



Toronto Western Hospital
University Health Network

NEWS RELEASE *for immediate release*

Scientists discover first cells that lead to retinoblastoma *Finding will help develop targeted treatments for children with eye tumours*

(Toronto – June 14, 2004) – Scientists at Toronto Western Hospital have discovered the specific cells in the eye that develop into retinoblastoma, the most common eye cancer in young children. The research suggests that these cells already have cancer-like properties, a finding that explains why retinoblastoma occurs in children while other cancers such as colon and lung cancer occur in adults, developing after decades. Featured as the cover story in the June issue of *Cancer Cell*, this discovery paves the way for developing new treatments for retinoblastoma that target these first cancerous cells, thereby avoiding the difficult side effects that patients suffer from treatments such as radiation therapy and chemotherapy.

“From the first cancerous cell to the malignant tumour, there are a chain of events that must occur for a person to develop cancer, which must overcome each one of the body’s natural protective barriers that guard against tumour growth,” explains Dr. Rod Bremner, the study’s lead author and senior scientist with the division of Cell and Molecular Biology at the Toronto Western Research Institute, the research arm of Toronto Western Hospital. He is also affiliated with the hospital’s Vision Science Research Program, and is associate professor with the department of Ophthalmology and Vision Science at the University of Toronto. “For a number of years, it’s been known that retinoblastoma develops more quickly and with fewer number of events than typical adult cancers, but until now, it wasn’t clear why.”

Dr. Bremner and his colleagues discovered that the genetic mutation associated with retinoblastoma removes some of body’s protective barriers at a cellular level. The result is that specific retinal cells are predisposed to becoming tumours since they already have tumour-like properties, including the ability to bypass cell death – a special mechanism that causes cells to self-destruct if they begin dividing uncontrollably, as happens when a tumour begins growing. Normally, a gene called *Rb* prevents retinoblastoma by blocking cell division. In children with retinoblastoma, *Rb* is defective. To study the consequences of the defective *Rb*, the scientists knocked out the *Rb* gene in the retina of mice. Expecting to see the cells with defective *Rb* die as a result of cell death, they were instead surprised to find that while four types of cells did die, three type of cells not only survived but also continued dividing.

“Just like tumours, these three types of cells had the natural ability to survive despite the defective gene, and they were naturally resistant to cell death,” says Dr. Bremner. “Much is known about the advanced stages of cancer, but there is a paucity of information about the tiny single cell where it all starts. This understanding will help us develop drugs that interfere with the cellular development of cancer by preventing growth of malignant tumours, earlier on in the process.”

This research was funded by the Canadian Institutes for Health Research. The work was carried out by post-doctoral students Danian Chen, Izhard Livne-bar, and Mahima Agochiya.

Home to the Krembil Neuroscience Centre, one of the largest combined clinical and research neurological facilities in North America, the hospital also offers a community and population health program and expertise in musculoskeletal health and arthritis. Toronto Western Hospital is one of three hospitals – including Toronto General Hospital and Princess Margaret Hospital – that make up University Health Network, a teaching hospital of the University of Toronto.

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