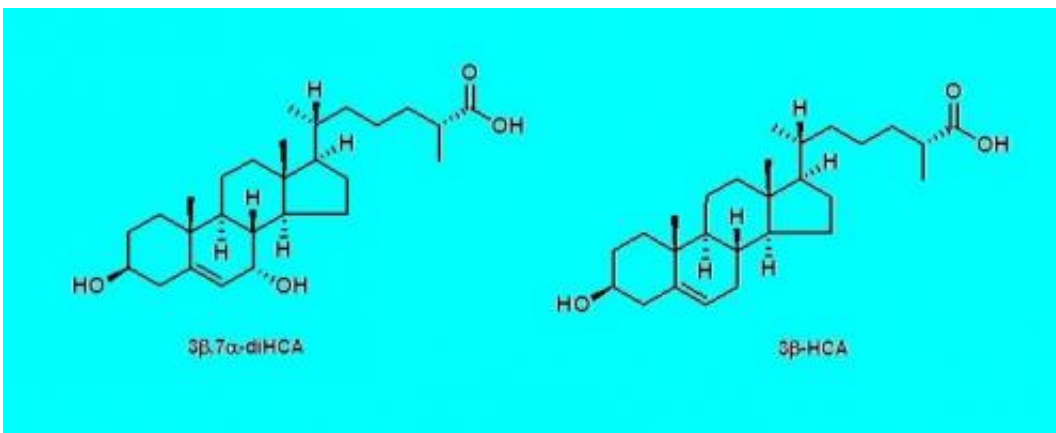


# Cholesterol-like molecules vital for the survival of motor neurons

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Scientists at Karolinska Institutet and Swansea University in Wales have, in studies in rodents and humans, identified two cholesterol-like molecules that play an important role in regulating the survival of nerve cells in the brain. The discovery is published in the *Journal of Clinical Investigation*, and may be significant in the long-term for the treatment of motor neuron disorders, such as ALS.

The researchers show that receptors in the cell nucleus known as 'liver X receptors' (LXR) are necessary for the development and survival of different types of [nerve cells](#) in the brain, amongst them motor neurons transmitting nerve impulses to control muscles in the eye. It has

previously been unknown how LXR regulate the balance between survival and death of these oculomotor neurons. However, the collaboration between the Stockholm group, who are experts in molecular/developmental biology, and scientists at Swansea University, who are expert in the use of mass spectrometry to identify biomolecules, lead to the discovery of two cholesterol-like molecules that bind to and activate LXR.

The results show that one molecule, called  $3\beta,7\alpha$ -diHCA, promotes motor neuron survival in an LXR-dependent manner. The other molecule, called  $3\beta$ -HCA, causes motor neuron loss. Most importantly  $3\beta,7\alpha$ -diHCA prevents the loss of [motor neurons](#) induced by  $3\beta$ -HCA.

### **Promotes survival**

An important conclusion of the part of the study that was conducted in vivo in rodents, is that  $3\beta,7\alpha$ -diHCA promotes the [survival](#) of the cell type that dies in ALS ([amyotrophic lateral sclerosis](#)) and other neurodegenerative diseases. According to the researchers, this finding opens the possibility of using cholesterol-type molecules in future treatments of these disorders.

Principal Investigator of the Swedish part of the study has been Professor Ernest Arenas at the Department of Medical Biochemistry and Biophysics. The work was supported by funding from the Swedish Research Council, the European Union, the Swedish Foundation for Strategic Research, Hjärnfonden, and Karolinska Institutet's strategic funding programme for research in stem cells and regenerative medicine, StratRegen.

**More information:** "Cholestenic acids regulate motor neuron survival via liver X receptors." *J Clin Invest*. 2014 Oct 1. pii: 68506. [DOI: 10.1172/JCI68506](https://doi.org/10.1172/JCI68506). [Epub ahead of print]

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