About Artemisinin (aka) Artemisia; Sweet Wormwood; Qinghaosu

Artemisinin, which is originally from Chinese folk medicine, is a type of chemical compound that comes from the common garden plant artemesia, or wormwood. It has been shown in studies to induce apoptosis (natural cell death) in human cancer cells. During an in vitro study, it successfully killed select cancer cells and slowed the growth of tumors in rats.

In fact, **Seattle scientists** have shown that a compound extracted from the wormwood plant actually seeks out and destroys invaders such as breast cancer cells while leaving healthy cells unscathed. **The substance is used extensively in European alternative cancer clinics**.

Artemisinin is considered a safe, non-toxic, and inexpensive alternative for cancer patients. Chinese researchers said the key to its effect was a peroxide linkage (two oxygen atoms hooked together) within the herb's active molecule, which makes this treatment very similar to oxygen therapy. Cancer cells thrive in an oxygen-free (anaerobic) environment and high levels of oxygen are therefore fatal to them.

In laboratory experiments, the compound killed virtually all human breast cancer cells that had been exposed to the compound over a span of 16 hours. These studies were conducted **by Dr. Henry Lai** and his bioengineering research team at the **University of Washington.** Dr. Lai also stated that nearly all of the normal cells exposed to the compound remained alive.

In a separate experiment, a dog with severe bone cancer known as osteosarcoma couldn't walk across the room. The animal made a complete recovery within five days of receiving the treatment. X-rays showed the animal's tumor "had basically disappeared," says Lai. He added that the dog survived for at least two more years.

Artemisinin reemerged as a therapy for malaria, for which it was once common, after a "secret recipe" for the treatment was discovered on a stone tablet in the tomb of a prince of the Han Dynasty during an archaeological dig in the 1970s. In fact, a purified form of the plant compound is now the drug of choice for treating malaria.

Experiments into why artemisinin works as an anti-malaria agent led to its being tested as an anticancer drug. The key turned out to be a shared characteristic of the malaria parasite and dividing cancer cells: high iron concentrations.

When artemisinin, or any of its derivatives, meets iron, a chemical reaction ensues. This prompts the creation of free radicals. In malaria, the free radicals attack and bind with cell membranes, breaking them apart and killing the single-cell parasite.

Lai points out that cells need iron to replicate DNA when they divide. Because cancer is characterized by out-of-control cell division, cancer cells have much higher iron concentrations than do normal cells.

"Not only does [the drug] appear to be effective, but it's very selective," Lai says. "It's highly toxic to the cancer cells, but has a marginal impact on normal cells."

On the surface, cancer cells have more so-called transferrin receptors than healthy cells have.

Transferrin receptors are cellular pathways that allow iron to enter. In the case of breast cancer, the cells have five to 15 times more transferrin receptors on their surface than normal breast cells, Lai says.

The main strategy, according to Lai, is to pump up cancer cells with even more iron and then introduce artemisinin to kill them selectively. In his experiments, Lai subjected sets of both breast cancer cells and normal breast cells to two substances. The first was a compound known as holotransferrin, which binds with transferrin receptors to transport iron into cells and thus further increases the cells' iron concentrations.

The second was a water-soluble form of artemisinin. He also studied a combination of both compounds.

Cells exposed to just one of the compounds showed no noticeable effect, Lai reported. But the response by cancer cells when hit with first holotransferrin and then artemisinin was dramatic, he says.

After eight hours, three-fourths of the cancer cells were obliterated. After16 hours, nearly all the cancer cells were dead. Just as importantly, he says, the vast majority of normal breast cells did not die, showing the safety of the treatment.

The normal breast cancer cells were also resistant to radiation utilized in the experiment, Lai adds. “So that means this approach might work for cancer resistant to conventional therapy.” One might expect even more aggressive cancers such as pancreatic and acute leukemia, known for rapid cell division and so much higher iron concentrations, to respond even better.

Further animal testing followed by human trials is expected. In human trials, patients would likely be given iron supplements to raise the iron concentrations in their cancer cells.

Even though human tests are years away, the treatment could revolutionize the way cancer, especially the aggressive, fast-growing kind, is approached.

One study found elevated iron storage in 88% of breast cancer patients, so the application is logical. There’s also a wealth of research linking iron and cancer.

Artemisinin is best taken on an empty stomach with some natural fat to enhance absorption. If iron is present from residual food, it may neutralize the peroxides. Milk has a minimal amount of iron, as do cottage cheese and yogurt—and all three have enough fat to enhance absorption. Artemisinin is also administered intravenously in some clinics. **SOURCE: Alternative Cancer Research Institute**

Further Reading & References

- Chinese remedy ‘may fight cancer,’ http://news.bbc.co.uk/1/hi/health/1678469.stm
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- Cancer Therapies Page: Artemisia or Sweet Wormword Anti-Cancer Herbs, http://www.huldaclarkzappers.com/php2/sweetwormwoodtherapy.php