# THE CANCER REVOLUTION

## Additional Material for Appendix 1

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### The anti-cancer qualities of amygdalin

In the early 1960s, Dr. Ernesto Contreras, Sr. was the first doctor in Mexico to treat cancer patients with amygdalin. It would be correct to say that amygdalin established his hospital, Oasis of Hope, as the birthplace of alternative cancer treatment in Mexico. It also made Oasis of Hope the epicenter for the biggest cancer controversy of the 1960s and 1970s. Scientists and legislators argued over the efficacy and safety of amygdalin, also known as laetrile. The debate came to a head in the early 1970s. Proponents of amygdalin touted its cancer killing properties, but, opponents stated that amygdalin was ineffective at best, and dangerously toxic at worst. This paper will present clinical studies from the past along with current peer reviewed publications in order to reveal the anti-cancer qualities of amygdalin.

### The arguments against amygdalin

The first argument against amygdalin is that it can provoke cyanide poisoning in patients. While it is true that amygdalin is a cyanogenic glucoside1 (it contains cyanide), no study has established that patients taking amygdalin have experienced cyanide poising. Opponents to amygdalin point to case studies with children who suffered cyanide poison after ingesting bitter almonds.2 But these studies were not conducted on cancer patients who were administered amygdalin in a clinical setting. Also, these studies are not consistent with the safety record of Oasis of Hope's use of amygdalin in tens of thousands of patients over the course of five decades. We have not observed one case of cyanide poisoning. Amygdalin is safe because the mitochondrial enzyme named rhodanese is present in healthy cells and it neutralizes cyanide.3 Malignant cells have low to nil levels of this enzyme. Therefore, the cyanide is not neutralized in the cancer cells, and this is why amygdalin selectively kills malignant cells while leaving healthy cells unharmed.

The second argument against amygdalin is that it is ineffective. In the 1970s, cancer researchers at Memorial Sloan Kettering conducted studies that provided mixed results. Part of the research included inviting Dr. Ernesto Contreras, Sr. to present case studies from Oasis of Hope. He showed X-rays of patients who experienced cancer control and were living ten years after their diagnoses. The researchers rejected the case studies on the grounds that complete tumor destruction had not been achieved. They indicated that life extension was not part of the criteria for the evaluation of the efficacy of a drug.

As an institution, Memorial Sloan Kettering concluded that amygdalin was not a viable cancer treatment, though two of its researchers presented cases of patients who benefited from the treatment,4 and another researcher, Dr. Kanematsu Sugiura published his conclusion that, "...it [amygdalin] shows a strong inhibitory effect on the development of lung metastases in mice."5 He observed that 100% of the mice with breast cancer tumors not treated with amygdalin experienced lung metastases, while only 22% of the mice treated with amygdalin experienced metastases.

It is difficult to understand why Memorial Sloan Kettering dismissed amygdalin considering Dr. Kanematsu Sugiura's findings. Unfortunately, the National Cancer Institute has accepted Memorial Sloan Kettering's report discrediting amygdalin. The NCI continues to hold its position that amygdalin has shown some limited benefit to patients, but no long term objective reports in patients.6

**Why Oasis of Hope uses amygdalin**

Though the NCI does not support the use of amygdalin, it does state that amygdalin is promising when used in combination with other therapies including pancreatic enzymes and high dose vitamin C.6 This has been our experience at Oasis of Hope. We consider amygdalin to be a powerful adjuvant therapy. Amygdalin is not a cure for cancer. It is not a stand alone drug that can reverse cancer. It does however have its place in treating cancer and there are clinical studies in vitro and in vivo that support the use of amygdalin with patients suffering from malignancies. It is important to note that the studies that discredited amygdalin in the 1970s are quickly being supplanted by studies from 2004 to 2014 that conclude that amygdalin in fact posses anti-cancer qualities including, "Decomposing carcinogenic substances in the body, killing cancer cells, blocking nutrient source of tumor cells, and inhibiting cancer cell growth."7 The evidence is growing supporting amygdalin's chemopreventive properties and its ability to stabilize tumors and slow growth. Studies are finding that amygdalin has attributes that were previously not know. For example, amygdalin is a potent neurotrophic agent.8 Let's take a look at some of findings from recent studies.

