Medical Xpress

Hormone signal drives motor neuron growth, fish study shows

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A discovery made in fish could aid research into motor neuron disease.

Scientists have found that a key hormone allows young zebrafish to develop and replace their motor neurons – a kind of nerve cell found in the spinal cord.

The discovery may aid efforts to create neurons from stem cells in the lab, and support further research into a disorder for which there is still no cure.

In humans, motor neurons control important muscle activities such as speaking, walking and breathing. When these cells stop working, it causes difficulties in motor functions and leads to paralysis and death.

While humans cannot replace motor neurons when they break down, zebrafish can, making them a good model for research.

The study, led by scientists at the University of Edinburgh's Centre for Neuroregeneration, is the first to show that a signal released from the fish's brain – a hormone called dopamine – triggers the development and regeneration of cells in the spinal cord.

Dopamine acts on a mechanism – known as the hedgehog pathway – to increase the number of motor neurons formed in the developing spinal cord of zebrafish.

The dopamine signal was found to act in a similar way to replace damaged cells in adult zebrafish.

Dopamine was also found to drive the development of motor neurons in human embryonic stem cells, potentially paving the way for new and improved studies into motor neuron disease.

The work, published in the journal *Developmental Cell*, involved researchers from the Universities of Edinburgh, Cambridge, Helsinki and the Okazaki Institute for Integrative Biosciences, Japan.

It was mainly funded by the BBSRC, The Packard Center for ALS Research at Johns Hopkins, the Euan MacDonald Centre for MND Research at the University of Edinburgh and MND Scotland.

Dr Catherina Becker, Reader in Neurobiology at the University of Edinburgh's Centre for Neuroregeneration, and one of the lead authors of the study, said: "Our work sheds light on the way in which motor neurons develop and re-generate, and could inform research that leads to an increased understanding of motor neuron disease and spinal cord injuries."

Provided by University of Edinburgh