

## Bevacizumab (Avastin®)

**Pronounce:** BEV-a-SIZ-oo-mab

**Classification:** Monoclonal Antibody

### About Bevacizumab (Avastin®)

Monoclonal antibodies are created in a lab to attach to the targets found on specific types of cancer cells. The antibody “calls” the immune system to attack the cell it is attached to, resulting in the immune system killing the cell. These antibodies can work in different ways, including stimulating the immune system to kill the cell, blocking cell growth or other functions necessary for cell growth.

Bevacizumab is a monoclonal antibody that binds to and inhibits the activity of vascular endothelial growth factor (VEGF). This prevents the VEGF from interacting with its receptor on endothelial cells (lining of blood vessel). This, in turn, inhibits the formation of new blood vessels, which slows down the growth of the particular tissue. In essence, it kills tumors by cutting off their blood supply.

### How to Take Bevacizumab (Avastin®)

Bevacizumab is given by intravenous (IV, into a vein) infusion. The amount of time the infusion will take will depend on your treatment plan and if you tolerate the medication. Dosage depends on the person’s size and type of cancer being treated. How often you receive this medication and what other medications you receive will be determined by your care team.

### Possible Side Effects of Bevacizumab (Avastin®)

There are a number of things you can do to manage the side effects of bevacizumab. 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:

#### High Blood Pressure

Patients receiving bevacizumab can develop high blood pressure (hypertension). Your blood pressure should be monitored at every clinic visit or every 2-3 weeks. If your blood pressure is elevated, you may be treated with a medication to reduce your pressure. If severe hypertension develops, bevacizumab should be discontinued immediately. Your blood pressure should continue to be monitored, even if bevacizumab is stopped. Signs of hypertension to report to your team include: blurry vision, nosebleed, headache and fatigue.

#### 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.

#### Bleeding

Patients may experience minor bleeding, such as a nosebleed. Serious bleeding has also occurred in patients treated with this medication, including coughing up blood, bleeding into the stomach, vomiting blood, bleeding

in the brain (stroke), and vaginal bleeding. People who have had serious bleeding should not take this medication. These events are uncommon, though if they occur, bevacizumab should be discontinued. While a nosebleed may not seem like much of a concern, you should notify your healthcare team right away if you develop bleeding of any sort.

## Important but Less Common Side Effects

- **Wound Healing:** This medication can lead to slower or incomplete wound healing, such as a surgical wound not healing or staying closed. Therefore, it is recommended that the medication be discontinued 4 weeks prior to any surgery. In addition, the medication should be held for 28 days after surgery and any surgical incision should be fully healed prior to starting or restarting the medication. If you have a surgical wound that has not healed or begins to have signs of infection (redness, swelling, warmth), report this to your healthcare team.
- **Kidney Damage:** Kidney damage can occur while receiving bevacizumab. Your healthcare team will monitor this by periodically checking the amount of protein in your urine. If the protein levels become elevated, you may require further urine tests to evaluate your kidney function. If your kidneys become damaged, you may need to stop receiving this medication.
- **Blood Clots, Stroke and Heart Attack:** Bevacizumab can increase the risk of blood clots, stroke and heart attack. If you experience symptoms of these problems, you should contact your healthcare provider immediately or go to an emergency room. Symptoms can include: swelling, redness or pain in an extremity, chest pain or pressure, pain in your arm, back, neck or jaw, shortness of breath, numbness or weakness on one side of the body, trouble talking, confusion or mental status changes.
- **Infusion Reactions:** The infusion can cause a reaction that may lead to chills, fever, low blood pressure, nausea and vomiting. Reactions are most common during the first week of therapy, including the evening after the infusion. Let your nurse know if you are feeling any different during your infusion.
- **Gastrointestinal Perforation:** This medication can cause a tear in the intestinal wall, also called a gastrointestinal perforation. Signs of this can include: new or worsening pain in the abdomen, new abdominal swelling, chills, fever, constipation, nausea or vomiting. If you experience any of these, contact your healthcare provider immediately or go to the emergency room.
- **Posterior Reversible Encephalopathy Syndrome (PRES):** In rare cases, this medication has caused a neurological disorder called posterior reversible encephalopathy syndrome (PRES), also called reversible posterior leukoencephalopathy (RPLS). Symptoms of PRES/RPLS include headache, seizure, lethargy, confusion, blindness and other visual and neurological disturbances. Report any of these symptoms to your healthcare team immediately.
- **Fistula:** A possible, but rare, side effect is the development of a fistula, which is an abnormal passage between two body parts (for instance, a hole between the lung and esophagus).
- **Congestive Heart Failure (CHF):** Bevacizumab can cause or worsen pre-existing heart problems, including congestive heart failure. Notify your healthcare provider if you have sudden weight gain or swelling in the ankles or legs. If you develop chest pain or pressure, sweating, shortness of breath, nausea, dizziness or lightheadedness, call 911 or go to the nearest emergency room.

