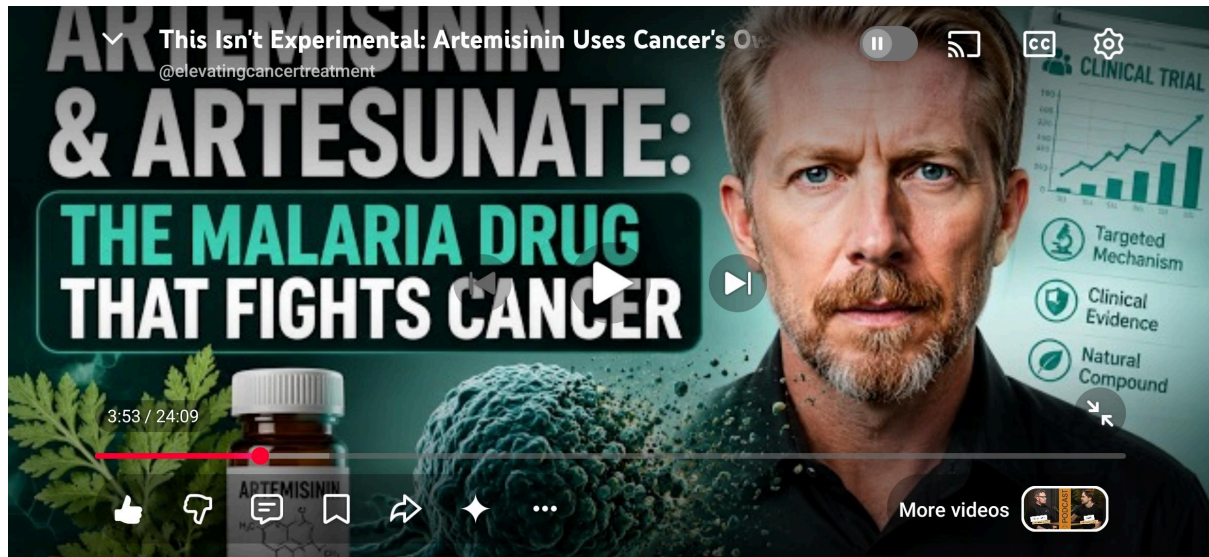


How artemisinin—a drug traditionally used to treat malaria—acts as a potential anti-cancer agent by exploiting the iron-dependent metabolism of tumor cells (0:04:12-0:04:48).

https://youtu.be/_2H8tWJIVU?si=6H6T-OQilVg25M1K slide 3416



Artemisia C15H22O5

Key takeaways include:

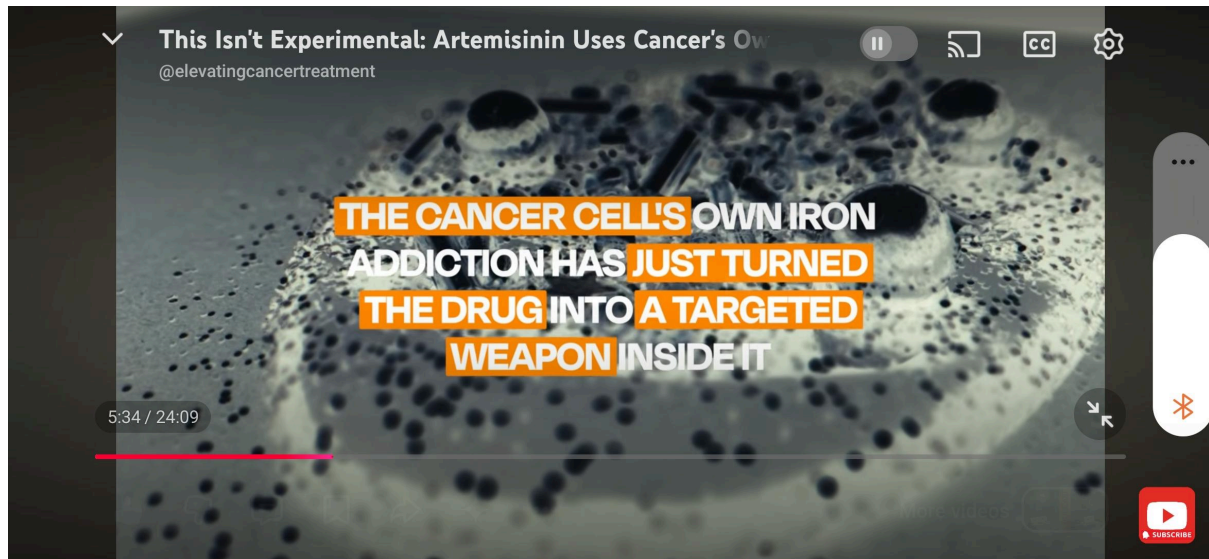
<https://www.hyperthermia-centre-hannover.com/artemisinin-infusions>

The same thing that kills malaria inside red blood cells also kills cancer cells - specifically and selectively.

