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New cancer-fighting virus kills invasive brain cells

Best results when VSV injected intravenously

CALGARY – Researchers funded by The Terry Fox Foundation and the Canadian Cancer Society have found that a cancer-fighting virus called VSV kills the most malignant form of brain cancer in mice.

The team also discovered that the virus can be given intravenously and targets invasive tumour cells.

The research team first modified the virus by altering one of the genes to make it safer in normal cells but still able to kill cancer cells. They then used a new way of delivering the virus – intravenously instead of directly into the tumour – and were able to target the main tumour as well as the tumour cells that had spread from the main mass.

The study was led by Dr. Peter Forsyth, a medical oncologist with the Alberta Cancer Board and a professor of oncology, neurosciences, biochemistry and molecular biology at the University of Calgary. The study is published in the Nov. 1 issue of the Journal of the National Cancer Institute.

The brain tumour cells that invade into the surrounding normal brain are usually "hidden" from current treatments and are the ones that usually lead to a disease recurrence. The research using the vesicular stomatitis virus (VSV) was conducted on mice as well as on tumour specimens from patients with an aggressive form of brain cancer called malignant glioma.

"These findings are an excellent example of the great value of scientific collaboration," says Darrell Fox, national director of The Terry Fox Foundation. "Dr. Forsyth is part of a pioneering group of researchers that are sharing their expertise and benefiting from the knowledge of others working in this exciting new area of anti-cancer treatment."

"Research into viruses that target cancer is a promising new avenue in the fight against this disease," says Dr. Barbara Whyllie, CEO of the Canadian Cancer Society. "We look forward to the possibility of this research leading to more effective treatments for this devastating disease."

Despite dramatic advances in the treatment of malignant glioma, one of the most common types of nervous system cancers in adults, the prognosis of patients has not improved substantially in the past 30 years. While there is typically initial success in treatment, the cancer cells usually spread beyond the main tumour and the disease recurs in another part of the body. When this happens, the disease often becomes resistant to standard chemotherapy treatment.

"An ideal cancer-fighting virus should have effective delivery into multiple sites within the tumour, evade the body's immune responses, reproduce rapidly, spread within the tumour and infect cells that have spread. In this study, that's exactly what we found that VSV has done when injected intravenously," says Dr. Forsyth.

The researchers tested VSV on 14 cell lines of malignant glioma and found that the virus infected and killed all cell lines. The normal cell lines – those that did not contain malignant glioma cells – were not affected.

"One of the limitations to the use of these viruses in patients is the difficulty in getting a

sufficient amount of virus to the cancer," says Dr. Forsyth. "While these are very early results, we are very encouraged to find that delivering VSV intravenously attacks the cancer cells and not normal cells. From a patient's point of view, it is obviously a lot easier to be treated with a few intravenous treatments rather than having several surgeries to inject the treatment directly into your brain."

In 2006, an estimated 2,500 Canadians will be diagnosed with brain cancer and 1,670 will die of it. Even with the best available treatments – usually surgery and chemotherapy or radiation – patients with malignant glioma survive, on average, just one year.

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The Terry Fox Foundation's mission is to maintain the principles of Terry Fox while raising money for cancer research through the annual Terry Fox Run, memoriam donations and planned gifts. This year, the Foundation, through the National Cancer Institute of Canada, is funding \$20 million in research across the country.

The Canadian Cancer Society is a national community-based organization of volunteers whose mission is to eradicate cancer and to enhance the quality of life of people living with cancer. It is the largest charitable funder of cancer research in Canada. This year, the Society is funding more than \$47 million in leading-edge research projects across the country. When you want to know more about cancer, visit our website at www.cancer.ca or call our toll-free, bilingual Cancer Information Service at 1 888 939-3333.

Dr. Peter Forsyth will be available for interviews in his laboratory on Nov. 1 from 10 a.m. to 1 p.m. MT. To schedule an interview on this date, please contact:

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