and to keep them focused on the “bad guys,” like viruses and bacteria.

Cancer cells steal these stop signs and use them to avoid being destroyed by the immune system. When the cancer cell has a stop sign in front of it, the immune system won't attack it (**Figure 3**).

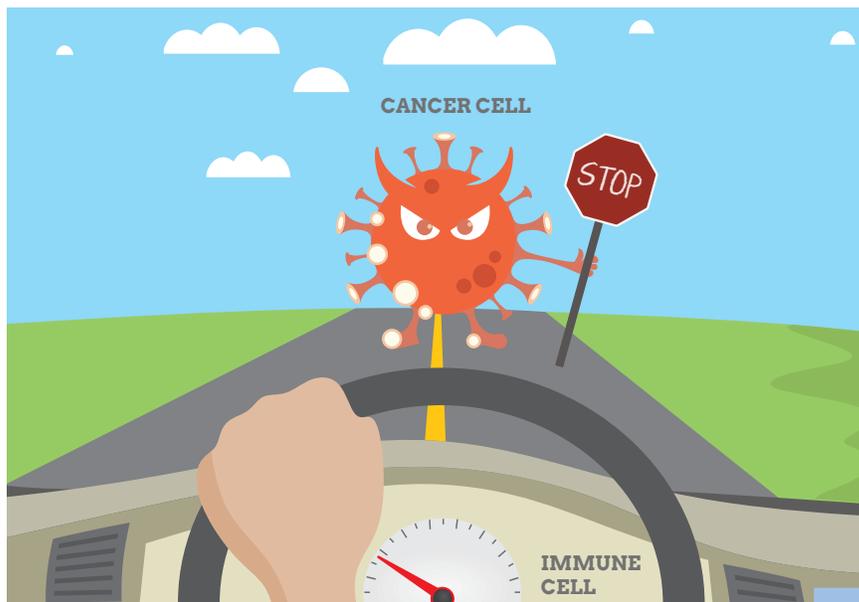


Figure 3. Cancer cells try to avoid being attacked by the body's immune cells.

How Do Immune Checkpoint Inhibitors Work to Kill Cancer?

Immune checkpoint inhibitors act like traffic controllers. They cover up the stop sign that the cancer is holding and hold up a sign saying “Go!” They allow the immune system to recognize the cancer cell as another “bad guy” that must be destroyed (**Figure 4**).

Available cancer drugs block three different checkpoints in the body: CTLA-4, PD1, and PD-L1. Several drugs can be used together to block different checkpoints and make sure that the immune system gets the signal to attack the cancer cells.



Figure 4. The checkpoint inhibitor stops the cancer cell from its effort to avoid being attacked by the immune cell.

What Causes Side Effects from Immune Checkpoint Inhibitors?

Just like different drivers of a car, each person's immune system reacts differently to these checkpoints or stop signs. When some people are given immunotherapy, their immune cells may ignore the stop signs in front of normal cells, almost as if the driver of the car has a foot on the gas pedal (**Figure 5**). The immune system traveling at a high speed can damage normal cells by mistake. This damage, called *auto-immune side effects*, is caused by a person's own immune system. When the side effects are recognized early, they can be treated with medications (such as steroids) that slow the immune cells down again, like decreasing the speed of a car.

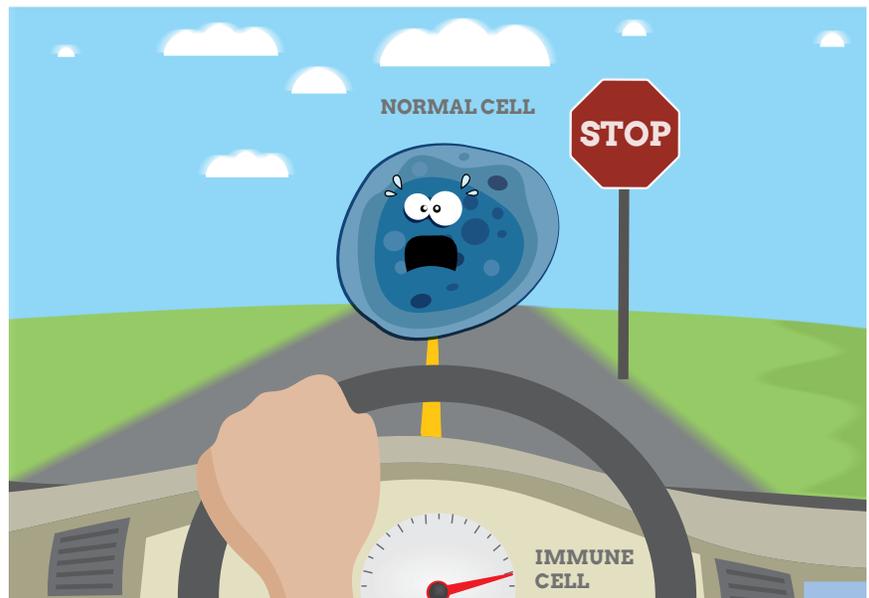


Figure 5. Some people's immune cells can react to the checkpoint inhibitors by damaging the normal cells.

What Can I Expect During Treatment?

What?

- Your immunotherapy can be given alone, with another immunotherapy, or with other cancer drugs.
- You will have blood tests and possibly other physical tests before you start your immunotherapy.
- You will have blood tests before each infusion of medication to make sure that you are not having any side effects.

Where?

- You may receive immunotherapy in a doctor's office, in a clinic, or in the hospital.

Who?

- A nurse or another trained healthcare professional will give you this therapy.
- You will meet with someone from your care team regularly to discuss how you are feeling, to make sure you are not having side effects, and to make sure your cancer is responding to the treatment.

When?

- Immunotherapy can be given every 2, 3, 4, or even 6 weeks, depending on the therapy and type of cancer being treated.

How?

- You will receive this medication through a vein in your arm or through a port-a-cath, a device that is placed under the skin near your collarbone.
- Medications may be given before the infusion to reduce side effects.
- Single immunotherapy infusions take 30–90 minutes to complete. If immunotherapy is combined with other cancer drugs, the infusion will take longer.