Princess Margaret Hospital
University Health Network

NEWS RELEASE

Cancer scientists create "human" leukemia process to map how disease begins, progresses

(Toronto, Canada – April 26, 2007) – Cancer researchers led by Dr. John Dick at Ontario Cancer Institute (OCI) have developed a method to convert normal human blood cells into "human" leukemia stem cells. The converted cells, when transplanted into special mice that permit the growth of human cells, can replicate the entire disease process from the very moment it begins. The findings are published in the journal *Science*.

Dr. Dick, Senior Scientist at OCI, the research arm of Princess Margaret Hospital, and a Professor in the Department of Molecular Genetics, University of Toronto, said: "Most human leukemia research involves studying a patient's diseased cells or a cell line grown from those cells. However, since cancer takes many months or years to develop, just studying the cells at the end of the process does not let you know what the series of changes were that caused the cells to become leukemic, and when they happened.

"With the method we developed, we have duplicated the natural process every step of the way. The method we developed opens the pathway generally to understanding the process of how cancer begins."

The scientific team of Frederic Barabe, James Kennedy and Kristin Hope introduced a specific leukemia gene into normal human stem cells and injected the genetically altered cells into mice that lacked immune systems. The result? 100% of the mice developed fatal leukemia that displayed the same characteristics and patterns of human disease.

For the past 20 years, said Dr. Dick, leukemia research has focused mainly on human cells where the disease already exists or by studying leukemia created in mouse cells. This study flipped it around to focus on asking which are the normal cells within which the disease arises and then how it evolves and progresses, all within the context of human cells.

"So what we are building is a new approach and way of studying how leukemia arises in the first place. We found that with the leukemia gene we were using, the disease only arose from immature stem and progenitor cells. The leukemic stem cells that were created seemed to change as the human leukemia was grown for longer times in a series of transplanted mice. Our findings of how these leukemic stem cells functioned could explain several features of the leukemia in children and adults that also contain the same leukemia gene, MLL-ENL."

In 1994, Dr. Dick identified the first cancer stem cell in leukemia, following on the original discovery in 1962 of the blood stem cell by two other renowned OCI scientists, Drs. Ernest McCulloch and James Till -- a discovery that formed the basis of all current

stem cell research. Dr. Dick, who holds the Canada Research Chair in Stem Cell biology and is also Senior Scientist at the Toronto General Research Institute and at the McEwen Centre for Regenerative Medicine, University Health Network, recently published other findings showing that colon cancer arises from stem cells specific to the tumour.

This research was financially supported by grants and fellowships from the Canadian Institutes for Health Research, Ontario Institute for Cancer Research, Genome Canada through the Ontario Genomics Institute, the Leukemia and Lymphoma Society, and the National Cancer Institute of Canada with funds from the Canadian Cancer Society and the Terry Fox Foundation.

Princess Margaret Hospital and its research arm, Ontario Cancer Institute, have achieved an international reputation as global leaders in the fight against cancer. PMH is a member of the University Health Network, which also includes Toronto General Hospital and Toronto Western Hospital. All three are research and teaching and research hospitals affiliated with the University of Toronto. For more information, go to www.uhn.ca

- 30 -

For more information:

Princess Margaret Hospital: Jane Finlayson, Public Affairs, (416) 946-2846