Research team identifies a potential strategy in fight against brain cancer

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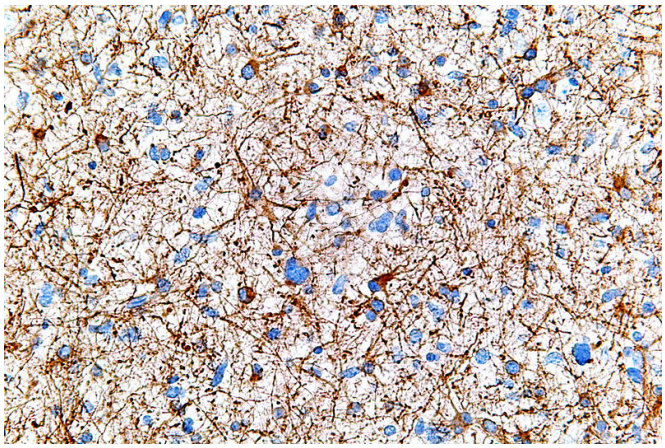

A microscope image of brain cancer cells, a glioma tumor type known as anaplastic astrocytoma. Credit: Wikimedia/ CC BY-SA 3.0

Scientists with the Virginia Tech Carilion Research Institute say a gene involved in the body's circadian rhythms is a potential target for therapies to help patients with a deadly form of brain cancer known as glioblastoma.

This discovery, to be published in the journal *Scientific Reports* on Tuesday, Sept. 11, points to a subtype of a particular gene that apparently is enabling the survival of cancer cells, although it is more commonly associated with circadian rhythms—the body's 24-hour biological clock.

"The world is desperately seeking new treatments for glioblastoma and no one has ever before pointed to this gene as a target upon which to base therapies," said Zhi Sheng, an assistant professor at the Virginia Tech Carilion Research Institute, whose team pinpointed the gene from 20 suspects it had previously identified.

"We have found that inhibiting this gene may inhibit cancer stem cells from renewing themselves and differentiating into glioblastoma cells, which we suspect may be a hallmark of this very persistent cancer," said Sheng, who is also an assistant professor of Internal Medicine at the Virginia Tech Carilion School of Medicine. "More research is needed before a treatment can be designed, but our early, basic science results are promising."

New therapies for glioblastoma patients are desperately needed, according to Sheng, who led the study.

Most patients do not live more than about 15 months after diagnosis. About 90 percent of patients who live longer than two years develop recurrent tumors, for which an additional brain surgery is often not a treatment option. The disease, which accounts for almost half of all brain cancers, recently claimed the life of U.S. Sen. John McCain.

Sheng says the cancer can recur if only a few hundred glioblastoma stem cells survive after surgery, radiation therapy, and chemotherapy.

However, in their experiments, carried out in cell cultures and in a laboratory mouse model of glioblastoma as described in *Scientific Reports*, the researchers determined when an enzyme produced by a member of the casein kinase 1 gene family is blocked, the proliferation of glioblastoma stem cells stops and tumor formation in mice is inhibited.

The researchers found evidence to show the enzyme is regulating the glioblastoma stem cells effectiveness at self-renewal, rather than differentiation.

"Blocking this gene effectively killed cancer stem cells," Sheng said.

Sheng and his colleagues also evaluated two commercially available drugs that block casein kinase 1 gene from activating circadian rhythms,

with one showing some potential for further investigation as a chemical inhibitor of glioblastoma stem cells.

Provided by Virginia Tech