

# Technique filters cancer where chemo can't reach

July 30 2013

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(Medical Xpress)—A cancer therapy that removes malignant cells from a patient's cerebrospinal fluid may soon be available to prevent metastases and decrease complications of cancers involving the brain, according to Penn State medical researchers.

Many [cancer types](#) metastasize to the brain—including [breast cancer](#), pancreatic cancer, prostate cancer and leukemia—but by filtering these [malignant cells](#) out of the [cerebrospinal fluid](#) (CSF), the researchers hope to decrease the chance of cancer spreading toward and away from the brain.

The brain and spinal cord are surrounded by cerebrospinal fluid, separated from the blood circulating throughout the rest of the body by a cellular lining known as the blood-brain barrier.

"Most chemotherapies have a difficult time crossing the blood-brain barrier, but cancer cells can if they have the right instructions," said Joshua E. Allen, [postdoctoral fellow](#) at the Penn State Hershey Cancer Institute.

The researchers have devised a way to move CSF through a filter outside the body that catches the cancer cells and then allows the CSF to flow back into the patient, tumor cell-free.

"Currently nothing exists that can filter cerebrospinal fluid—which, in some patients, contains malignant active cancer cells," said Akshal S.

Patel, [neurosurgery resident](#) at the Penn State Milton S. Hershey Medical Center. "This therapy filters all cerebrospinal fluid."

Many treatments, including [chemotherapy](#), increase therapeutic resistance of cancer cells, Allen noted. However, filtering cells out does not offer the malignant cells an opportunity to develop therapeutic resistance.

Treatment providers can count the cells captured in the filter and use that to measure the severity of metastasis, another benefit to using this method.

Approximately 15 to 20 percent of metastatic [breast cancer patients](#) eventually develop [brain metastases](#), according to the researchers.

"There is a high likelihood of breast cancer patients getting [cancer cells](#) in their cerebrospinal fluid," said Patel.

The researchers monitored the number of tumor cells in nine breast cancer patients with confirmed metastatic spread to their central nervous system. They counted both the number of tumor cells in the bloodstream and in the CSF.

Approximately half of these patients had tumor cells that moved through the blood-brain barrier. Allen and Patel found that this movement of tumor cells is not necessarily restricted to later phases of breast cancer, as previously thought.

With this new knowledge in mind, the researchers' proposed method can help treat breast cancer—and other metastasizing cancers—earlier and with potentially fewer drugs. This filtering of body fluid is similar to that used as standard care for leukemia, and offers potentially increased cure rates.

"The minimum this therapy would provide is straining the [tumor cells](#) out," said Allen. "But we could also include other therapies when returning the CSF to the body."

A provisional patent application for this method described by the inventors has been filed.

Also working on this research were Wafik S. El-Deiry, American Cancer Society Research Professor, Rose Dunlap Professor, chief of the hematology/oncology division and associate director for Translational Research, Cancer Institute; and Michael J. Glantz, professor of neurosurgery, medicine and neurology.

The National Institutes of Health, the American Cancer Society and start-up funds from the Penn State Hershey Cancer Institute laboratory supported this work.

Provided by Pennsylvania State University

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