



Interleukin-2 (Proleukin®, IL-2, Aldesleukin)

Pronounced: IN-ter-LOO-kin

Classification: Biologic Response Modifier

About Interleukin-2 (Proleukin®, IL-2, Aldesleukin)

Interleukin-2 is a type of medication called a biologic response modifier. It is a type of protein called a cytokine that works to increase the production and function of some parts of your body's immune system. This protein is normally produced in the body, but in small amounts. By increasing levels of IL-2, the immune system gets a kick-start (specifically T cells and natural killer cells) to attack the cancer cells.

How to Take Interleukin-2

Interleukin-2 is given in two different ways. It can be given in higher doses into a vein (IV, intravenously) while the patient is monitored in the hospital. It can also be given in a low-dose regimen via a shot placed under the skin (SubQ, subcutaneous injection). The low-dose regimen is given on an outpatient basis (at home or in the provider's office). The actual dose depends on your body size. Premedication may be given to lower the risk of infusion reactions, like fever, chills, nausea, and low blood pressure.

Interleukin-2 can interact with many different medications. Be sure to tell your healthcare provider about all medications and supplements you take. This medication should not be used in people with abnormal cardiac (heart) or pulmonary (lung) function. Your provider may perform testing prior to starting this medication to be sure your function is normal. If you are having an imaging test (like an MRI) that uses contrast dye, tell your care team that you are being treated with or have been treated with Interleukin-2 in the past.

Possible Side Effects of Interleukin-2

There are things you can do to manage the side effects of interleukin-2. Talk to your care team about these recommendations. They can help you decide what will work best for you. Keep in mind that these side effects are more common and more intense for people receiving the IV infusion, as opposed to the lower dose injection regimen. These are some of the most common or important side effects:

Capillary Leak Syndrome

Capillary leak syndrome is a condition in which blood, and components of blood, leak out of vessels and into body cavities and muscles. The movement of this fluid out of the vessels can cause hypotension (low blood pressure) and organ failure. Signs and symptoms of capillary leak syndrome include: a sudden drop in blood pressure, weakness, fatigue, sudden swelling of the arms, legs or other parts of the body, nausea, and lightheadedness. If you are having any of these symptoms, tell your healthcare provider right away.

Infection and Low White Blood Cell Count (Leukopenia or Neutropenia)

This medication can cause life-threatening infections, with or without a decrease in white blood cell counts. White blood cells (WBC) are important for fighting infection. While receiving treatment, your [WBC count can drop](#), putting you at a higher risk of getting an infection. You should let your doctor or nurse know right away if you have a fever (temperature greater than 100.4° F/38° C), sore throat or cold, shortness of breath, cough, burning with urination, or a sore that doesn't heal.

Tips to preventing infection:

- [Washing hands](#), both yours and your visitors, is the best way to prevent the spread of infection.
- Avoid large crowds and people who are sick (i.e.: those who have a cold, fever, or cough or live with someone with these symptoms).
- When working in your yard, wear protective clothing including long pants and gloves.
- Do not handle pet waste.
- Keep all cuts or scratches clean.
- Shower or bath daily and perform frequent [mouth care](#).
- Do not cut cuticles or ingrown nails. You may wear nail polish, but not fake nails.
- Ask your oncology care team before scheduling dental appointments or procedures.
- Ask your oncology care team before you, or someone you live with, has any vaccinations.

Infusion Related Side Effects

The interleukin-2 infusion (the high dose regimen) can cause a reaction that may include low blood pressure, increased heart rate or arrhythmias, shortness of breath, rash, nausea, diarrhea and joint and muscle stiffness. The infusion may be stopped or slowed down if this occurs and medications may be given to stop the reaction. These reactions generally occur within 24 hours of the dose and most often resolve when the medication is stopped. Nearly all patients on the high-dose regimen will experience flushing of the face and body or skin rash.

Flu-Like Syndrome

This occurs in a majority of patients, no matter the regimen, because of the "revving-up" of the immune system. Flu-like syndrome occurs hours to days after the infusion and is characterized by fever, chills, weakness, muscle and joint aches. Medications such as acetaminophen can be used to manage these symptoms. Try to keep warm with blankets and warm clothes, and drink plenty of non-alcoholic fluids. These symptoms tend to lessen over time on low-dose regimens.

Diarrhea

Your oncology care team can recommend medications to relieve [diarrhea](#). Also, try eating [low-fiber](#), bland foods, such as white rice and boiled or baked chicken. Avoid raw fruits, vegetables, whole grain breads, cereals and seeds. Soluble fiber is found in some foods and absorbs fluid, which can help relieve diarrhea. Foods high in soluble fiber include: applesauce, bananas (ripe), canned fruit, orange sections, boiled potatoes, white rice, products made with white flour, oatmeal, cream of rice, cream of wheat, and farina. Drink 8-10 glasses of non-alcoholic, un-caffeinated fluid a day to prevent dehydration.

Nausea and/or Vomiting

Talk to your oncology care team so they can prescribe medications to help you manage [nausea and vomiting](#). In addition, dietary changes may help. Avoid things that may worsen the symptoms, such as heavy or greasy/fatty, spicy or acidic foods (lemons, tomatoes, oranges). Try saltines, or ginger ale to lessen symptoms.

