



Laetrile

Abstract and key points

Laetrile is an acronym used to describe a purified, semi-synthetic form of Amygdalin (LAEvorotatory and mandeloniTRILE). Amygdalin is a naturally occurring plant compound that contains sugar and produces cyanide and is found primarily in the kernels of apricots, peaches and bitter almonds and also in plants such as lima beans, clover and sorghum.

- Laetrile is an acronym used to describe a purified, semi-synthetic form of Amygdalin, a naturally occurring plant compound.
- There is no clear evidence that laetrile is effective as an anti-cancer agent.
- Laetrile is associated with serious safety concerns.

The main active cancer-killing ingredient of Laetrile is thought to be cyanide, this has caused serious concerns over toxicity. Laetrile is reported to be an anti-cancer treatment or even cure. It was at the height of its popularity in the 1970s and 1980s, and has since been rejected by the scientific community after a phase II controlled clinical trial in 1982 which found no evidence for the efficacy of laetrile and highlighted safety concerns.

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Laetrile/Amygdalin/B17 is associated with potential toxic effects at certain doses (cyanide poisoning) and liver problems.

What is Laetrile?

Scientific/ common names

Laetrile is also known as: Apricot pits, Vitamin B17, mandelonitrile-beta-glucuronide (semi-synthetic), mendelonitrile beta-D-gentiobioside (natural product), laevorotatory and mandelonitrile, purasin, Amygdalina, and nitriloside.

Ingredients

Laetrile is an acronym used to describe a purified, semi-synthetic form of Amygdalin (LAEvorotatory and mandeloniTRILE). Amygdalin is a naturally occurring plant compound that contains sugar and produces cyanide and is found primarily in the kernels of apricots, peaches and bitter almonds and also in plants such as lima beans, clover and sorghum.

Laetrile in the US is not the same thing as Laetrile/Amygdalin used in Mexico. This is because the “Laetrile” used in Mexico may actually be simply crushed apricot kernels, rather than the semi-synthetic form of Laetrile (mandelonitrile-beta-glucuronide) used in the US. Therefore, not all studies of laetrile may have tested the same substance, making conclusions difficult. Incorrect labels have been found and samples tested have been contaminated with bacteria, toxins and other substances¹. Several foods may also contain Laetrile in low and safe amounts as part of a balanced diet.

Application and dosage

Laetrile is usually administered either orally as a pill, or by injecting into a vein or muscle. Treatment is usually started intravenously for a period of time (approximately two to three weeks) and then provided orally (maximum of 5 kernels at one time, or 1 gram of Laetrile) as a maintenance therapy. Laetrile can also be used in enema form, or can be applied directly to skin lesions.

History

Amygdalin was first identified and isolated by French chemists in 1830 and was used as an anti-cancer agent in 1845 in Russia. By the 1920s Amygdalin had reached the US, but the early pill form was considered to be too toxic and its use was discontinued. In the 1950s an apparently non-toxic, semi-synthetic intravenous form of Amygdalin was developed by Dr Krebs in the US, and this became known as Laetrile. In the 1970s Laetrile gained popularity either as a single-agent treatment or as part of a metabolic therapy programme (that also included high-dose vitamin supplements and enzymes)².

Claims of efficacy/mechanism(s) of action/alleged indication

Powerful claims of anti-cancer effects have been made by distributors and hospitals in Mexico where Laetrile is used. Proponents suggest that cyanide is responsible for the anti-cancer action, which is released from the enzymatic degradation of laetrile³. However, none of these claims have been supported by research evidence. Supporters of Laetrile often use anthropological evidence to back up their anti-cancer claims. Such evidence comes from studies of remote cultures who consume high levels of foods rich in nitrilolides (Amygdalin), for instance, the Hunza, aboriginal Eskimo, the Hopi and Navajo Indians⁴. However, it is important to remember that, even though studies of these populations have reported low incidences of cancer, this must be viewed in context and other unmeasured variables taken into account.

Cyanide released from enzymatic degradation of laetrile or amygdalin is believed to be the ingredient responsible for the alleged anti-cancer action. Proponents claim that malignant cells are specifically

vulnerable to cyanogenic glycosides because of two characteristics: a higher level of beta-glucosidases and beta-glucuronidase compared to normal cells, which would lead to a more rapid intracellular release of cyanide from laetrile or amygdalin and a deficiency in rhodanese, an enzyme that converts cyanide into the harmless compound thiocyanate. Another theory claims that cancer develops due to the deficiency of a vitamin, named "vitamin B17", which was the name that the chemist E.T. Krebs gave to laetrile⁵.

Prevalence of use

The popularity of Laetrile reached its peak in 1978 when it was reported that 70,000 people had been treated with it². Current prevalence data are not available.