## Sexual & Reproductive Concerns

This drug may affect your reproductive system, resulting in the menstrual cycle or sperm production becoming irregular or stopping permanently. Women may experience menopausal effects including hot flashes and [vaginal dryness](#). In addition, the desire for sex may decrease during treatment. You may want to consider sperm banking or egg harvesting if you may wish to have a child in the future. Discuss these options with your oncology team.

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 and for at least

6 months after treatment, even if your menstrual cycle stops or you believe you are not producing sperm. You may want to consider sperm banking or egg harvesting if you may wish to have a child in the future. Discuss these options with your oncology team. You should not breastfeed while taking this medication and for 6 months after treatment.

## Current Biosimilars

There are biosimilar versions of bevacizumab. 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 biosimilar versions of this medication include bevacizumab-awwb (Mvasi), bevacizumab-bvzr (Zirabev®), bevacizumab-tnjn (Avzivi), bevacizumab-adcd (Vegzelma), and bevacizumab-maly (Alymsys).

## Carboplatin (Paraplatin®)

**Pronounce:** car-boe-PLATT-in

**Classification:** Platinum Chemotherapies

### About Carboplatin (Paraplatin®)

Carboplatin is a heavy metal compound that affects the RNA, DNA, and protein in cells. By preventing cancer cells from dividing, the medication can stop the cancer from growing.

### How to Take Carboplatin

Carboplatin is given by intravenous (IV, into a vein) injection. Your dose is based on your size, kidney function, and type of cancer. It can be given alone, or with other drugs.

Even when carefully and correctly administered by trained personnel, this drug may cause a feeling of burning and pain. There is a risk that this medication may leak out of the vein at the injection site, causing tissue damage that can be severe. If the area of injection becomes red, swollen, or painful at anytime during or after the injection, tell your provider right away. Do not apply anything to the site unless told to do so by your provider.

Carboplatin can interact with certain medications including some antibiotics, diuretics and blood thinners. Be sure to tell your provider about all medications and supplements you take.

### Possible Side Effects

There are a number of things you can do to manage the side effects of carboplatin. Talk to your provider 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:

#### Low White Blood Cell Count (Leukopenia or Neutropenia)

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 provider know right away if you have a fever (temperature greater than 100.4°F or 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 bathe daily and perform frequent [mouth care](#).
- Do not cut cuticles or ingrown nails. You may wear nail polish, but not fake nails.
- Ask your provider before scheduling dental appointments or procedures.
- Ask your provider before you, or someone you live with has any vaccinations.

## 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 provider 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.

## 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 provider 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 talk with your provider about the use of these medications and any over the counter medications/supplements while on therapy.
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

## Allergic Reactions

In some cases, patients can have an allergic reaction to this medication. Signs of a reaction can include: rash, itching, hives, flushing, and/or shortness of breath or difficulty breathing. If you notice any changes in how you feel during the infusion, let your provider know right away. The infusion will be slowed or stopped if this happens. Depending on the severity of your reaction, you may still be able to receive the medication with a pre-medication to prevent a reaction, or if the medication is given at a slower rate.

## Nausea and/or Vomiting

Talk to your provider 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 provider if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

## Electrolyte Changes

This medication can affect the normal levels of electrolytes (sodium, potassium, magnesium, calcium, etc.) in your body. Your levels will be monitored using blood tests. If your levels become too low, your provider may prescribe certain electrolytes to be given by IV or taken by mouth. Do not take any supplements without first consulting with your provider.

## Liver Toxicity

This medication can cause liver toxicity, which you will be monitored for using blood tests called liver function tests. If you develop elevations in your liver function tests, your provider may need to lower your dose or stop the medication. Call your provider if you notice yellowing of the skin or eyes, your urine appears dark or brown, or if you have pain in your abdomen (belly), as these can be signs of liver toxicity.

