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Scientists find way to reduce ovarian cancer tumors, chemo doses

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In a potential breakthrough against ovarian cancer, University of Guelph researchers have discovered how to both shrink tumours and improve drug delivery, allowing for lower doses of chemotherapy and reducing side effects.

Their research appears today in the *FASEB Journal*, one of the world's top biology publications.

"We hope that this study will lead to novel treatment approaches for women diagnosed with late-stage ovarian cancer," said Jim Petrik, a Guelph biomedical sciences professor. He worked on the study with Guelph graduate student Samantha Russell and cancer researchers from Harvard Medical School. Petrik is scheduled to present the paper Friday at Harvard's Translational Cancer Program.

"The development of new therapies to treat women with advanced ovarian cancer is essential in order to reduce the morbidity and mortality associated with this disease."

Ovarian cancer is the most lethal gynecological cancer; about 150,000 women worldwide die each year of the disease. Women can have the disease for years without knowing it because the symptoms, which include nausea, bloating and abdominal pain, are vague and attributable to many ailments.

In about eight out of 10 cases, ovarian cancer is detected only at an

advanced stage, and the odds of survival are poor. "This is why it's known as the 'silent killer,'" Petrik said.

Women often succumb to ovarian cancer because the inefficient delivery of chemotherapy drugs allows the cells to build up resistance so they no longer respond to treatment, he said.

"The five-year survival rate for ovarian cancer has changed very little over the last 20 years, and new treatment options are urgently needed."

Petrik, who has researched ovarian cancer for nearly 15 years, focuses on anti-angiogenic therapies.

Ovarian tumours, like many other types of cancer, obtain nutrients and oxygen by inducing growth of new blood vessels, a process termed "angiogenesis."

His recent study focuses on a portion of a naturally occurring protein inhibitor molecule called 3TSR. It interacts with another protein found on the surface of endothelial cells, reducing abnormal tumor angiogenesis.

"We also made the surprising discovery that 3TSR causes ovarian cancer cells to die through a direct inhibitory effect against the tumour itself," Petrik said.

Giving 3TSR to patients with advanced-stage ovarian cancer would help patients in two ways, Petrik said. "With this novel approach, we were able to both shrink the tumor and enhance the ability of the tumor to take up chemotherapy drugs."

More efficient drug delivery also means doctors can administer lower amounts of chemotherapy, alleviating many of the side effects, he said.

"One of the main problems with current treatment regimens is the significant side effects caused by the high doses of chemotherapy that women with ovarian cancer receive."

He used an animal model of advanced-stage ovarian cancer—the same stage when most women are diagnosed with ovarian cancer. "It makes our studies very relevant to the current clinical scenario," Petrik said.

He and his collaborators are working towards human trials and, ultimately, to the development of targeted cancer therapies.

While the study focused on ovarian cancer, the approach could help in treating other solid tumours, Petrik said.

Provided by University of Guelph