



## Patient Resource: European Mistletoe



### What is mistletoe?

European mistletoe (*Viscum album*) is a plant that grows on a variety of trees. It is sometimes recommended to people with cancer as an integrative or complementary treatment. The plant is extracted into a liquid that can be used as an injection (subcutaneous) or an intravenous (IV) infusion. Mistletoe should only be used under the guidance of a qualified healthcare provider.

### What is mistletoe used for?

Mistletoe is used in cancer care as it may:

- Enhance the immune system
- Support quality of life
- Reduce cancer and cancer treatment-related symptoms and side effects
- Improve treatment outcomes or slow progression

Mistletoe is not used as a cure for cancer. Mistletoe should not be considered an alternative to cancer treatments such as chemotherapy or radiation therapy.

### How does mistletoe work?

There are two ways in which it is thought mistletoe works.

- (1) Enhancing immune function – mistletoe appears to increase types of white blood cells called lymphocytes including natural killer cells, certain compounds called cytokines, and mistletoe antibodies.
- (2) Directly killing cancerous cells (cytotoxicity) – mistletoe may trigger cell death which may reduce cancers ability to grow and spread.

### Does mistletoe work?

Dozens of studies have been done to evaluate the safety and effectiveness of mistletoe as a supportive treatment in cancer care. Some of these studies are high quality but others are not, making interpretation difficult. Mistletoe has been studied in a variety of cancer types and stages, and alongside a variety of treatments including chemotherapy, radiation, and surgery.

Overall, mistletoe therapy is likely effective in supporting quality of life in people with cancer and reducing side effects of chemotherapy. Results are mixed for tumour response and survival. Some inconsistency may be due to the range of mistletoe preparations, cancer types, and cancer stages evaluated in these studies.

#### *Immune Response*

In several studies mistletoe has been found to increase certain white blood cells called lymphocytes including natural killer cells. Mistletoe treatment seems to decrease the immunosuppressive effects of surgery. Mistletoe does not appear to help increase neutrophils.

#### *Quality of Life and symptom management*

Several systematic reviews (large summaries of research) have shown a benefit of mistletoe treatment on quality of life and symptom management across a range of cancer types. Side effects which may be improved with mistletoe include nausea, vomiting, diarrhea, appetite loss, pain, and fatigue.

#### *Survival and tumor response*

Although several studies have found improved lifespan for people treated with mistletoe, about an equal number have not found this. Some of the higher quality studies were less likely to find benefit compared to some of the lower quality studies. Therefore, results are not conclusive and additional research is needed to study any potential benefit to survival.

Mistletoe is not a curative treatment for cancer and should not be used to replace other effective cancer treatments. Given the data, mistletoe should be considered primarily for support for quality of life, side effects, and immune system support. Discuss your options with a healthcare provider.



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### Is mistletoe safe?

Mistletoe has a very good safety profile. However, there are times when mistletoe therapy may not be safe.

Mistletoe should not be used by anyone with a known allergy or sensitivity to mistletoe. Use is generally not recommended during pregnancy or breastfeeding due to lack of information on safety. Because mistletoe can stimulate the immune system, it should not be used in combination with immunosuppressant medications (e.g. for treatment of autoimmune conditions or after transplants).

Mistletoe should be used cautiously in people with autoimmune conditions although it is likely safe for most if not taking immunosuppressant medication. Mistletoe should be used cautiously in people with brain tumors due to the possibility of inflammation. Due to lack of information, mistletoe should be used cautiously in people with blood cancers, particularly acute leukemias.

No studies have found negative interactions with mistletoe and chemotherapy, radiation therapy, or surgery. Preliminary studies have found no harm using mistletoe alongside immunotherapies and targeted therapies, but more research is needed.

Mistletoe should only be used under the guidance of a healthcare provider to monitor for reactions, response, and to administer and/or monitor injections.

### Where can I get references and more information?

For more detailed information including references you can read the OICC's Healthcare Professional Mistletoe Monograph which may be found on our website: [www.oicc.ca](http://www.oicc.ca). You can also consult with a health care provider such as a naturopathic doctor, medical doctor, or nurse practitioner who is experienced in the use of mistletoe.

### What are the side effects of mistletoe?

Mistletoe is generally well tolerated, but there are some common and expected side effects. Most side effects are mild and resolve on their own. Discuss use with your health care provider in detail.

Subcutaneous injections: injection site reactions (redness, swelling, itching), fatigue, flu-like symptoms, mild fever, diarrhea, and headache. Severe local reactions at the injection site occur in less than 1% of people.

Intravenous infusions: mild fever, itching, weakness, fatigue, re-inflammation of prior injection sites.

Serious reactions are rare but include angioedema, anaphylaxis, hypotension and loss of consciousness, cellulitis at injection site.

There is more research on the use and safety of subcutaneous injections of mistletoe than for IV infusions. The risk of severe adverse reactions such as anaphylaxis may be higher with IV use, but more research is needed.

### What is the recommended dose, frequency, and length of use of mistletoe?

At the OICC, mistletoe is available as subcutaneous injections or intravenous (IV) infusions. The route of administration, type of mistletoe, maximum dose, and length of use varies based on the individual's cancer type, stage, medical history, goals and preferences, and other cancer treatments. Treatment with subcutaneous or IV administration begins with a low dose to assess tolerability. If mistletoe is well tolerated the dose is increased slowly to a maximum of 200mg for subcutaneous injections or 1000mg for IV.

Treatment may be used for a few months to support people during active treatment, and in some instances may be used for one or more years if well-tolerated and positive outcomes are observed.