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Cancer-killing virus combined with a chemotherapy drug might effectively treat recurrent ovarian cancer

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In six out of 10 cases, ovarian cancer is diagnosed when the disease is advanced and five-year survival is only 27 percent. A new study suggests that a cancer-killing virus combined with a chemotherapy drug might safely and effectively treat advanced or recurrent forms of the disease.

Researchers at The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James), led the cell and animal study. Reporting in the journal *Clinical Cancer Research*, the researchers showed that the oncolytic virus called 34.5ENVE has significant antitumor activity against ovarian cancer on its own, and that its activity is even greater when combined with the chemotherapy drug doxorubicin in an animal model of disseminated peritoneal ovarian cancer.

"Our findings suggest that this could be a promising therapy, and we believe it should be further developed for the treatment of recurrent or refractory ovarian cancer in humans," says principal investigator Balveen Kaur, PhD, professor of neurological surgery and an OSUCCC – James researcher.

Among women treated for ovarian cancer whose tumors regress, 70 percent experience recurrence. The recurrent tumors are thought to develop from reserves of cancer stem-like cells that are chemotherapy-resistant and survive therapy. Consequently, recurrent tumors also tend

to be resistant to primary chemotherapy regimens, and lethal.

The oncolytic herpes simplex virus 34.5ENVE is engineered to target cancer cells that overexpress the protein nestin and to inhibit the growth of blood vessels to tumors.

The researchers chose to combine the oncolytic virus with doxorubicin because the drug is often administered to patients with recurrent ovarian cancer. "This study underscores the significance of combining the oncolytic virus with doxorubicin for patients who have developed resistance to primary chemotherapy," Kaur says.

Kaur and her colleagues assessed the anticancer activity of the oncolytic virus 34.5ENVE, which is a genetically engineered herpesvirus, using several ovarian cancer cell lines, human and mouse tumor cells, and an animal model. Key technical findings included:

- The expression of nestin was 10 to 100 times greater in human ovarian tumor cells compared with normal ovarian cells;
- In a model of disseminated peritoneal ovarian cancer, the combination of doxorubicin plus the oncolytic virus increased survival, with an average survival of 58 days for treated animals versus 32.5 days for controls;
- The combination of doxorubicin and the oncolytic virus showed a synergistic increase in apoptosis (programmed cell death) in ovarian cancer cells compared to each agent alone.

Provided by Ohio State University Medical Center

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