Legal issues

Laetrile has had a very long and detailed history. This includes inaccurate theories of how it works, conspiracy theories of unpublished research supporting its use, banning of its use in the US by the Food and Drug Administration (FDA), and the jailing of many supporters and suppliers (including Dr Krebs himself). The controversy continues with vendors' internet sites being shut down and injunctions being served. In the UK, according to the Medicines and Healthcare products Regulatory Agency (MHRA), the status of Amygdalin/Laetrile/B17 is that it is a prescription only medicine. It is not a banned substance but it is unlicensed, and as such its availability is restricted through a prescription from a doctor. This means that a doctor can supply it to a patient should he or she considers it an appropriate treatment, however, the doctor does this under their own responsibility. No licensed products contain the Laetrile/Amygdalin/B17 substance.

Cost and expenditures

Laetrile tablets are available via the internet for approximately 100 USD for 100 tablets. Since there are no clear guidelines on dosage and length of treatment, it is not possible to give an overall cost for laetrile treatment.

Does it work?

Systematic reviews

Researchers conducting a Cochrane systematic review were unable to find any randomised clinical trials assessing the effectiveness of Laetrile⁵. They concluded that there was no evidence that Laetrile was effective as an anti-cancer agent.

An earlier review reported that although beneficial results had been reported from best case series and case studies, as these do not include a comparison group, they do not provide good quality evidence. It concluded that there is no sound evidence that Laetrile is effective as an anti-cancer agent⁶.

Uncontrolled clinical trials

Two clinical trials have been conducted with Laetrile. In the first study (a phase I study n=6)[7](#), two of the six people studied developed cyanide poisoning symptoms whilst undergoing oral Laetrile treatment. The second (phase II) clinical trial (n=175)[8](#) tested a metabolic therapy programme (which included the use of laetrile in addition to a healthy vegan diet). Only one person showed any benefit from taking Laetrile (tumour shrinking). During Laetrile therapy 7% reported an improvement in ability to perform normal activities and 20% showed symptomatic relief. However, these benefits did not continue after the therapy ended.

Results of trials in Benzaldehyde[9,10](#) (one of Laetrile's breakdown products) showed that in the first trial, out of 57 people, 19 showed a complete eradication of the cancer and ten showed a reduction in tumour size; in the second study the cancer was eradicated in seven of the 65 people and 29 had a partial removal or reduction in their tumour. No toxicity was reported in either study, furthermore, the positive benefits of the benzaldehyde only continued while it was being continuously taken.

Preclinical and animal studies

In one study, the viability of human cervical cancer HeLa cell line was found to be significantly inhibited by amygdalin.[22](#)

Two animal studies of laetrile in rodents found no statistically significant increase in survival time[11,12](#).

However, four positive animal studies using laetrile have been found. In the first study positive effects of Laetrile were seen only when it was administered to mice alongside vitamin A and enzymes[13](#). In the second study researchers using cell cultures found that Laetrile stimulated the immune system in terms of more white blood cells adhering to prostate cancer cells[14](#). In the third, using tumour cells created in the laboratory, researchers found that Laetrile could indirectly sensitize the oxygen-starved cells at the centre of a tumour to the lethal effects of gamma irradiation[15](#). In the fourth study researchers cultured human bladder cells and treated them with Laetrile alone and in conjunction with an antibody chemically related to beta-glucosidase. They found no benefit from administering Laetrile alone, however, when the antibody was also added cancer cells were killed[16](#).

Is it safe ?

Adverse events

Cyanide is believed to be the active cancer-killing ingredient in Laetrile, which has caused concern over toxicity. Adverse events linked with Laetrile treatment are like the symptoms of cyanide poisoning. These symptoms include: nausea and vomiting, headache, dizziness, bluish discolouration of the skin due to lack of oxygen in the blood, liver damage, abnormally low blood pressure, difficulty walking, droopy eyelids, fever and mental confusion, coma and death. Several deaths have been attributed to Laetrile[17,18](#). If taking Laetrile orally, the potential risk of cyanide poisoning symptoms are increased if any from the list of foods

containing Laetrile are eaten (see above) or high doses of vitamin C are taken¹⁹. A recent adverse drug reaction case of severe life-threatening accidental cyanide poisoning has been reported in Australia. The report suggests a patient increased her risk of cyanide toxicity by co-ingesting amygdalin with a megadose of Vitamin C (4800mg)²⁰. More severe adverse events (i.e. cyanide poisoning) are seen when Laetrile is administered orally than when it is given by injection, as intestinal bacteria contain enzymes that promote the release of cyanide in the digestive system²¹.

A review concluded that the risk of people developing cyanide poisoning who ingest Laetrile is high⁶.

Contraindications

In addition to the above serious concerns, for those with liver problems/damage Laetrile may compromise liver function¹⁸. Furthermore, this treatment should be avoided by pregnant or breast-feeding women.

Interactions

Ascorbic acid (vitamin C) may increase the toxicity of Laetrile/Amygdalin/B17¹⁹.

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