

BOSTON COLLEGE BIOLOGISTS BUILD A BETTER MOUSE MODEL

Mice yield new finding on role of macrophage cells in cancer's spread

CHESTNUT HILL, MA (April, 2008) – Researchers at Boston College have developed the first laboratory mouse model that mimics cancer's spread through the human body. Using their novel cell line, the team discovered one of the body's primary defensive cells plays a role in cancer's attack.

The development of a new animal model – a line of cancer cells injected into a laboratory mouse – that displays the full spectrum of systemic metastatic cancer in humans removes a "scientific stumbling block" in advancing cancer research, said Boston College Biologist Thomas Seyfried, whose findings appear this week in the online version of the *International Journal of Cancer* and will be presented Sunday April 13 at the annual meeting of the American Association for Cancer Research, in San Diego.

"What we have developed is the first model in the mouse that replicates all of the hallmarks of metastatic cancer," said Seyfried, the project leader. "Now, we have a tool that can be effective in identifying basic mechanisms and new therapies to treat the disease."

Researchers produced two cell lines that when injected into mice express all the major biological processes of metastasis. A third line, when injected, grew rapidly, but did not lead to metastatic cancer.



Biologist Thomas Seyfried

Previous mouse models contain limitations in effectiveness and speed. Many models fail to produce cancer in each animal subject and it often takes several months before cancer is detected. In other models, cancer cells are transplanted into animals with disabled immune systems. Within three weeks, the two Seyfried models produced tumors in 100 percent of the mice, which had healthy immune systems.

The cell line enabled researchers to make a new discovery about metastatic cells, namely that these cells express properties of macrophages, tissue cells that usually protect organisms against invading microbes in the environment and bacteria that lead to infection and disease.

"We show that the metastatic cells have macrophage properties," said doctoral researcher Leanne Huysentruyt, the lead author of the paper, who will present the findings April 13, when the American Association for Cancer Research meets. "Knowing this should allow for new types of therapies that target the macrophage-like cells."

Metastasis, the spread of cancer from a primary site to other tissues and organs within the body, is the primary cause of death among cancer patients and remains largely unmanageable. Without an animal model that consistently reproduces human-like metastasis, researchers have relied primarily on individual cancer patients to assess new therapies.

"The development of new drugs for cancer lags behind basic research," said Seyfried. "How can you cure a disease when you have no model system that replicates the disease except for the sick humans? It's almost as if each person who develops the disease is a guinea pig."

Seyfried said when a person has metastatic cancer, the macrophage-like tumor cells multiply and attack the body, system by system. Human metastatic cancers include breast, lung, colon and melanoma. When injected into mice, the metastatic cancer cells spread to other systems within three weeks.

"This will have an impact on how we view the role of macrophages in cancer progression," said Huysentruyt.

Seyfried's research was funded, in part, by a grant from the American Institute of Cancer Research, which praised the findings.

"We are happy to be able to contribute to Dr. Seyfried's academic and professional progress," said Ivana Vucenik, a spokeswoman for the institute. "As a result of our support, Dr. Seyfried has made a major advance in this field."

Additional funding for the research was provided by the National Institutes of Health and Boston College.

These biological materials are available for license to researchers and pharmaceutical companies through BC's Office for Technology Transfer and Licensing.

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International Journal of Cancer: <http://www3.interscience.wiley.com/cgi-bin/abstract/117954608/ABSTRACT> (subscription site)

For more information about the Seyfried lab, visit:
<http://www2.bc.edu/~seyfridt/mission.html>