Could the zika virus fight the brain cancer that killed john McCain?

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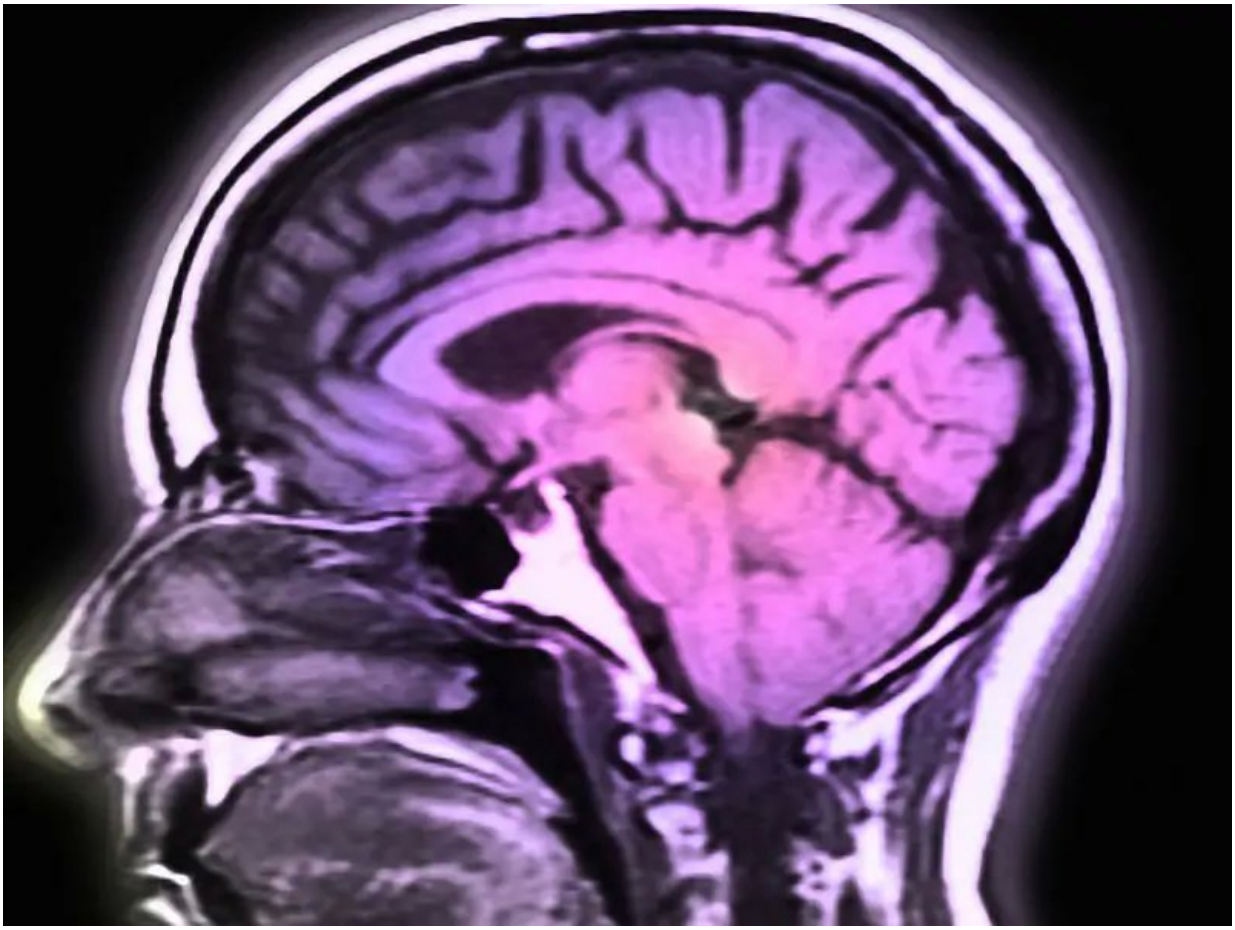

(HealthDay)—Preliminary research in mice suggests that the Zika virus

might be turned from foe into friend—enlisted to curb deadly glioblastoma brain tumors.

