OncoLink
Abramson Cancer Center of the University of Pennsylvania

Fluorouracil (Adrucil®, 5-FU)

Pronounced: FLURE-oh-UE-ra-sil
Classification: Antimetabolite

About Fluorouracil

Fluorouracil exerts its anti-cancer effect by preventing synthesis of DNA and RNA in the cell by significantly decreasing thymine (a nucleotide that is one of the building blocks of DNA). Lack of functional DNA and RNA prevent the cancer cell from reproducing and making vital proteins, which results in death of the cell. In this way, fluorouracil slows or stops the growth of cancer cells in your body.

How to Take Fluorouracil

Fluorouracil can be given as an intravenous (into a vein) infusion over a period of 12-24 hours. It also comes as a topical cream, which should be applied 10 minutes after thoroughly washing, rinsing and drying the affected area. It can be given alone or with other drugs.

Possible Side Effects of Fluorouracil

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

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), 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.

For more suggestions, read the Neutropenia Tip Sheet.

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. Read the anemia tip sheet for more information.

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 nosebleeds, bleeding gums or blood in your urine or stool. If your platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor to shave (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.

Read the thrombocytopenia tip sheet for more information.

Nausea and/or Vomiting

Take anti-nausea medications as prescribed. If you continue to have nausea or vomiting, notify your doctor or nurse so they can help you manage this side effect. 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. Read the Nausea & Vomiting Tip Sheet for more suggestions.

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 that absorbs fluid and can help relieve diarrhea. Foods high in soluble fiber include: applesauce, bananas (ripe), canned fruit, orange and grapefruit sections, boiled potatoes, white rice and products made with white flour, oatmeal, cream of rice, cream of wheat, and farina. Drink 8-10 glasses on non-alcoholic, un-caffeinated fluid a day to prevent dehydration. Read Low Fiber Diet for Diarrhea for more tips.

Decrease in Appetite

Visit OncoLink's section on Nutrition for tips on dealing with this side effect. Ask your nurse about nutritional counseling services.

- 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 dislike foods or beverages that you liked before receiving chemotherapy. These symptoms can last up to several months.
- 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.
- Flavor meat or fish by marinating it in sweet juices, sweet and sour sauce or dressings. Use seasonings like basil, oregano or rosemary. Bacon, ham and onion can also add flavor to vegetables.

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.

Read the mouth ulcer tip sheet for more information.

Nail and Skin Changes

Your fingernails/toenails may become dark, brittle or fall off. You may notice dry skin or changes in the color or tone of your skin. Your skin will be more sensitive to the sun, which can result in severe sunburn or rash. Sun sensitivity can last even after chemotherapy is completed. Avoid the sun between 10-2pm, when it is strongest. Wear sunscreen (at least SPF 15) everyday, wear sunglasses and long sleeves/pants to protect your skin. Keep your fingernails and toenails clean and dry. You may use nail

polish, but do not wear fake nails. Notify your doctor or nurse if any nails fall off. For more suggestions, read the Nail and Skin Care Tip Sheet.

Changes of Vein Color

May cause darkening of the veins. Call your doctor or nurse if the vein used for injection becomes red, swollen, or painful at anytime during or after the injection. Do not apply anything to the site unless instructed by your doctor or nurse.

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.

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:

Low White Blood Cell Count (Leukopenia or Neutropenia)

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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.
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For more suggestions, read the Neutropenia Tip Sheet.

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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.

Read the thrombocytopenia tip sheet for more information.

Nausea and/or Vomiting

Take anti-nausea medications as prescribed. If you continue to have nausea or vomiting, notify your doctor or nurse so they can help you manage this side effect. 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. Read the Nausea & Vomiting Tip Sheet for more suggestions.

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 that absorbs fluid and can help relieve diarrhea. Foods high in soluble fiber include: applesauce, bananas (ripe), canned fruit, orange and grapefruit sections, boiled potatoes, white rice and products made with white flour, oatmeal, cream of rice, cream of wheat, and farina. Drink 8-10 glasses on non-alcoholic, un-caffeinated fluid a day to prevent dehydration. Read Low Fiber Diet for Diarrhea for more tips. Diarrhea can lead to serious dehydration and should be reported to your oncology team.

