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# Therapeutic target identified for treatment of spinal cord injuries

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Spinal cord injuries cause serious functional deficits, including paraplegia or tetraplegia, depending on the scale of the injury. This is due to degeneration of the spinal pathways that carry nerve signals from the brain to the various parts of the body, and vice versa, leading to loss of mobility and sensitivity below the injury.

An international team of scientists coordinated by Rubèn López Vales, of the Department of Cell Biology, Physiology and Immunology of the Universitat Autònoma de Barcelona (UAB), the UAB Institute of Neuroscience, and the Centre for Networked Biomedical Research in Neurodegenerative Diseases (CIBERNED), has discovered that lysophosphatidic acid plays a major role in degenerative processes in spinal cord injuries. Lysophosphatidic acid is a lipid that acts as a signalling molecule between the different cells in the organism, thus controlling many biological functions. The researchers observed that, following a spinal cord injury, levels of this lipid rise significantly in the nerve tissue and there is a loss of myelin, the electrically insulating material that surrounds nerve fibres and is needed for the transmission of nerve signals.

The scientists also identified the biological receptor, known as LPA1, through which this lipid multiplies the harmful effects of a spinal cord injury. In experiments with mice, the use of a drug that prevents the interaction of lysophosphatidic acid with LPA1 led to a drastic reduction in myelin loss, and the mice's locomotor performance improved after the spinal cord injury. Following spinal cord injury, mice displayed only

occasional, uncoordinated locomotion, but 87% of those treated with the drug displayed normal, coordinated locomotion. In addition, only 10% of the untreated mice could run at 20 cm./s and none at 25 cm./s while, on applying the drug, 50% could run at 20 cm./s, 40% at 25 cm./s and 30% at 30 cm./s.

This work means the discovery of a new therapeutic target for treating acute spinal cord injuries, which at present have no clinically effective treatment.

In the words of UAB researcher Rubén López, "this discovery could also open the door to treatments for other neurodegenerative illnesses in which myelin loss plays a major role, such as multiple sclerosis."

**More information:** Eva Santos et al. Activation of Lysophosphatidic Acid Receptor Type 1 Contributes to Pathophysiology of Spinal Cord Injury, The *Journal of Neuroscience*, July 15, 2015 - 35(28):10224-10235

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