Milestone in the regeneration of brain cells

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The majority of cells in the human brain are not nerve cells but star-shaped glia cells, the so called “astroglia”. “Glia means “glue”, explains Götz. “As befits their name, until now these cells have been regarded merely as a kind of “putty” keeping the nerve cells together.

A couple of years ago, the research group had been already able to prove that these glia cells function as stem cells during development. This means that they are able to differentiate into functional nerve cells. However, this ability gets lost in later phases of development, so that even after an injury to the adult brain glial cells are unable to generate any more nerve cells.

In order to be able to reverse this development, the team studied what molecular switches are essential for the creation of nerve cells from glial cells during development. These regulator proteins are introduced into glial cells from the postnatal brain, which indeed respond by switching on the expression of neuronal proteins.

In his current work, Dr. Benedikt Berninger, was now able to show that single regulator proteins are quite sufficient to generate new functional nerve cells from glia cells. The transition from glia-to-neuron could be followed live at a time-lapse microscope. It was shown that glia cells need some days for the reprogramming until they take the normal shape of a nerve cell. “These new nerve cells then have also the typical electrical properties of normal nerve cells”, emphasises Berninger. “We could show this by means of electrical recordings”.

“Our results are very encouraging, because the generation of correctly functional nerve cells from postnatal glia cells is an important step on the way to be able to replace functional nerve cells also after injuries in the brain,” underlines Magdalena Götz.

Source: National Research Center for Environment and Health