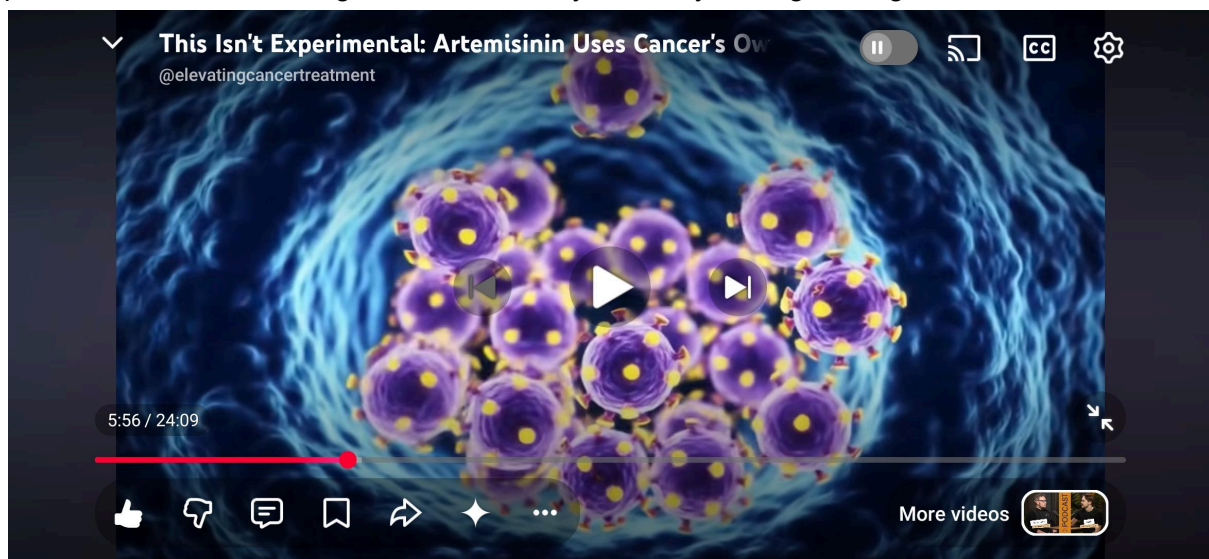


Iron plays a key metabolic role in cells, but cancer cells are extraordinarily greedy at taking in iron using 15 x's more than normal cells, and showcasing the iron on the surface of cancer cells. They need it to fuel their rapid growth, their rapid division. So they up-regulate the proteins that import iron. They actively pull iron in from the surrounding environment far more aggressively - 15 x's more than normal cells. This is all part of "normal" tumour biology. Tumour cells are iron-hungry, and artemisinin exploits that perfectly. Artemisinin contains what chemists call an endoperoxide bridge. Essentially a molecular tension point. On its own it's perfectly stable. The moment it encounters iron (it forms rust) however, it releases a highly reactive alkylating radical; and it tears through proteins and DNA alike. It

does it completely indiscriminately and damages everything around it.



The cancer cells' own iron addiction has just turned the drug into a targeted weapon inside tumours. Normal cells, with their much lower iron with none on the surface, experience far less of this chemistry and far less of this damage. And normal cells, if they are damaged, will pause and heal the damage, that's what they do. They have good regulation.



Tumour cells loaded with iron bear the brunt, take a lot of damage, and they don't know how to stop multiplying. They keep trying to multiply, often leading to their death, because they multiply while they're damaged.

That's the artemisinin mechanism:

Iron activated

Free radical mediated DNA damage.

<https://pubmed.ncbi.nlm.nih.gov/28254675/>

Mechanism: Cancer cells are "iron-hungry." Artemisinin contains an endoperoxide bridge that reacts with high iron concentrations inside tumor cells, releasing free radicals that cause lethal DNA damage.