A glioblastoma is among the most lethal of brain cancers, killing more than 15,000 Americans each year. U.S. Senators John McCain and Ted Kennedy both succumbed to this cancer.

In the new therapy, an international group of researchers used a harmless form of the Zika virus to target and destroy glioblastoma cells in mouse brains, while leaving healthy brain cells untouched.

The mosquito-borne Zika virus made headlines over the past few years because of its connection to severe brain defects in babies born to women infected in pregnancy.

But the virus might offer a new avenue for brain cancer care, according to a team led by Pei-Yong Shi, a virologist at University of Texas Medical Branch in Galveston, and virologist Cheng-Feng Qin of the Chinese Academy of Military Medical Sciences in Beijing.

They explained that Zika's ability to infect brain cells—and cause devastating brain changes in the fetus—could be used to target glioblastoma stem cells (GSCs) in the brain as well. These stem cells are thought to be the source of tumor recurrence.
"If we could find a way to specifically target those GSCs that are the source of recurrence, then that might provide an option to prevent recurrence or even a cure," Qin said in a news release from the American Society of Microbiology (ASM).

In their research, the team members first confirmed that Zika could attack glioblastoma stem cells, both in lab culture and in a mouse model. In fact, the virus was much more "efficient" at targeting the tumor cells compared to healthy brain neurons, they said.

Shi and Qin's group has already developed a candidate Zika virus vaccine, made from an inactivated, harmless form of the virus. This tweaked virus has a deletion from its genetic blueprint that makes it incapable of efficiently replicating, the researchers explained.

The scientists first confirmed that the vaccine was safe in mice. Next, they mixed the vaccine with a sample of glioblastoma stem cells, and injected that combo in the brains of mice. Other mice received an injection of the stem cells alone, without the tweaked Zika virus.

The result: While glioblastomas arose quickly in the brains of mice that didn't receive the vaccine, they developed much more slowly for mice that got the Zika vaccine as well.

And while the average survival time for mice without the vaccine was an average of 30 days, survival for those that had gotten the Zika vaccine was extended to 50 days.

Of course, this research is in an extremely early stage. But the hope is that glioblastoma patients might one day be given the Zika vaccine simultaneously with their surgery to "let the viruses hunt down the GSCs and eliminate them," Qin said.

Brain cancer specialists cautioned that the research is promising but preliminary.

"Many new therapies for glioblastoma have looked promising 'in vivo' [that is, in animal studies], only to fail later on," said Dr. Michael Schulder, who helps direct neurosurgery at North Shore University Hospital in Manhasset, N.Y.

Still, he thinks the approach is "ingenious."

"The authors of this study cleverly used the very aspect of the Zika virus that has made it worrisome as a public health threat—the tendency of the virus to replicate and damage brain cells, specifically the cells that are involved in brain development—as a way to attack glioblastoma," Schulder said.

Dr. John Boockvar, vice chair of neurosurgery at Lenox Hill Hospital in New York City, agreed.

"Like the authors in this study, we are looking for ways to trigger a strong immune response in patients with glioblastoma, which induces inflammation and eventually glioblastoma cell death," he said. "Using a harmless form of the Zika virus to preferentially infect glioblastoma cells in order to illicit an immune response is a smart strategy to fight this devastating disease."

According to Shi, the next step is to collaborate with doctors to develop trials evaluating the approaches' safety in patients.

The study authors also hope to genetically tweak the Zika virus even more to make it a more effective killer of glioblastoma cells.

"As a virologist, I see that we should take advantage of the 'bad' side of viruses," Shi said in the release. "They should have a role to play in cancer treatment."

The findings were published Sept. 18 in the ASM journal *mBIO*.

More information: Qi Chen et al, Treatment of Human Glioblastoma with a Live Attenuated Zika Virus Vaccine Candidate, *mBio* (2018). DOI: 10.1128/mBio.01683-18