

**White Paper:  
Laetrile / Vitamin B17 / Amygdalin  
as a Cancer Prevention & Treatment  
(an organic compound of the Nitrilosides family of plants)**

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## **Overview**

Laetrile is a purified derivative of a naturally occurring compound called Amygdalin, which is found in the pits of many fruits, raw nuts, seeds, and other plants [1].

Amygdalin, also known as vitamin B17, is present in high amounts in the apricot seed and is commonly believed to have anticancer properties. Apricot seeds (also known as kernels) are a member of the Nitriloside family of plant products. These include over 1200 commonly consumed foods, many of which were a significant part of the American diet but have since been replaced mainly by highly processed, less nutritional foods.

The health benefits of vitamin B17-containing foods have not been discovered recently. The therapeutic properties of Amygdalin were documented in ancient Egypt and employed in traditional Chinese medicine practices. It is hypothesized that the consumption of foods high in vitamin B17 may be largely responsible for certain cancer-free tribes, such as the Hunza of the Karakoram mountains of northern Pakistan, whose diets historically include the consumption of significant amounts of apricot kernels [21].

Laetrile is theorized to prevent cancer development and eliminate cancer cells by producing hydrogen cyanide. Hydrogen cyanide is proposed to target and destroy mutated cells selectively (with altered or damaged DNA) [3]. Laboratory research supports the potential anticancer properties of Laetrile [4] [5]. However, clinical research in humans is still minimal. The Amygdalin compound is found in many plant-based products. It is considered a Nitriloside (a substance that naturally contains a molecular structure that includes cyanide locked in a molecular compound), which has raised concerns about potential toxicity [3].

Proponents assert that cyanide is locked in a molecule that benignly passes through the body and is excreted in the urine. However, if an aberrant cell is present in the body, enzymes interact to release the cyanide to “attack” the cancerous cell, as explained further below.

## **Historical Perspective**

Amygdalin was isolated for the first time by two French chemists, Pierre Jean Robiquet and Antoine François Boutron-Charlard, in the 1830s. Records of its use as an anticancer therapy date back as early as 1845, with positive results initially reported with patients in Russia [6]. Amygdalin was first used for cancer in pill form in the United States in the 1920s. In the 1950s, Ernst T. Krebs patented a semi-synthetic and purified derivative of Amygdalin under the brand name Laetrile [6].

Congress initiated the war on cancer. President Richard Nixon signed the National Cancer Act of 1971 into federal law, precipitating a decades-long funding funnel that continues to this day.

Three institutions were considered comprehensive treatment facilities at the time of the National Cancer Act of 1971. Among them was the Memorial Sloan Kettering Cancer Center in New York City, which began research into Laetrile under the direction of Dr. Kanematsu Sugiura, an esteemed pioneer in cancer research and co-inventor of chemotherapy. Dr. Sugiura found that when he used Laetrile on mice, it tended to inhibit the growth of secondary tumors (although effects on the primary tumors were considered by some to be inconclusive) [9].

Dr. Sugiura repeated his findings many times over several years with the same encouraging results. However, despite being renowned as an extraordinarily reliable and trustworthy scientist, his research was suppressed by a complex constellation of political and economically driven interests [9]. Ralph W. Moss, a science writer at Sloan Kettering, attempted to publicize the research and leaked Dr. Sugiura's findings to the American media and public, but he was fired by the company after refusing to falsify the reports [10].

The institute never published Dr. Sugiura's original findings. It is important to note that at the time, Sloan Kettering was the world's leading manufacturer of Sugiura-created chemotherapy. Instead, the institute published results from colleagues who claimed to have followed the same protocol but found no benefits [11]. Dr. Sugiura stood behind his findings and continued to believe that Laetrile could have potential therapeutic applications, notably in cancer prevention and palliative care, to slow the spread or progression of the disease [12].

Despite public pressure to make it broadly available during the 1970s, Laetrile was banned in 1980 [6]. 1982 the Mayo Clinic conducted a clinical trial on Laetrile and concluded it ineffective [13]. They claimed that further investigation into its potential anticancer effects was not justifiable [14]. However, there exists substantial evidence of flaws in the research methodologies used by the Mayo Clinic related to the type of Laetrile used, the way it was administered, the use of terminally diagnosed patients, and how the results were interpreted [14].

The Mayo Clinic study sparked considerable acceptance within some medical communities that Laetrile was ineffective. However, in alternative medical circles, this research may have given an overly pessimistic view of Laetrile's safety profile and potential efficacy as a cancer treatment [14].

## **Research**

Laetrile is widely used worldwide as a natural, organic cancer preventative and treatment [6]. Despite voluminous anecdotal benefits reports, only two clinical trials have been published on Laetrile as a human cancer treatment [13] [20].

A 2019 review explains that recent preclinical *in vitro* (laboratory) research shows that Amygdalin does have anticancer properties that kill cancer cells [1]. However, the results of *in vivo* (animal) studies indicate that Amygdalin was less effective on animals. [1]. The review concedes that many case studies describe the antitumor effects of Amygdalin, yet anecdotal reports have not yet been validated by clinical trials[1].

Data from a 2018 review of the published scientific literature confirms that apoptosis (programmed cell death) is a central process activated by Amygdalin in cancer cells [2]. The review provides a complete interpretation of the known anticancer mechanisms of Amygdalin. It explains that it may have a possible role in the fight against cancer by blocking cancer cell proliferation and growth [2]. It also states that there are mistaken beliefs surrounding the cyanide toxicity-causing potential of Amygdalin [2].