Five Pathways: It kills cancer via direct DNA damage, ferroptosis (lipid peroxidation), angiogenesis inhibition, immune system modulation, and bypassing multi-drug resistance.

Synergy: Research shows it significantly enhances the effectiveness of platinum-based chemotherapies and radiation, as it prevents cancer cells from repairing DNA damage

The Critical Warning: Taking artemisinin daily can cause hemolysis (the destruction of red blood cells), leading to severe anemia. Dr. Chaplin advises against chronic daily use, recommending instead a "pulsed dosing" strategy or specific windows around chemotherapy/radiation to protect healthy bone marrow.

Delivery: While oral versions are available, it is best absorbed when taken with fat.

<https://pubmed.ncbi.nlm.nih.gov/32485311/>

Research by the [German Cancer Research Center \(DKFZ\)](#) and Heidelberg University indicates that artemisinin derivatives (like artesunate and dihydroartemisinin) are potent anti-cancer agents. They selectively trigger cancer cell death by interacting with high iron concentrations in tumors and blocking cell survival pathways. [1, 2, 3]

Key findings and developments include:

- **Lysosomal Cell Death:** DKFZ scientists found that artesunate activates lysosomes in cancer cells, causing them to self-destruct while mostly sparing healthy tissue. [1]
- **Brain Tumor Sensitization:** In studies involving glioblastoma organoids, researchers found that combining artemisinins with the surgical fluorescence marker 5-aminolevulinic acid (5-ALA) sharply increases cancer cell death by enhancing heme biosynthesis. [1]
- **Clinical Trials:** Because of its favorable toxicity profile and ability to act against drug-resistant tumors, artemisinin and its derivatives have been investigated in human clinical trials for metastatic breast cancer and other malignancies. [1, 2, 3, 4]
- **Metastasis and Prevention:** Research shows that these compounds also inhibit angiogenesis (the creation of new blood vessels that feed tumors) and prevent the recurrence of various malignant cells, including melanoma. [1, 2]

If you want, I can share more details about:

- The specific **artemisinin derivatives** currently being tested
- How it targets **specific cancer types** (e.g., breast cancer or glioblastoma)
- Which **clinical trials** are underway

Let me know what you'd like to **explore further**.

Malaria Drug Artesunate Activates Lysosomal Cell Death in Cancer Cells - German Cancer Research Center

Nov 7, 2011 — This information does not constitute medical advice or diagnosis. Artesunate is a derivative of artemisinin, a substance obtained from a medicinal plant used to...

Deutsches Krebsforschungszentrum

From ancient herb to modern drug: *Artemisia annua* and artemisinin ...

Feb 28, 2017 — In this review, we give a systematic overview of the literature published over the past two decades until the end of 2016. Like other natural products, ARS acts...

National Institutes of Health (NIH) | (.gov)

Antitumor Activity of Artemisinin and Its Derivatives: From a Well- ...

Abstract. Improvement of quality of life and survival of cancer patients will be greatly enhanced by the development of highly effective drugs to selectively ki...

PubMed Central (PMC) (.gov)

A whole-genome scan for Artemisinin cytotoxicity reveals a novel ...

Mar 8, 2023 — Artemisinin and its derivatives are endoperoxides that damage proteins in eukaryotic cells; their definite mechanism of action and host cell targets, however, hav...

National Institutes of Health (NIH) | (.gov)

Artemisinin Suppressed Melanoma Recurrence and Metastasis after ...

Jan 1, 2025 — Abstract. Cancer radical surgery is the primary treatment for melanoma, but almost all malignant melanoma patients get recurrence and metastasis after surgery a...

PubMed Central (PMC) (.gov)

Artemisinin infusions | Cancer treatment and therapy in Germany | Hyperthermia Centre Hannover

It is used worldwide to treat malaria. Artemisinin has also been shown to be effective in treating certain cancers, especially those of the abdomen. Artemisinin...

Hyperthermia Centre Hannover

Artemisinin and Its Derivatives as a Repurposing Anticancer Agent

Similarly, it was proven that artemether and arteether had antitumor activities in some malignant cells, such as gastric cancer, glioma, and breast cancer [22,2...

PubMed Central (PMC) (.gov)

Repurposing of artemisinin-type drugs for the treatment of acute ...

May 30, 2020 — Abstract. Cancer treatment represents an unmet challenge due to the development of drug resistance and severe side effects of chemotherapy. Artemisinin (ARS)-ty...