

Fludarabine

(floo-DARE-a-been)

Trade names: Fludara®

Chemocare.com uses generic drug names in all descriptions of drugs. Fludara is the trade name for fludarabine. In some cases, health care professionals may use the trade name fludara when referring to the generic drug name fludarabine.

Drug type: Fludarabine is an anti-cancer ("antineoplastic" or "cytotoxic") chemotherapy drug. This medication is classified as an "antimetabolite." (For more detail, see "How this drug works" section below).

What this drug is used for:

- Treatment of chronic lymphocytic leukemia (CLL), including CLL that has not responded to or reoccurred after standard therapy.
- Salvage therapy for non-Hodgkin's lymphoma and acute leukemias.
Note: If a drug has been approved for one use, physicians may elect to use this same drug for other problems if they believe it may be helpful.

How this drug is given:

- Fludarabine is given through a vein, intravenously, IV.
- The amount of fludarabine that you will receive depends on many factors, including your height and weight, your general health or other health problems, and the type of cancer or condition being treated. Your doctor will determine your dose and schedule.

Side effects:

Important things to remember about the side effects of fludarabine:

- Most people do not experience all of the side effects listed.
- Side effects are often predictable in terms of their onset and duration.
- Side effects are almost always reversible and will go away after treatment is complete.
- There are many options to help minimize or prevent side effects.
- There is no relationship between the presence or severity of side effects and the effectiveness of the medication.
- The side effects of fludarabine and their severity depend on how much of the drug is given. In other words, high doses may produce more severe side effects.

The following side effects are common (occurring in greater than 30%) for patients taking fludarabine:

- Low blood counts. Your white and red blood cells and platelets may temporarily decrease. This can put you at increased risk for infection, anemia and/or bleeding.

Nadir: Meaning low point, nadir is the point in time between chemotherapy cycles in which you experience low blood counts.

Onset: none noted

Nadir: 10-14 days

Recovery: 14-21 days

- Fever

- Infection
- Weakness
- Cough
- Nausea and vomiting
- Poor appetite

These side effects are less common side effects (occurring in about 10-29%) of patients receiving fludarabine:

- Chills
- Fatigue
- Pain
- Sweating
- Numbness and tingling of hands and feet
- Shortness of breath (see lung problems)
- Diarrhea
- Rash (see skin reactions)
- Swelling
- Taste changes, metallic taste

Other side effects:

- Increased risk of infection (such as herpes, fungal infection, and *Pneumocystis carinii*) due to suppression of the immune system. Antibiotics are often given to prevent or protect from these infections while receiving fludarabine.
- Although rare at regular dosages, severe central neurotoxicity may be seen in high dose treatment. Symptoms such as weakness, agitation, confusion, seizures, and/or coma.
- Hemolytic anemia has rarely occurred in people receiving one or more cycles of fludarabine. Patients are monitored for this condition.
- Your fertility, meaning your ability to conceive or father a child, may be affected by fludarabine. Please discuss this issue with your health care provider.
- Tumor lysis syndrome may occur as a result of leukemia treatment. Tumor lysis syndrome occurs when large amounts of cancerous cells are rapidly killed by the therapy. These cells release uric acid, potassium and phosphorus into the blood stream. Tumor lysis syndrome can lead to kidney failure. Tumor lysis syndrome usually occurs within 24 - 48 hours of therapy. Care must be taken to prevent the development of tumor lysis syndrome. Your health care provider will prescribe plenty of fluids to keep you hydrated. You may be given a drug called allopurinol that blocks uric acid production. In some cases, your health care provider may prescribe other measures to lower your white blood count before therapy. Let your health care provider know immediately if you are unable to urinate. Your health care provider will monitor your progress carefully during therapy. This is rarely seen and most often in the setting of high tumor cell burden.

Not all side effects are listed above. Some that are rare (occurring in less than 10% of patients) are not listed here. However, you should always inform your health care provider if you experience any unusual symptoms.

When to contact your doctor or health care provider:

Contact your health care provider *immediately*, day or night, if you should experience any of the following symptoms:

- Fever of 100.4° F (38° C) or higher, chills (possible signs of infection)

- Shortness of breath, difficulty breathing
- Unable to urinate

The following symptoms require medical attention, but are not an emergency. Contact your health care provider *within 24 hours* of noticing any of the following:

- Nausea (interferes with ability to eat and unrelieved with prescribed medication)
- Vomiting (vomiting more than 4-5 times in a 24 hour period)
- Diarrhea (4-6 episodes in a 24-hour period)
- Unusual bleeding or bruising
- Black or tarry stools, or blood in your stools
- Blood in the urine
- Extreme fatigue (unable to carry on self-care activities)
- Signs of infection such as redness or swelling, pain on swallowing, coughing up mucous, or painful urination.

Always inform your health care provider if you experience any unusual symptoms.

