

Gemcitabine (Gemzar®)

Pronounced: jem-SYE-ta-been

Classification: Antimetabolite

About Gemcitabine

Gemcitabine kills cancer cells undergoing DNA synthesis. It inhibits ribonucleotide reductase, an enzyme important to DNA synthesis. Because cells cannot copy their DNA, they cannot properly divide, and thus die.

How to Take Gemcitabine

Gemcitabine is given by intravenous (IV, into a vein) infusion, over a period of 30 minutes. The dosage and schedule is determined by the person's size and type of cancer. It can be given alone or with other medications or therapies, such as radiation.

Due to a risk for increased toxicity, gemcitabine should not be given during, or within seven (7) days of, radiation therapy.

Possible Side Effects of Gemcitabine

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

Nausea and/or Vomiting

Talk to your doctor or nurse 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 antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms.

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

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), 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 doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse 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 doctor or nurse 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 doctor or nurse 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®, Aleve®, Advil®, etc. as these can all increase the risk of bleeding. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol).
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

Rash



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Some patients may develop a rash, dry skin, or itching. This rash can become severe, so be sure to let your care team know if you develop a rash. Use an alcohol free moisturizer on your skin and lips; avoid moisturizers with perfumes or scents. Your doctor or nurse 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 healthcare provider of any rash that develops, as this can be a reaction. They can give you more tips on caring for your skin.

Fever & Flu-Like Symptoms

Fever can be a side effect of this medication and typically occurs in the first 6-12 hours after your first dose. However, fever can be a sign of infection. If you develop a fever (temperature above 100.4), you should notify your doctor right away.

Patients may experience "flu-like" symptoms, which can include body aches, weakness, poor appetite and headache. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol) to help with some of these symptoms.

Fluid Retention / Swelling

Some patients may develop fluid retention, which can cause swelling in the feet and/or ankles or face or gain weight. Fluid can also build up in the lungs and cause you to feel short of breath. Notify your healthcare team if you have any swelling, unexpected weight gain or shortness of breath.

Liver Toxicity

This medication can cause liver toxicity, which your doctor 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 pain in your abdomen, as these can be signs of liver toxicity.

Radiation Recall

Radiation recall is when the administration of a medication causes a skin reaction that looks like a sunburn (redness, swelling, soreness, peeling skin) in areas where radiation was previously given. Notify your oncology team if you notice this side effect. Treatment can include topical steroid ointments and a delay in your next chemotherapy dose.

Lung Problems

This medication may cause pulmonary fibrosis (a scarring and stiffening of the lung tissue), interstitial pneumonitis, pulmonary edema or acute respiratory distress syndrome (ARDS). These problems can develop during treatment or up to two weeks after treatment is completed. Call your physician right away if you have shortness of breath, cough, wheezing or difficulty breathing.



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Posterior Reversible Encephalopathy Syndrome (PRES)

PRES is a rare, reversible neurological disorder that can occur with use of bortezomib. Symptoms of PRES include seizure, high blood pressure, headache, confusion, fatigue, confusion, any changes in your vision, or difficulty walking or thinking. If you experience any of these symptoms, contact your care team or go to the emergency room immediately.

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.

Loss or Thinning of Scalp and Body Hair (Alopecia)

Your hair may become **thin, brittle, or may fall out**. This typically begins two to three weeks after treatment starts. This hair loss can be all body hair, including pubic, underarm, legs/arms, eyelashes, and nose hairs. The use of scarves, wigs, hats and hairpieces may help. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun.

Hemolytic Uremic Syndrome (HUS)

This medication can also cause a rare complication called hemolytic uremic syndrome (HUS). Your healthcare team will monitor you for symptoms of HUS throughout your treatment. Notify your healthcare team if you notice changes in the color or amount of your urine or if you develop bleeding or increased bruising.

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 infusion nurse or provider immediately.

Reproductive Concerns



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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.

