

## Unexpected findings about development of nervous system

October 18 2006

In his dissertation work, Per-Henrik Edqvist at Uppsala University in Sweden has characterized the molecular development of the retina in the eye with the aim of understanding how the nervous system develops. He has attained several unexpected results that may be of importance to the future treatment of damage to the nervous system.

The retina of the eye, which is part of the central nervous system, is where visual impressions take their initial shape. The retina consists of photoreceptors and several different specialized nerve cells that use various networks to coordinate impressions from the light-sensitive photoreceptors before the information is relayed to the brain.

Per-Henrik Edqvist has studied how the retina's complex structure of specialized cells is formed from a small number of retina stem cells during the fetal development of chickens.

Above all, he has examined how one of the retina's specialized cell types, so-called horizontal cells, are formed and reach maturity. Their task is to receive and integrate information from a large number of photoreceptors, and there are at least two functionally different types.

"We have characterized the molecular development of these different horizontal cell types in order to better understand how the nervous system is formed," explains Per-Henrik Edqvist.

He shows that the different types take on their determined role at a very



early stage in development, which conflicts with certain conventional models of the development of the retina. What's more, they do not develop simultaneously but rather one after the other, and in their development they undergo a highly unexpected cell migration from their birth site to their ultimate position in the retina.

"The fact that they migrate at different times toward or away from signals that can influence their continued development may be the mechanism that governs them in different developmental directions," says Per-Henrik Edqvist.

The dissertation enhances our knowledge of how the central nervous system is formed during fetal development, and thereby our understanding of how disturbances of the brain and ocular system can occur and be prevented.

"By understanding these mechanisms, we hope some day to be able to use stem cells to create spare parts that can replace damaged or dead nerve cells in the retina."

Source: The Swedish Research Council

Citation: Unexpected findings about development of nervous system (2006, October 18) retrieved 1 May 2024 from <u>https://medicalxpress.com/news/2006-10-unexpected-nervous.html</u>

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