



CANADIAN GENETIC DISEASES
NETWORK

BULLETIN



Researchers discover retinal stem cells in adult mammals

Toronto, March 17, 2000: Canadian Genetic Diseases Network researchers are members of scientific teams at the University of Toronto and the Hospital for Sick Children (HSC) who have identified retinal stem cells in the adult mammalian eye. The study, which appears in the March 17 edition of the journal *Science*, opens the door for retinal regeneration as a possible cure for damaged or diseased eyes.

“Before our study, it wasn’t known whether retinal regeneration was possible in adult mammals, especially humans,” says Vincent Tropepe, a PhD student in University of Toronto’s developmental biology program and lead author of the study. “We’ve shown that by removing these cells from the eye, we can encourage the production of new neurons even after the retinas have fully matured and cell division has stopped.”

Stem cells give rise to a lineage of other cells by simultaneously dividing and self-renewing, beginning in the embryo and continuing throughout post-natal life and into adulthood. When this cell division occurs, one of the two new cells is identical to the original while the other is slightly different. These new cells continue to divide and can become specialized and replace others that die or are lost. “The stem cells we discovered appear to be under inhibitory control while still in the eye, but proliferate once they are removed,” says Dr. Roderick McInnes, CGDN principal investigator and holder of the Anne and Max Tannenbaum Chair in Molecular Medicine at HSC and University of Toronto.

The research team now hopes to be able to stimulate the stem cells in their natural region inside the eye in order to generate new neurons to help return the eyes to their proper function. “Our next goal is to find those factors that inhibit them from proliferating in their natural region inside the eye and release that inhibition so as to give the cells the ability to regenerate and ultimately produce the different types of cells needed to make a new retina,” says Derek van der Kooy, professor of anatomy and cell biology at University of Toronto’s Faculty of Medicine.

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The researchers say that the findings, which are linked to Tropepe's thesis on characterizing neural stem cells during development of the brain, contribute to the rapidly growing body of evidence that the adult brain has more potential to regenerate and grow new neurons than people previously thought. They say it is a matter of discovering how new neurons can be generated from these stem cells *in vivo*.

The Canadian Genetic Diseases Network is a not-for-profit nation wide centre of research excellence under the federal Networks of Centres of Excellence Program. CGDN creates strategic partnerships to commercialize discoveries for the benefit of health care in Canada and worldwide. Fifty scientists and their teams, based in 18 universities, hospitals and research centres across Canada focus on the molecular and cellular causes of inherited disease.

This research was partly funded by the Medical Research Council of Canada, University Medical Discoveries Inc. and two members of the federal Networks of Centres of Excellence program – the Canadian Genetic Diseases Network and the NeuroScience Network.

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