Filgrastim (Neupogen®, G-CSF)

**Pronounced:** fil-GRA-stim

**Classification:** Colony Stimulating Factor

### About Filgrastim (Neupogen®, G-CSF)

Filgrastim is a type of colony stimulating factor, which is a group of medications that stimulate the production and function of blood cells. Granulocyte colony-stimulating factor (G-CSF) is a protein naturally produced by the body to increase the production of white blood cells. Filgrastim is a man-made version of G-CSF that stimulates white blood cell production, and in particular, neutrophil production. A neutrophil is a type of white blood cell that is responsible for fighting infection and is often decreased during cancer therapy. When the number of these cells drops below 1000/mm³, it is called neutropenia, which puts the patient at significant risk of infection. Filgrastim is used to prevent neutropenia related to cancer therapy. It may also be used to increase the number of white blood cells prior to a stem cell collection for transplant.

Filgrastim is **not** a cancer treatment, but a supportive care medicine. This means it is used to lessen the bone marrow suppression (reduced blood counts) secondary to cancer and its cytotoxic treatments.

### How to Take Filgrastim

Filgrastim is most often given as a subcutaneous injection (SQ, given under the skin), but it can be given directly into a vein (intravenous, IV). It is given once a day, preferably at the same time of day, until the neutrophil count returns to normal. The actual dose is based on your body size and what you are taking it for and will be determined by your healthcare provider.

Because this medication works to increase your white blood cell count, you will have your blood cell count monitored to ensure that your white blood cell count does not become too high.

The needle cap on the prefilled syringes is made with dry, natural rubber which is derived from latex. If you have a latex allergy, it is important to notify your care provider to determine the safest way for you to receive your filgrastim.

### Storage and Handling

Filgrastim should be stored in the refrigerator and in the original carton to protect it from light. To lessen the sting of the injection, it should be taken out of the refrigerator 30 minutes prior to being injected. Filgrastim should be started no sooner than 24 hours after completion of the chemotherapy dose.

Do not reuse single dose vials, syringes or needles. Do not throw the vials, syringes, or needles in the household trash. Dispose of all used needles and syringes in a puncture-proof disposable container with a lid. The FDA provides further information about the disposal of vials, syringes and needles.

### Where do I get this medication?

Depending on your insurance coverage, filgrastim is available through specialty, retail, or mail order pharmacies. Your oncology team will work with your prescription drug plan to identify an in-network pharmacy for medication distribution.

Alternatively, this medication may be given in the doctor’s office, clinic, or infusion suite. Where you receive it is often dependent on your insurance coverage.
Insurance Information

This medication may be covered under your major medical plan or prescription drug plan. Patient assistance may be available to qualifying individuals depending upon prescription drug coverage. Co-pay cards, which reduce the patient co-pay responsibility for eligible commercially (non-government sponsored) insured patients, may also be available. Your care team can help you find these resources, if they are available.

Possible Side Effects of Filgrastim

There are a number of things you can do to manage the side effects of filgrastim. Talk to your care team about these recommendations. They can help you decide what will work best for you. These are some of the most common or important side effects:

Bone Pain

Filgrastim stimulates the bone marrow to produce many white blood cells, which can lead to pain in the bones. This pain is often felt in the bones of the thighs, hips, and upper arms. Your healthcare team may not want you to take acetaminophen (Tylenol™) because it can "mask" a fever, so talk to them about which pain relievers you can safely take.

Irritation or Burning at the Injection Site

Some people experience redness, swelling, or itching at the site of injection. This is usually temporary. The injection is known to sting or burn if given when it is cold. Take the medication out of the refrigerator 30 minutes ahead of time to allow it to come up to room temperature before administration. Rotate the sites that the injection is given, inject slowly, and/or numb the area with ice prior to giving the injection.

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 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.

Less common, but important side effects can include:

• Allergic Reactions: In some cases, patients can have an allergic reaction to this medication. Signs of a reaction can include: shortness of breath or difficulty breathing, wheezing, rash, flushing, swelling around the mouth or eyes, fast pulse, or sweating. If you notice any changes in how you feel after the injection, let your nurse know immediately.
• Spleen Rupture: Filgrastim can cause your spleen to become enlarged and rupture. If you experience pain in the left upper stomach / abdominal area or left shoulder, contact your healthcare team or go to the emergency room immediately.
• Acute Respiratory Distress Syndrome (ARDS)/Alveolar Hemorrhage: This medication can cause a serious lung problem called acute respiratory distress syndrome. If you experience shortness of breath, fever, breathing trouble or a fast rate of breathing, contact your healthcare team or go to the emergency room. The medication can also cause bleeding in the lungs. Go to your nearest emergency room if you start to cough up blood.
• Sickle Cell Crisis: In patients with sickle cell anemia, filgrastim can cause a sickle cell crisis. Contact your healthcare team immediately if you have symptoms of a sickle cell crisis including pain and trouble breathing.
• 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 notify your healthcare provider immediately.

- **Cutaneous Vasculitis**: Let your care team know if you develop purple spots or redness on your skin as this can be a sign of an inflammation of your blood vessels.

- **Kidney Problems**: This medication can cause kidney problems, which your oncology care team may monitor for using blood tests. Notify your healthcare provider if you notice decreased urine output, dark colored urine, blood in the urine, swelling in the ankles or face, or loss of appetite.

- **Aortitis**: This medication can cause an inflammation of your aorta (the largest artery in your body), which can occur as early as the first week of starting treatment with filgrastim. Signs of aortitis include fever, abdominal pain, fatigue, and back pain. Be sure to call your provider right away if you are experiencing any of these symptoms.

- **Secondary Cancer**: A secondary cancer is one that develops as a result of cancer treatment for another cancer. This is quite rare, but you should be aware of the risk. People who have received this medication along with chemotherapy and/or radiation to treat breast or lung cancer may have an increased risk of developing MDS or AML. This can occur years after treatment. Your provider will monitor your labs closely. Consider having a complete blood count with differential checked annually by your healthcare provider.

**Reproductive Concerns**

It is not known if 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.

**Current Biosimilars**

There are biosimilar versions of filgrastim. A biosimilar is a medication that has been approved by the FDA because it is very similar to an FDA-approved medication (called a reference product, or the medication it is being compared to), and that there are no meaningful differences between the biosimilar product and the reference product. These medications may be used interchangeably.

The current biosimilar versions of this medication include filgrastim-sndz (Zarxio®) and filgrastim-aafi (Nivestym™).