

News from SickKids®

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Seeing eye to eye with...the fly?

SickKids scientists confirm common ancestry of the eyes in humans and flies

Toronto – Scientists at The Hospital for Sick Children (SickKids) have established that despite our many differences, the genes that control the development of eyes in humans and flies are remarkably similar. This research, published in the September 9, 2008 issue of the journal *Current Biology*, suggests that the eyes of invertebrates (such as fruit flies) and vertebrates (such as humans) have a common ancestry.

“This work is exciting because it suggests that our eyes and the eyes of the fruit fly, though they appear very different, share a common evolutionary history,” says Ted Erclik, a graduate student in the Developmental and Stem Cell Biology Program at SickKids and at the Department of Molecular Genetics at the University of Toronto, and the study’s lead author. “Our last common ancestor would have already contained a visual system with photoreceptors and the downstream neurons that connect the eyes to the brain.”

Thanks in part to the powerful genetic tools available in the fruit fly, its eye has been an important research model for the study of human eye development and disease. Using the fly eye model, researchers compared the two visual systems and found many striking commonalities. Erclik’s study establishes that the common ancestor had a primitive visual system, which included photoreceptors (photosensitive cells which convert light into electrical impulses), as well as other nerves (interneurons and projection neurons), that connect the eye to the brain.

“Ted’s work beautifully demonstrates the power of genetic research on relatively simple animals such as the fruit fly, and how this can lead to unexpected insights into humans,” says Dr. Howard Lipshitz, Senior Scientist at SickKids, professor and Chair of the Department of Molecular Genetics at the University of Toronto, Canada Research Chair in Developmental Biology, and Erclik’s co-supervisor. “Combining this understanding with prior research in Dr. Roderick McInnes’ laboratory on these genes in mice and humans, we have gained a greater understanding of the genetic pathways, defects in which lead to blindness.”

“The remarkable similarity in the regulation of eye development in flies and humans means that we can use the fly system to quickly identify other important genes that control human eye formation,” says Dr. McInnes, Senior Scientist at SickKids, University Professor and professor in the Departments of Paediatrics and Molecular Genetics at the University of Toronto, holder of the Anne and Max Tannenbaum Chair in Molecular Medicine, and Erclik’s other co-supervisor. “Genes that are likely to be associated with inherited blindness.”

The study was funded by the Canadian Institutes of Health Research, The Foundation Fighting Blindness in Canada, Canada Research Chairs Program, the National Science Foundation of the USA (which funded their collaborator, UCLA professor Volker Hartenstein), and the SickKids Foundation.

The Hospital for Sick Children (SickKids), affiliated with the University of Toronto, is Canada's most research-intensive hospital and the largest centre dedicated to improving children's health in the country. As innovators in child health, SickKids improves the health of children by integrating care, research and teaching. Our mission is to provide the best in complex and specialized care by creating scientific and clinical advancements, sharing our knowledge and expertise and championing the development of an accessible, comprehensive and sustainable child health system. For more information, please visit www.sickkids.ca. SickKids is committed to healthier children for a better world.

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