

Indirubin -- Component Of Chinese herbal remedy might block brain tumor's spread

July 12 2011

The active ingredient in a traditional Chinese herbal remedy might help treat deadly brain tumors, according to a new study by researchers at the Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James).

The researchers discovered that the compound, indirubin, both blocks the migration of glioblastoma cells, preventing their spread to other areas of the [brain](#), and the migration of endothelial cells, preventing them from forming the new blood vessels that the tumor needs to grow.

Glioblastomas occur in about 18,500 Americans annually and kill nearly 13,000 of them yearly. Glioblastoma multiforme is the most common and lethal form of the malignancy, with an average survival of 15 months after diagnosis.

The research is published online in the journal *Cancer Research*.

"We have pretty good methods to stop glioblastoma from growing in the human brain, but these therapies fail because [tumor cells](#) migrate from the original site and grow elsewhere in the brain," says co-principal investigator Dr. E. Antonio Chiocca, professor and chair of neurological surgery and co-director of the Dardinger Center for Neuro-oncology and Neurosciences.

"Our findings suggest that indirubins offer a novel therapeutic strategy

for these tumors that simultaneously targets tumor invasion and angiogenesis," Chiocca says.

"This study shows for the first time that drugs of the indirubin family may improve survival in glioblastoma, and that these agents inhibit two of the most important hallmarks of this malignancy – tumor-cell invasion and angiogenesis," says co-principal investigator Dr. Sean Lawler, senior scientist and group leader of the Translational Neurooncology Group at the Leeds Institute of Molecular Medicine.

Indirubin is derived from the Indigo plant. It is the [active ingredient](#) in the Chinese herbal remedy called Dang Gui Long Hui Wan, which is used to treat chronic myeloid leukemia.

Chiocca, Lawler and their collaborators used multiple glioblastoma cell lines and two animal models to examine three derivatives of indirubin. Key findings include the following:

- When human glioblastoma cells were transplanted into one brain hemisphere of mice, indirubin-treated animals survived significantly longer than controls and showed no migration of tumor cells to the opposite hemisphere.
- In a separate experiment, indirubin reduced the migration of tumor cells by 40 percent in treated animals versus controls.
- Treated tumors showed a lower density of blood vessels, and new blood-vessel growth was reduced up to three-fold in intracranial tumors, depending on the tumor-cell line.
- A laboratory assay showed that indirubins reduced endothelial-cell migration by 52 to 41 percent compared with untreated

controls.

"Overall, our findings suggest that indirubins reduce tumor invasion and tumor vasculature because of their antimigratory effects on both tumor and endothelial cells," Chiocca says.

Provided by Ohio State University Medical Center

Citation: Indirubin -- Component Of Chinese herbal remedy might block brain tumor's spread (2011, July 12) retrieved 25 April 2024 from <https://medicalxpress.com/news/2011-07-indirubin-component-chinese-herbal.html>

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