

Brain cancer breakthrough: Experimental vaccine trains immune system to target remaining tumor cells after surgery

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“Cancer cells are like crabgrass: Once they take root, they’re hard to eradicate,” says UC Irvine neuro-oncologist Dr. Daniela Bota, who’s exploring the use of immunotherapy against glioblastoma multiforme. Credit: Paul R. Kennedy

UC Irvine oncologists are looking for new ways to treat [glioblastoma multiforme](#), the deadliest type of brain cancer. While surgery followed by chemotherapy and radiation is the current standard of care, it doesn't fully eliminate the cancer. The goal is to develop an additional therapy

that seeks out and destroys the cancer cells that inevitably remain.

Dr. Daniela Bota is testing whether enlisting the immune system to fight the tumor can complement surgery, drugs and radiation and improve a patient's odds of surviving. Nearly 14,000 Americans are diagnosed each year with glioblastoma multiforme, and only 10 percent will survive more than five years, according to the [National Cancer Institute](#).

"[Cancer cells](#) are like crabgrass: Once they take root, they're hard to eradicate," says Bota, a neuro-[oncologist](#) and medical director of UC Irvine's [Comprehensive Brain Tumor Program](#). "The immune system is powerful, but it must be trained to recognize these cancer cells before it can do its job."

Enter the experimental glioblastoma vaccine. Think of it as a personal [brain cancer](#) smoothie: Pulverized pieces of a patient's surgically excised tumor are blended in a laboratory with his or her own [white blood cells](#). When injected back into the body, the concoction programs the individual's immune system with new targets – any remaining cancer cells.

"The lab becomes like a training camp outside the body," Bota says.

She and Dr. Jose Carrillo plan to test several experimental immunotherapies and are now enrolling patients at UC Irvine's Chao Family Comprehensive Cancer Center in a trial of a [dendritic cell vaccine](#). [Dendrites](#) are a type of white blood cells that, once trained, can paint bull's-eyes on cancer cells. A previous trial demonstrated that this vaccine is safe and, in some cases, doubled patients' median survival after diagnosis from 15 months to about 31 months.

"The current standard of care prolongs survival, but it does not fully destroy the cancer," Bota says. She believes the vaccine can help get rid

of remaining tumor cells and further extend patients' lives.

A glioblastoma vaccine does not eliminate the need for brain surgery, which is also required to collect the cancer cells used in the "smoothie."

"We try to be aggressive and remove as much tumor as possible," says Dr. Johnny Delashaw, chair of UC Irvine's Department of Neurological Surgery and surgical director of the brain tumor program. "If we can get more than 90 percent, the patient has a much greater chance of surviving."

Other vaccines under development for glioblastoma also enlist the immune system.

One identifies and targets a surface protein, EGFRvIII, that regulates cell growth. Another, based on the knowledge that cancer cells mutate, includes a combination of different glioblastoma tumor cells.

"Everyone responds differently, but immunotherapy has a great chance to be the next leap forward in cancer treatment," Bota says.

Provided by University of California, Irvine

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