Another 2018 review similarly concluded that *in vitro* (test tube) experiments confirm that Amygdalin induces apoptosis (cell death) in cancer cells [5]. Amygdalin has also been shown to inhibit the adhesion of breast, lung, and bladder cancer cells by decreasing the expression of specific pathways such as Akt-mTOR. This mechanism of action could potentially lead to inhibition of metastases (spread of cancer cells) [5]. Amygdalin has also been shown to inhibit cell proliferation in renal (kidney) cancer cells [5].

A 2020 study concluded that Amygdalin is a natural anticancer agent that promotes apoptosis and cell cycle arrest in hepatocellular carcinoma (liver cancer) cells [4]. The results of a 2013 study on Amygdalin in human cervical cancer cell lines indicate that Amygdalin could potentially provide therapeutic benefits for patients with cervical cancer [7]. A 2016 study demonstrates that Amygdalin induces apoptosis and inhibits triple-negative breast cancer (TNBC) cell adhesions. The results support the potential therapeutic application of Amygdalin as a chemo-preventive agent or to alleviate the progression of TNBC [8].

Furthermore, preclinical research shows that Amygdalin in Laetrile reduces the expression of pro-inflammatory cytokines, has an anti-inflammatory effect, and activates muscle cell growth. These results indicate other potential benefits for cancer patients, especially regarding palliative care and disease management [5].

## Potential Applications

Initial cellular studies indicate that Amygdalin (the active component in Laetrile or B17) could potentially have therapeutic applications in the treatment of various forms of cancer [5]. Preclinical research demonstrates anticancer effects on most, if not all, cancer cell types with greater potential efficacy on a range of cancer cell types here listed [5]:

- Lung [5]
- Bladder [5]
- Breast [17]
- Uterine [2]
- Stomach [2]
- Brain [2]
- Esophageal [2]
- Cervical [7]
- Kidney [5]
- Liver [4]
- Colon [2]

Laetrile, or vitamin B17, is also claimed to interact with other antioxidants, such as vitamins A, C, E, and pancreatic enzymes, which help to break down and eliminate harmful mutated cells in the body [15]. The supplemental benefits of vitamin B17 include supporting detoxification, boosting the immune system, reducing oxidative stress, and helping to prevent various disease processes [16]. These claims have yet to be fully confirmed by clinical research.

Anecdotal reports and preclinical research indicate that Laetrile could be used in cancer care. Early research or case reports have shown its potential therapeutic effects.

- Selectively destroys cancer cells
- Inhibit new cancer cell growth
- Prevent metastases (stop cancer spreading)
- Enhance immune function
- Improve detoxification
- Reduce inflammation
- Increase antioxidant activity
- Rebuild muscle and healthy tissues
- Retards progression of the disease

Laetrile can be administered orally in pill/capsule form or by injection, either into the muscle (intramuscular) or directly into the veins (intravenous) [6]. It is most commonly applied intravenously, followed by oral maintenance doses [6].

One explanation (among other theories) for the mechanism of action behind the anticancer effects of Laetrile is related to the enzymatic vulnerabilities of cancer cells.

Cancer cells are reported to have higher levels of beta-glucosidase, an enzyme that releases hydrogen cyanide from Amygdalin [2].

Cancerous cells also lack the enzyme rhodanese required to detoxify cyanide [2]. The human body contains rhodanese, which breaks down cyanide to render it neutral. As a result of the imbalance of these two specific enzymes, cancer cells are vulnerable to the effects of Laetrile [6].

Amygdalin, the active compound of Laetrile, breaks down into three components in the human body: glucose, benzaldehyde, and hydrogen cyanide. Benzaldehyde has been shown to inhibit cancer cell growth, indicating a potential synergistic anticancer effect [6].

In light of their enzymatic differences, hydrogen cyanide is reportedly liberated in much greater concentration at the location of cancer cells. Laetrile is theorized to target cancer cells specifically. Elsewhere in the body, healthy cells with sufficient rhodanese enzyme activity are believed to convert the cyanide into a harmless compound called thiocyanate [2].

## **Risks and Side Effects**

There are no known cases of actual Amygdalin overdose or acute hospitalization. Cyanide is a cytotoxin that may, in rare cases, cause the following effects [6]:

- Nausea
- Headache
- Dizziness
- Cyanosis
- Liver damage
- Hypotension
- Ptosis
- Ataxic neuropathies
- Fever
- Mental confusion

Any side effects of Amygdalin can be potentiated by concurrent ingestion of raw almonds, crushed fruit pits, and vegetables containing beta-glucosidase (such as celery, peaches, bean sprouts, and carrots) or by taking generous amounts of vitamin C orally [6].

## **Summary & Conclusion**

The latest scientific research on Laetrile suggests that its active compound Amygdalin could potentially be applicable in the treatment or management of various cancer types

and that its cyanide toxicity-causing potential may be grossly misunderstood or exaggerated.

Current laboratory research supports the hypothesis that cancer cells break down Amygdalin in Laetrile into hydrogen cyanide, which kills cancer cells and leaves normal cells relatively unaffected due to differences in enzymatic activity. Other breakdown compounds of Amygdalin may also have synergistic anticancer effects.

The proposed mechanism of action of Laetrile against cancer is based mainly on preclinical research. Well-designed clinical research in humans is preferred to gain better insight into the purported actions of Laetrile, its safety profile, efficacy against cancer, and other potential therapeutic applications. Further, well-designed clinical research is preferable to better determine whether anecdotal reports and proponents' claims of therapeutic benefits can be substantiated.

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