

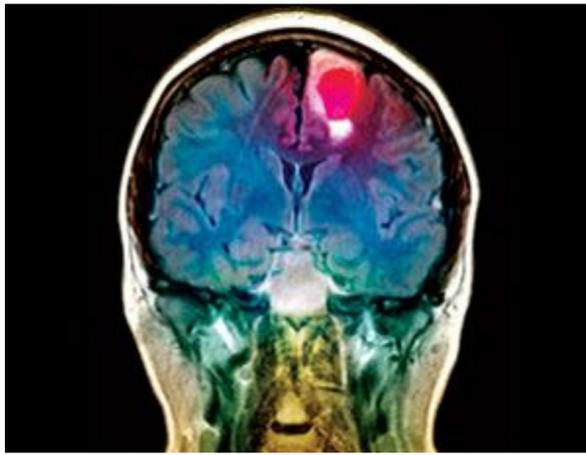
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Stem cells turn into seek-and-destroy cancer missiles

- › 04 June 2010 by [Linda Geddes](#)
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GENETICALLY modified stem cells are to be injected into the brains of cancer patients, where they will convert an inactive cancer drug into a potent and targeted tumour-killing agent.

Stem cells are strongly attracted towards cancer cells, so it is hoped that as well as homing in on the main tumour, they will also be drawn to secondary growths, or metastases. This will enable higher doses of drug to be delivered to cancer cells while minimising the risk of side effects in the rest of the body.



Target acquired (Image: Simon Fraiser/SPL)

A team led by [Karen Aboody](#) at the City of Hope [Beckman Research Institute](#) in Duarte, California, used neural stem cells originally derived from human fetuses which had been genetically engineered to produce cytosine deaminase. This is an enzyme that converts a drug called 5-fluorocytosine (5-FC) into an active chemotherapy drug, 5-fluorouracil (5-FU), but only in the immediate vicinity of the stem cell.

The team then injected the modified stem cells into the brains of mice with glioma, an aggressive form of brain cancer. The animals were subsequently given 5-FC. Treated mice saw a 70 per cent reduction in tumour mass compared with untreated animals. "In effect, we're allowing a much higher dose of chemo to be localised to the tumour site," says Aboody, who presented the results in May at an [international brain tumour conference](#) in Travemünde, Germany.

The US Food and Drug Administration has granted Aboody approval to carry out a safety trial of the therapy in up to 20 patients with recurrent glioma, for whom life expectancy is just three to six months. The stem cells will be injected into the tumour cavity following surgery to reduce its mass, and then given four days to home in on any remaining cancer cells. Patients will then be treated with daily 5-FC for one week.

Tiny colonies of glioma cells often spread deep into healthy brain tissue, but Aboody hopes that the new treatment will be able to zero in on single tumour cells, meaning it could destroy even the smallest metastases.

[Evan Snyder](#) at the Sanford-Burnham Medical Research Institute in La Jolla, California, who first proposed the use of stem cells to [fight cancer](#), suggests the same cues that make a tumour invade normal tissue also make a stem cell migrate to that site. "I believe the same concept will work for metastatic cancers that go outside the brain, and for other kinds of cancers," he says.

Unlike clinical trials that use neural stem cells to repair damage [caused by stroke](#), the stem cells used by Aboody have not been seen to differentiate, and stop dividing after 48 hours. This should reduce concerns about the potential for stem cells to [trigger cancers](#) in their own right.

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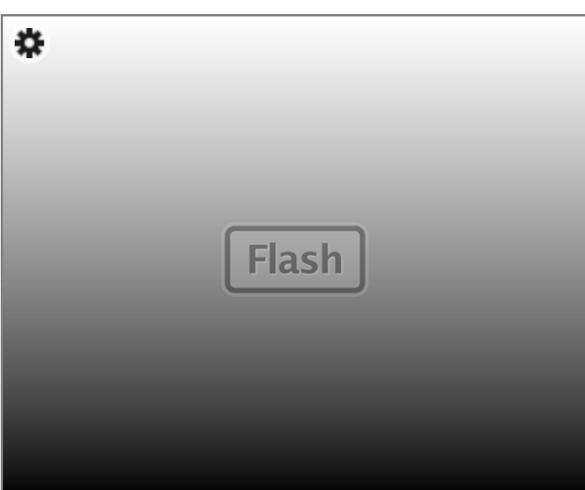
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