

Neurons change shape after gene therapy

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(Medical Xpress) -- Gene therapy not only helps injured brain cells to live longer and regenerate, but also changes the shape of the cells, according to researchers The University of Western Australia.

The study, published in the international science and medicine journal *PLoS One*, was led by Winthrop Professor Alan Harvey from UWA's School of Anatomy, Physiology and Human Biology, and Associate Professor Jennifer Rodger, NHMRC Research Fellow in Experimental and Regenerative Neurosciences at UWA's School of Animal Biology. The research was funded primarily by the WA Neurotrauma Research Program.

Professor Harvey said [gene therapy](#) was a relatively new strategy that attempted to help injured [brain cells](#) survive and regrow.

"Our previous work has shown that when growth-promoting genes are introduced into injured brain cells for long periods of time (up to nine months), the cells' capacity for survival and regeneration is significantly increased," he said.

"We have now shown that these same [neurons](#) have also changed shape in response to persistent over-expression of the growth factors. Importantly, it is not just neurons containing the introduced growth-promoting gene that are affected, but neighbouring "bystander" neurons."

Professor Harvey said neural morphology was very important in

determining how a cell communicated with other cells and formed the circuits that allowed the brain to function.

"Any changes in morphology are therefore likely to alter the way neurons receive and transmit information. These changes may be beneficial but could also interfere with normal brain circuits, reducing the benefits of improved survival and regeneration."

Professor Harvey said the results were significant for those involved in designing gene therapy-based protocols to treat brain and spinal cord injury and degeneration.

"These new results suggest that we may need to be careful about the types of genes we use in neurotherapy and how long we continue the therapy. While it may be beneficial for these genes to move around and cause changes in other cells, we need to be able to switch them off once the change has taken place."

Provided by University of Western Australia

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