Oxaliplatin (Eloxatin®)

Pronounced: ox-AL-i-PLA-tin

Classification: Platinum Chemotherapy

About Oxaliplatin

Oxaliplatin is a type of platinum chemotherapy, which are heavy metal compounds that inhibit synthesis of RNA, DNA, and protein in cells. All of these are vital for cells to divide and grow. By preventing them from dividing, the medication can stop the cancer from growing.

How to Take Oxaliplatin

Oxaliplatin is given by intravenous (into a vein) infusion over a period of about 2 hours. It is often given in combination with other chemotherapy medications such as fluorouracil and irinotecan. The dosage and schedule is determined by the person's size, type of cancer, and mode of administration.

This medication can cause dizziness, vision problems or vision loss. You should not drive or operate machinery until you know how the medication affects you.

Possible Side Effects of Oxaliplatin

There are a number of things you can do to manage the side effects of oxaliplatin. Talk to your doctor or nurse about these recommendations. They can help you decide what will work best for you. Some of the more common side effects include:

Peripheral Neuropathy (Numbness or Tingling in the Hands and/or Feet)

This medication can cause two types of neuropathy, which are caused by damage to nerves. The first type tends to occur within 1-2 days of receiving the medication, tends to resolve within 2 weeks, and can reoccur with subsequent doses. It can feel like a tingling or numbness (pins & needles) or burning in the hands, feet, area around the mouth, or in the throat. This neuropathy can be exacerbated by exposure to cold temperature or cold objects (drinking a cold drink can trigger a feeling of spasm in the throat, or touching a



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cold steering wheel could cause numbness or tingling of the hands). Avoid cold exposure for several days after treatment. Drink room temperature fluids and wear gloves and socks in cool weather.

The second type of neuropathy tends to develop after several doses, persists between treatments (no break in the symptoms), and can get progressively worse with additional doses of the medication. It is typically a numbness and tingling in the hands and/or feet in the area a glove or sock would cover. This can progress to be painful and can affect your ability to perform daily tasks safely (unable to sense temperature of bath water, cannot feel the step with your toe, becoming a fall risk). Patients may have changes in proprioception, which is the ability of the body to be aware of its position. For instance, you can button a shirt without looking because your fingers know how they are bending and moving to perform the task -- this is called proprioception. Without proprioception, your body would not be able to tell the position of the fingers without looking at them. These symptoms are caused by damage to the nerves in the hands and feet. This neuropathy may improve gradually over the months following the discontinuation of treatment, but can become permanent for some patients.

Nausea and/or Vomiting

Talk to your doctor or nurse 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 antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms.

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

Diarrhea

Your oncology 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.

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), sore throat or cold, shortness of breath, cough, burning with urination, or a sore



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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 doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse 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 doctor or nurse 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 doctor or nurse 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®, Aleve®, Advil®, etc. as these can all increase the risk of bleeding. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol).
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

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



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tips on dealing with this side effect.

Mouth Ulcers (Sores)

Certain cancer treatments can cause [sores or soreness in your mouth](#) and/or throat. Notify your doctor or nurse 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. A baking soda and/or salt warm water mouth rinse (2 level teaspoons of baking soda or 1 level teaspoon 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.

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, chest pain, rash, flushing or itching or a decrease in blood pressure. If you notice any changes in how you feel during the infusion, let your nurse know immediately. The infusion will be slowed or stopped if this occurs. 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.

Liver Toxicity

This medication can cause liver toxicity, which your doctor 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 pain in your abdomen, as these can be signs of liver toxicity.

Other Side Effects

Some less common side effects include:

- Posterior reversible encephalopathy syndrome (PRES). Symptoms include headache, seizure, lethargy, confusion, blindness and other visual and neurological disturbances. Report any of these symptoms to your healthcare team immediately.
- Lung changes, including pulmonary fibrosis (a scarring and stiffening of the lung tissue). Notify your healthcare provider if you have new or worsening shortness of breath, non-productive cough, fever, wheezing or difficulty breathing.



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- Let your care team know if you have had or have cardiac (heart) problems as some of these can become worse on therapy and require ECG monitoring.
- Rhabdomyolysis (muscle damage) can occur. Report any muscle pain or weakness, reduced or no urine output, or red-brown colored urine to your healthcare provider.

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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