Call your oncology care team if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Rash

Rash, very dry, and/or itchy skin may occur. Antihistamines (like diphenhydramine) or topical steroids can be used to control symptoms if needed. It is important to prevent scratching and breaking of the skin, given the risk for skin infections with lowered white blood cell counts on this therapy. Oatmeal baths can be used to help with dry, itchy skin. Use an alcohol-free moisturizer on your skin and lips, avoiding moisturizers with perfumes or scents. If your skin does crack or bleed, be sure to keep the area clean to avoid infection. Be sure to notify your healthcare provider of any rash that develops, as this can be a reaction. They can give you more tips on [caring for your skin](#).

Liver Toxicity

This medication can cause liver toxicity, which your oncology care team may monitor for using blood tests called liver function tests. Notify your healthcare provider if you notice yellowing of the skin or eyes, your urine appears dark or brown, or you have pain in your abdomen, as these can be signs of liver toxicity.

Low Platelet Count (Thrombocytopenia)

Platelets help your blood clot, so when the [count is low](#) you are at a higher risk of bleeding. Let your oncology care team know if you have any excess bruising or bleeding, including nose bleeds, bleeding gums or blood in your urine or stool. If the platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor (an electric razor is fine).
- Avoid contact sports and activities that can result in injury or bleeding.
- Do not take aspirin (salicylic acid), non-steroidal, anti-inflammatory medications (NSAIDs) such as Motrin/Advil (ibuprofen), Aleve (naproxen), Celebrex (celecoxib) etc. as these can all increase the risk of bleeding. Please consult with your healthcare team regarding the use of these agents and all over-the-counter medications/supplements while on therapy.
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

Low Red Blood Cell Count (Anemia)

Your red blood cells are responsible for carrying oxygen to the tissues in your body. When the [red cell count is low](#), you may feel tired or weak. You should let your oncology care team know if you experience any shortness of breath, difficulty breathing or pain in your chest. If the count gets too low, you may receive a blood transfusion.

Kidney Problems

This medication can cause kidney problems, including an increased creatinine level, which your oncology care team may monitor for using blood tests. Notify your healthcare provider if you notice decreased urine output, blood in the urine, swelling in the ankles, or loss of appetite.

Fatigue

[Fatigue](#) is very common during cancer treatment and is an overwhelming feeling of exhaustion that is not usually relieved by rest. While on cancer treatment, and for a period after, you may need to adjust your schedule to manage fatigue. Plan times to rest during the day and conserve energy for more important activities. Exercise can help combat fatigue; a simple daily walk with a friend can help. Talk to your healthcare team for helpful tips on dealing with this side effect.

Decrease in Appetite

[Nutrition](#) is an important part of your care. Cancer treatment can affect your appetite and, in some cases, the side effects of treatment can make eating difficult. Ask your nurse about nutritional counseling services at your treatment center to help with food choices.

- Try to eat five or six small meals or snacks throughout the day, instead of 3 larger meals.
- If you are not eating enough, nutritional supplements may help.
- You may experience a metallic taste or find that food has no taste at all. You may dislike foods or beverages that you liked before receiving cancer treatment. These symptoms can last for several months or longer after treatment ends.
- Avoid any food that you think smells or tastes bad. If red meat is a problem, eat chicken, turkey, eggs, dairy products, and fish without a strong smell. Sometimes cold food has less of an odor.
- Add extra flavor to meat or fish by marinating it in sweet juices, sweet and sour sauce, or dressings. Use seasonings like basil, oregano, or rosemary to add flavor. Bacon, ham and onion can add flavor to vegetables.

Mouth Ulcers (Mucositis)

Certain cancer treatments can cause [sores or soreness in your mouth](#) and/or throat. Notify your oncology care team if your mouth, tongue, inside of your cheek or throat becomes white, ulcerated or painful. Performing [regular mouth care](#) can help prevent or manage mouth sores. If mouth sores become painful, your doctor or nurse can recommend a pain reliever.

- Brush with a soft-bristle toothbrush or cotton swab twice a day.
- Avoid mouthwashes that contain alcohol. Baking soda and/or salt with warm water mouth rinse (2 level teaspoons of baking soda or 1 level teaspoon of salt in an eight-ounce glass of warm water) is recommended 4 times daily.
- If your mouth becomes dry, eat moist foods, drink plenty of fluids (6-8 glasses), and suck on sugarless hard candy.

- Avoid smoking and chewing tobacco, drinking alcoholic beverages, and citrus juices.

Less common, but important side effects can include:

- **Heart Problems:** Interleukin-2 can cause or worsen pre-existing heart problems. Notify your healthcare provider if you have sudden weight gain or swelling in the ankles or legs, irregular heartbeat or feel dizzy.
- **Thyroid Problems:** This medication can cause hypothyroidism (underactive thyroid) and hyperthyroidism (overactive thyroid). Your healthcare provider will perform blood tests to check the function of your thyroid and treat this side effect if it develops. Symptoms of thyroid problems include: tiredness, feeling hot or cold, change in your voice, weight gain or loss, hair loss and muscle cramps. Report any of these symptoms to your oncology care team.

Reproductive Concerns

Exposure of an unborn child to this medication could cause birth defects, so you should not become pregnant or father a child while on this medication. Effective birth control is necessary during treatment. Even if your menstrual cycle stops or you believe you are not producing sperm, you could still be fertile and conceive. You should consult with your healthcare team before breastfeeding while receiving this medication.

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