## Kidney Problems

Carboplatin can impact your kidney function. Your provider will monitor your kidney function throughout treatment. Try to drink at least 6 to 8 glasses of uncaffeinated fluids a day. Call your provider if you do not urinate for more than 12 hours.

## Live Vaccines

You, or anyone you live with, should avoid having live or live-attenuated vaccines while receiving this medication. These include herpes zoster (Zostavax) for shingles prevention, oral polio, measles, nasal flu vaccine (FluMist®), rotavirus and yellow fever vaccines.

## Important but Less Common Side Effects

- **Peripheral Neuropathy (Numbness or Tingling in the Hands and/or Feet)** : [Peripheral neuropathy](#) is a toxicity that affects the nerves. It causes numbness or a tingling feeling in the hands and/or feet, often in the pattern of a stocking or glove. This can get progressively worse with additional doses of the medication. In some people, the symptoms slowly resolve after the medication is stopped, but for some it never goes away completely. You should let your provider know if you experience numbness or tingling in the hands and/or feet, as they may need to adjust the doses of your medication.
- **Vision/Hearing Changes**: In rare cases, this medication can cause changes to hearing and vision. Contact your provider if you notice ringing in your ears, decrease in hearing, or changes in your vision.

## 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 not breastfeed while receiving this medication.

# Pemetrexed (Alimta®)

**Pronounce:** pem-e-TREX-ed

**Classification:** Antifolate Antineoplastic Agent

## About Pemetrexed (Alimta®)

Pemetrexed works by blocking three enzymes that cells need to replicate. These enzymes, needed for folate-dependent metabolic processes, are required for DNA replication. By blocking DNA production, cell growth and division is stopped, causing cancer to slow or stop growing. Since cancer cells, in general, divide faster and with less error-correcting than healthy cells, cancer cells are more sensitive to this damage.

## How to Take Pemetrexed

Pemetrexed is given by intravenous (IV, into a vein) infusion. The dose is based on your height and weight. A steroid medication is often given before pemetrexed to decrease skin rash. A folic acid supplement and an injection of B12 may be given along with pemetrexed. These vitamin supplements should decrease the side effects you may have. Speak with your provider about specific dosing of steroids, folic acid, and B12 and the timing of these medications.

Let your provider know all medications, vitamins, and supplements you are taking as some can affect how pemetrexed works. Tell your care provider if you take any form of NSAID (non-steroidal anti-inflammatory drug) such as aspirin or ibuprofen because, taken in conjunction with pemetrexed, can cause kidney problems.

## Possible Side Effects of Pemetrexed

There are a number of things you can do to manage the side effects of pemetrexed. 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 effects:

### 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.

### 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 oncology care team 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.

### 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

### Important but Less Common Side Effects

- ***Low White Blood Cell Count (Leukopenia or Neutropenia)***: 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 or 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 bathe 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.
- **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:** Report any changes in your urinary habits, including a change in the amount or color of your urine. Be sure to notify your care provider if you take any form of NSAID (non-steroidal anti-inflammatory drug) such as aspirin or ibuprofen because, taken in conjunction with pemetrexed, can cause kidney problems.
- **Skin Changes/Rash:** These changes can include dryness, itching, and rash. Rash related to this medication typically occurs between doses and resolves before the next dose. A rash can result in blistering or peeling of the skin. Use an alcohol-free moisturizer on your skin and lips; avoid moisturizers with perfumes or scents. Your oncology care team can recommend a topical medication if itching is bothersome. If your skin does crack or bleed, be sure to keep the area clean to avoid infection. Be sure to notify your oncology care team of any rash that develops, as this can be a reaction.
- **Radiation Recall:** This medication may cause radiation recall. It may present as a skin reaction that looks like a sunburn (redness, swelling, soreness, peeling skin) in areas where radiation was previously given. Notify your oncology care team if you notice this side effect. Treatment can include topical steroid ointments and a delay in your next chemotherapy dose.
- **Pneumonitis:** Patients can develop an inflammation of the lungs (called pneumonitis) while taking this medication. Notify your oncology care team right away if you develop any new or worsening symptoms, including shortness of breath, trouble breathing, cough, or fever.

## 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. For women, effective birth control is necessary during treatment and for at least 6 months after the final dose. For men, effective birth control is necessary during treatment and for 3 months after the final dose. You should not breastfeed while receiving this medication and for one week after treatment is finished.

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