Numbness or Tingling in the Hands, Feet and Throat (Neuropathy)

This medication can cause two types of neuropathy, which are caused by damage to nerves. One 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 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 typically resolves or improves gradually over the months following the discontinuation of treatment, but can become permanent for some patients.

Be sure to tell your oncology team about any neuropathy symptoms, as this may require dose changes to prevent long-term damage. See OncoLink's section on neuropathy for tips on dealing with this side effect.

Fatigue

While on cancer treatment 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 and see OncoLink's section on fatigue for helpful tips on dealing with this side effect.

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 or for at least 2 weeks after stopping the medication. Effective birth control is necessary during treatment, even if your menstrual cycle stops or you believe you are not making sperm.

Other Side Effects

Some less common side effects that have been reported include: alopecia (loss or thinning of scalp and body hair) and an allergic-type reaction. This medication may affect your liver function, which your oncology team will monitor you for with blood tests. Report any yellowing of the skin or whites of the eyes (jaundice), as this can be a sign of liver damage.

Some patients developed pulmonary fibrosis, a scarring of the lung tissue. Notify your oncology team if you develop a cough, have difficulty breathing or shortness of breath.

A neurologic complication, called reversible posterior leukoencephalopathy syndrome, has been reported. If you experience headache, seizure, confusion, blindness or other visual changes, inform your healthcare provider right away.

Bevacizumab (Avastin™)

Pronounced: BEV-a-SIZ-oo-mab
Classification: Monoclonal Antibody

About Bevacizumab

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

Bevacizumab is given by intravenous (into a vein) infusion. The treatment is delivered over 90 minutes for the first infusion. If that dose is well tolerated, the second infusion can be administered over 60 minutes. If this is well tolerated, subsequent infusions can be given over 30 minutes. Dosage depends on the person and type of cancer being treated.

Bevacizumab is usually given at the same time as other chemotherapy medications. Therefore, this should be kept in mind as the side effects are reviewed.

Possible Side Effects of Bevacizumab

Bevacizumab has the potential to cause several serious side effects. There are some things you can do to manage the more common side effects of Bevacizumab. Talk to your doctor or nurse about these recommendations. They can help you decide what will work best for you.

Hemorrhage (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), nosebleeds 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.

Hypertension (High Blood Pressure)

Patients receiving bevacizumab can develop high blood pressure. Your blood pressure should be monitored at every clinic visit or every 2-3 weeks. If your blood pressure is elevated, you will be treated with a medication to reduce your pressure. If severe hypertension develops, bevacizumab should be discontinued immediately. In both cases, 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.

Gastrointestinal Perforation

Bevacizumab can result in a serious, sometimes fatal, problem called gastrointestinal perforation, which is the development of a hole in the stomach or small or large intestine. If you develop abdominal pain, nausea, vomiting, constipation or fever, you should notify your healthcare team immediately.

Poor Wound Healing

Bevacizumab can lead to slower or incomplete wound healing, such as a surgical wound not healing or staying closed. Therefore, it is recommended that bevacizumab not be given within at least 28 days before or after surgery. In addition, any surgical incision should be fully healed prior to starting bevacizumab. If you notice that your surgical wound 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.

Additional Rare, But Serious, Side Effects

Stroke or heart problems, including blood clots, heart attack and chest pain, can occur. Bevacizumab should be stopped if these occur. 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).

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 that absorbs fluid and can help relieve diarrhea. Foods high in soluble fiber include: applesauce, bananas (ripe), canned fruit, orange and grapefruit sections, boiled potatoes, white rice and products made with white flour, oatmeal, cream of rice, cream of wheat, and farina. Drink 8-10 glasses on non-alcoholic, un-caffeinated fluid a day to prevent dehydration. Read Low Fiber Diet for Diarrhea for more tips.

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For more suggestions, read the Neutropenia Tip Sheet.

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