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Identification of Genetic Pathways that Regulate the Survival and Development of Cancer and Cancer Stem Cells

Status	Current
Competition	III
Sector	Health
Genome Centre	Ontario Genomics Institute
Project Leader	Cynthia Guidos

Project Description

Breast cancer, leukemia and brain tumours are among the most common and lethal tumors that affect Canadians. Because these cancers frequently affect young women and children, many patients are given very aggressive treatments to improve their chances of survival. But these treatments often have serious side effects, and they are not effective in fighting the most serious forms of these cancers. According to Dr. Cynthia Guidos, a Senior Scientist at the Hospital for Sick Children Research Institute in Toronto and a Professor of Immunology at the University of Toronto, treatment failure might occur if the therapy does not target the rare cancer stem cells which can re-initiate tumour growth and thus function as the "roots" of the tumour.

Dr. Guidos' research focuses on the development of normal and leukemic immune cells. She is leader of a project entitled "Identification of Genetic Pathways that Regulate the Survival and Development of Cancer and Cancer Stem Cells". Her team also includes experts in leukemia, breast cancer, brain tumors, and cancer stem cells. Their project will study human tumors and mouse cancer models in order to address two crucial issues: what genetic alterations distinguish very aggressive from more benign tumors, and what genetic and biological malfunctions lead to the development of cancer stem cells.

By dissecting the cellular signals that govern abnormal survival of tumor cells and cancer stem cells, the project is expected to develop new "biomarkers" that may help to reserve the most aggressive cancer treatments for patients with the highest risk of failing conventional therapies. Ultimately, the project may lead to development of new and more effective therapies specifically targeted to cancer stem cells. The project team hopes that their research will eventually increase survival rates and improve quality of life for survivors of breast cancer, leukemia and brain tumours.