**Amygdalin inhibits angiogenesis**

To understand how to control cancer, it is important to know how cancer grows. Angiogenesis is the formation of new blood vessels. Cancer cells, like healthy cells, need blood to supply them with glucose in order to keep growing. As a tumor grows larger, its center tends to get cut off from blood supply. The tumor sends out angiogenic factors which provoke the formation of new blood vessels. Without angiogenesis, the creation of new blood vessels, it is very difficult for a tumor to continue to grow. If a cancer can stimulate the formation of hundreds of new capillaries, it can grow without any limitations. 9 Inhibiting angiogenesis is key to controlling the growth of cancer, or even killing it. A new study in mice confirmed that, "Amygdalin exerts inhibitory effects on angiogenesis."10 Just this fact alone, that amygdalin inhibits angiogenesis, supports its use in the effective treatment of cancer. But amygdalin posses many more anti-cancer qualities.

**Amygdalin induces apoptosis**

Apoptosis, also known as programmed cell death, is the function in every normal cell that causes the cell to die off and make room for a new replacement cell. One of the abnormalities of malignant cells is that they do not experience apoptosis. This essentially makes cancer cells immortal and that much more difficult to kill. Fortunately, there are a number of nutrients that can provoke apoptosis in cancer cells. In 2012, a study in China identified how amygdalin induces apoptosis.11 The study was conducted on human cell lines of cervical cancer. It was

observed that amygdalin down regulated the anti-apoptotic protein Bcl-2 and it unregulated the pro-apoptotic Bax protein. Up until this study, amygdalin was thought to work via necrosis alone, when in fact it also works through apoptosis.

**Amygdalin hinders metastases**

Dr. Sugiura is not the only researcher that uncovered amygdalin's ability to hinder metastases. In 2014, researchers in Germany conducted an in vitro study on the effects of amygdalin on bladder cancer cells and observed that, "Amygdalin alters the migratory behavior of tumor cells."12 This may be one of the most important findings that supports the use of amygdalin because the majority of cancer deaths result from metastases; not the primary tumor. For long term survival, it is critical to prevent or control metastases.

### Amygdalin exerts anti-inflammatory and analgesic effects

A study conducted in 2013, by researchers at the Second University of Naples, Italy and the Department of Chemical Engineering at the University in Barcelona Spain, concluded that amygdalin may, "Reduce the expression of genes of the inflammatory response."13 Another study conducted in Korea in 2007 concluded that, "Amygdalin exerts anti-inflammatory and analgesic effects."14 These finding are important as the inflammation response may provide an increase in the availability of new blood vessels which can feed tumor growth. Pain control is a most welcomed side effect as well. Then analgesic effect of amygdalin is a tremendous added value. It is quite common at Oasis of Hope to be able to reduce the doses of pain killers prescribed to patients once they start amygdalin therapy. Frequently patients are able to stop taking pain medications all together.

### Conclusion

In 2004, researchers in China conducted a study that demonstrated that amygdalin inhibits the proliferation of lung cancer cells.15 This is noteworthy as 31 years previously, Memorial Sloan Kettering's Dr. Sugiura concluded that amygdalin inhibited lung metastases. The basis of science is observation and the ability to repeat results when using the same method. Though amygdalin has received great opposition from the FDA, the NCI and cancer researchers, the body of recent clinical studies confirm that it is a viable and safe alternative cancer treatment. Ongoing studies continue demonstrate amygdalin's effect on stabilizing tumors and slowing growth. Oasis of Hope has administered amygdalin to tens of thousands of cancer patients since 1963. We have determined amygdalin to be completely safe and effective. We are hopeful that cancer research on the use of amygdalin will continue and that one day, the body of evidence will be sufficient for FDA approval to be granted.

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