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New oncolytic virus shows improved effectiveness in preclinical testing

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A new fourth-generation oncolytic virus designed to both kill cancer cells and inhibit blood-vessel growth has shown greater effectiveness than earlier versions when tested in animal models of human brain cancer.

Researchers at the Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James) are developing the oncolytic virus as a treatment for glioblastoma, the most common and deadly form of brain cancer (average survival: 15 months after diagnosis).

The new oncolytic virus, called 34.5ENVE, improved survival of mice with transplanted human glioblastoma tumors by 50 percent in a majority of cases compared with the previous-generation oncolytic virus.

The study was published online in the journal *Molecular Therapy*.

"These findings show the amazing therapeutic efficacy of this new oncolytic virus against four different glioblastoma models in animals," says cancer researcher Dr. Balveen Kaur, associate professor of neurological surgery, and a member of the OSUCCC – James viral oncology research program.

The new oncolytic virus is engineered to replicate in cells that express the protein nestin. First identified as a marker for neuronal stem cells, nestin is also expressed in glioblastoma and other malignancies including

gastrointestinal, pancreatic, prostate and breast cancer.

"We believe that nestin-driven oncolytic viruses will prove valuable for the treatment of many types of cancer," Kaur says.

The new oncolytic virus also carries a gene to inhibit tumor blood-vessel growth. That gene, called Vstat120, was added to increase its anti-tumor effectiveness and prolong the virus's presence within tumors.

In this study of eight animals with intracranial tumors, six lived longer than 80 days, and these were later found to be tumor free. By comparison, control mice survived a median of 20 days, and mice treated with a first-, a second-, and a third-generation oncolytic virus survived 33, 34 and 53 days, respectively.

"Magnetic resonance imaging and histological analyses revealed extensive tumor destruction in animals treated with 34.5 ENVE," says Kaur, who is also chief of Ohio State's Dardinger Laboratory of Neurosciences. "We hope that we can soon evaluate the safety of this virus in patients with cancer."

Provided by Ohio State University Medical Center