

# CHLORAMBUCIL

**BRAND NAME: LEUKERAN**

AVAILABLE IN  
2 mg  
TABLETS

## BACKGROUND

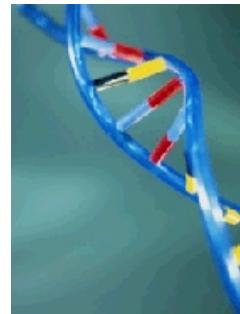
When cancer is not localized to one body area, one needs a treatment that can reach multiple body areas no matter how inaccessible. Surgery and radiation are therapies for localized disease and will not be helpful for more widespread tumors but medications, on the other hand, can travel anywhere that the body's blood vessels will take them. The use of medication to treat cancer is called "chemotherapy."

In order for chemotherapy to be effective, the medications must destroy tumor cells and spare the normal body cells that may be adjacent. This is accomplished by using medications that affect cell activities that go on predominantly in cancer cells but not in normal cells. Most chemotherapy agents focus on the rapid cell division that characterizes the spread of cancer cells.

Chlorambucil is what is called an "alkylating agent" of the "nitrogen mustard" group. Alkylating agents work by binding DNA strands so that the double helix cannot "unzip" and replicate. (In other words, cell division is not possible). Alkylating agents also bind other important biochemicals impairing their function and can even break DNA strands. All this DNA breakage and interference with replication makes cell division particularly difficult.

There are two scenarios where targeting rapidly dividing cells is necessary. As mentioned, non-localized cancer is one situation. The other is immune-mediated disease. Immune stimulation involves rapidly dividing lymphocytes which in turn produce antibodies and promote other immune activities. This kind of immune activity and rapid cell division is also vulnerable to drugs (like alkylating agents) that target cell division.

Alkylating agents as a group have had problems with side effects. Because chlorambucil is relatively slow acting, fewer side effects have been an issue with this medication, especially in feline use. The use of chlorambucil has made the treatment of numerous cancers and immune-mediated diseases more successful especially in cats.



Depiction of DNA Double Helix

## HOW THIS MEDICATION IS USED

Chemotherapy protocols for the following cancers have included chlorambucil:

- Lymphocytic leukemia
- Multiple myeloma
- Ovarian cancer
- Lymphoma
- Polycythemia rubra vera

Immune Mediated conditions where chlorambucil may be especially helpful include:

- The Pemphigus diseases
- Eosinophilic Granuloma Complex
- Inflammatory Bowel Disease
- Immune-mediated hemolytic anemia
- Immune-mediated platelet destruction

Chlorambucil is typically given daily, every other day, or every third day. Therapeutic effects may not be seen until after 2-4 weeks of use so effectiveness of treatment should not be judged before that time.

If a dose is accidentally skipped, simply give the medication when it is remembered or pick up with the next dose, allowing at least the proper interval between doses according to the label instructions.

## SIDE EFFECTS

The main side effect of concern with chlorambucil is bone marrow suppression. The bone marrow is one's source of all blood cells both white cells and red cells. Since the precursors of these cells are rapidly dividing, they are targeted by chlorambucil. When the bone marrow is suppressed, one can develop an anemia (inadequate amount of red blood cells), a drop in white cells (which constitute the bulk of the immune system), or both. This side effect is generally evident at some point during the second week of therapy and blood testing at this time is definitely in order to determine if this side effect is occurring. Once the medication is discontinued, the marrow should recover in another 1-2 weeks, though more severe and long lasting suppression has rarely occurred.

Poodles and Kerry Blue Terriers may have hair loss problems on chlorambucil but the hair loss humans experience with chemotherapy generally does not occur with dogs and cats.

Overdose of chlorambucil not only results in bone marrow suppression in all cell lines but seizures and twitching have been reported. If a pet shows neurologic signs such as these on regular dosing then chlorambucil should be discontinued.

## INTERACTIONS WITH OTHER DRUGS

Chlorambucil's bone marrow suppression side effect may be compounded if chlorambucil is used with other medications that also share possible bone marrow suppression as a side effect. Such medications include:

- Chloramphenicol
- Azathioprine
- Colchicine
- Cyclophosphamide

The use of chlorambucil may lead to the need to increase the dose of allopurinol for patients who take it (such as uric acid bladder stone forming Dalmatians).

## CONCERNS AND CAUTIONS

The DNA poisoning effects of this medication precludes its use in pregnant patients; further, pregnant women should not handle this medication, nor the urine/feces of animals taking chlorambucil.

Chlorambucil should not be used in patients with pre-existing bone marrow suppression.

Chlorambucil is suppressive to the immune system and should be used with caution in patients already immune suppressed (such as FIV+ cats) or with chronic infections.

Chlorambucil may cause permanent infertility when given to patients prior to puberty.

Chlorambucil is best given with food.

Gloves should be worn when disposing of a pet's waste or body fluids. Waste should be sealed in a plastic bag along with the gloves but these materials may be deposited in the regular trash.

Chlorambucil should be protected from light and refrigerated.

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Additional drug and general pet care information can be found on our world wide web site:

<http://www.marvistavet.com>