Precautions:

- Before starting fludarabine treatment, make sure you tell your doctor about any other medications you are taking (including prescription, over-the-counter, vitamins, herbal remedies, etc.). Do not take aspirin, or products containing aspirin unless your doctor specifically permits this.
- Do not receive any kind of immunization or vaccination without your doctor's approval while taking fludarabine.
- Inform your health care professional if you are pregnant or may be pregnant prior to starting this treatment. Pregnancy category D (fludarabine may be hazardous to the fetus. Women who are pregnant or become pregnant must be advised of the potential hazard to the fetus).
- For both men and women: Do not conceive a child (get pregnant) while taking fludarabine. Barrier methods of contraception, such as condoms, are recommended. Discuss with your doctor when you may safely become pregnant or conceive a child after therapy.
- Do not breast feed while taking this medication.

Self-care tips:

- You may be at risk of infection so try to avoid crowds or people with colds and those not feeling well, and report fever or any other signs of infection immediately to your health care provider.
- Wash your hands often.
- Use an electric razor and a soft toothbrush to minimize bleeding.
- Avoid contact sports or activities that could cause injury.
- To reduce nausea, take anti-nausea medications as prescribed by your doctor, and eat small, frequent meals.
- Drink at least two to three quarts of fluid every 24 hours, unless you are instructed otherwise.
- In general, drinking alcoholic beverages should be kept to a minimum or avoided completely. You should discuss this with your doctor.
- Acetaminophen or ibuprofen may help relieve discomfort from fever, headache and/or generalized aches and pains. However, be sure to talk with your doctor before taking it.
- Get plenty of rest.
- Maintain good nutrition.
- If you experience symptoms or side effects, be sure to discuss them with your health care team. They can prescribe medications and/or offer other suggestions that are effective in managing such problems.

Monitoring and testing:

You will be checked regularly by your health care professional while you are taking fludarabine, to monitor side effects and check your response to therapy. Periodic blood work to monitor your complete blood count (CBC) as well as the function of other organs (such as your kidneys and liver) will also be ordered by your doctor.

How this drug works:

Cancerous tumors are characterized by cell division, which is no longer controlled as it is in normal tissue. "Normal" cells stop dividing when they come into contact with like cells, a mechanism known as contact inhibition. Cancerous cells lose this ability. Cancer cells no longer have the normal checks and balances in place that control and limit cell division. The process of cell division, whether normal or cancerous cells, is through the cell cycle. The cell cycle goes from the resting phase, through active growing phases, and then to mitosis (division).

The ability of chemotherapy to kill cancer cells depends on its ability to halt cell division. Usually, the drugs work by damaging the RNA or DNA that tells the cell how to copy itself in division. If the cells are unable to divide, they die. The faster the cells are dividing, the more likely it is that chemotherapy will kill the cells, causing the tumor to shrink. They also induce cell suicide (self-death or apoptosis).

Chemotherapy drugs that affect cells only when they are dividing are called cell-cycle specific. Chemotherapy drugs that affect cells when they are at rest are called cell-cycle non-specific. The scheduling of chemotherapy is set based on the type of cells, rate at which they divide, and the time at which a given drug is likely to be effective. This is why chemotherapy is typically given in cycles.

Chemotherapy is most effective at killing cells that are rapidly dividing. Unfortunately, chemotherapy does not know the difference between the cancerous cells and the normal cells. The "normal" cells will grow back and be healthy but in the meantime, side effects occur. The "normal" cells most commonly affected by chemotherapy are the blood cells, the cells in the mouth, stomach and bowel, and the hair follicles; resulting in low blood counts, mouth sores, nausea, diarrhea, and/or hair loss. Different drugs may affect different parts of the body.

Chemotherapy (anti-neoplastic drugs) is divided into five classes based on how they work to kill cancer. Although these drugs are divided into groups, there is some overlap among some of the specific drugs. The following are the types of chemotherapy:

Fludarabine is classified as an antimetabolite. Antimetabolites are very similar to normal substances within the cell. When the cells incorporate these substances into the cellular metabolism, they are unable to divide. Antimetabolites are cell-cycle specific. They attack cells at very specific phases in the cycle. Antimetabolites are classified according to the substances with which they interfere.

- **Folic acid antagonist:** Methotrexate
- **Pyrimidine antagonist:** 5-Fluorouracil, Floxuridine, Cytarabine, Capecitabine, and Gemcitabine
- **Purine antagonist:** 6-Mercaptopurine and 6-Thioguanine
- **Adenosine deaminase inhibitor:** Cladribine, Fludarabine and Pentostatin

Because of how fludarabine is structured it is resistant to breakdown by the enzyme adenosine deaminase. It is changed by the body so that it can pass into the cells then it is changed within the cell to its active form where it can interfere with the cancer cell's process of duplicating itself, and induces apoptosis (cell suicide).

Note: We strongly encourage you to talk with your health care professional about your specific medical condition and treatments. The information contained in this website is meant to be helpful and educational, but is not a substitute for medical advice.