PRESS RELEASE

A study shows the peripheral nervous system regeneration capacity after a lesion

- The project, led by CIC bioGUNE and University College London, has discovered a new mechanism that facilitates the regeneration of the layer that surrounds the neurons in the peripheral nervous system after suffering a lesion.
- The loss of this insulating substance, called myelin, is involved in various severe neurodegenerative diseases.
- The research also shows that the cells that form myelin in the organs of the central nervous system, brain and spinal cord do not have this degradation mechanism.

(Bilbao, 3 September 2015).- Myelin is a substance made up of protein and lipids (lipoprotein) that surrounds the neurons that transmit nerve impulses. This lipoprotein has an insulating function, which enables fast and efficient transmission of electric impulses generated in neurons towards the different parts of the body, without losing intensity.

When myelin suffers a lesion, the nerve impulses are delayed or even stopped, and this can cause severe neurodegenerative diseases such as multiple sclerosis, amongst others.

A study led by Ikerbasque researcher from the Center for Cooperative Research in Biosciences, CIC bioGUNE, Ashwin Woodhoo, and the scientist from University College London (UCL) Kristján Jessen, showed that the cells in the peripheral nervous system are able to eliminate internally the myelin damaged after a lesion, facilitating the regeneration process.

This research also shows that this degradative mechanism is absent in central nervous system cells. This explains why the brain and spinal cord lack the capacity of removing myelin debris.

The study, published in *The Journal of Cell Biology*, concludes that cells that are situated in the peripheral nervous system, called Schwann cells, are able to destroy the myelin that is damaged after a nerve lesion by autophagy, which is a highly regulated cell process that involves degrading and recycling the substance that is no longer useful internally.

After helping to remove this debris, these cells reorganise to support the development of the new nerve endings, that is, they boost the neuron regeneration process.

The study conducted by CIC bioGUNE shows that during the first seven days after suffering a nerve lesion, Schwann cells are able to remove between 40% and 50% of the damaged myelin by autophagy.

A key substance

The loss of myelin in neurons leads to so-called demyelinating diseases. Some of them, like multiple sclerosis, take place in the central nervous system. Other lesser-known diseases, like Guillain-Barré syndrome, an autoimmune disorder that causes muscle weakness and paralysis, or Charcot-Marie-Tooth disease, a hereditary disorder that affects the lower extremities, take place in the peripheral nervous system.

“The study will enable us to better understand demyelinating diseases in the peripheral nervous system. The loss of myelin is a universal factor in different types of neuropathy. Our results can be applied to the knowledge of these diseases, because autophagy may be the mechanism used by these diseases to destroy myelin,” Woodhoo explains.

According to the expert, the possibility of new therapies is yet to be researched, but at the moment several autophagy modulating drugs are being tested and they could be redirected to act on demyelinating diseases.

About CIC bioGUNE

The Center for Cooperative Research in Biosciences CIC bioGUNE, with headquarters in the Bizkaia Science and Technology Park, is a biomedical research organisation that conducts innovative research into the interface between structural, molecular and cell biology, focusing specifically on the study of the molecular bases of disease, to be used in the development of new diagnostic methods and advanced therapies.

Study references

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Schwann cell autophagy, myelinophagy, initiates myelin clearance from injured nerves

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