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Press release

A new development in the relief of spasms related to amyotrophic lateral sclerosis.

A team of researchers from Strasbourg, directed by Luc Dupuis (Inserm unit 692 "molecular signalling and neurodegeneration"), have recently discovered the origin of spasms - a disabling symptom of amyotrophic lateral sclerosis. The degeneration of serotonin-releasing neurons is responsible for these sensations. In the longer term, researchers imagine that molecules acting on serotonin receptors present in the brain could eliminate spasticity in patients.
Their results are published in the *Brain* review.

Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease with an occurrence rate in France similar to multiple sclerosis (two to three new cases per year for every 100,000 residents). It has a specific affect on neurons responsible for motor control, in particular motor neurones and central motor neurones. The former, located in the spinal cord, are directly linked to muscles and are used for muscle contraction and stretching. The latter, located in the brain, receive movement orders. As the disease develops, the neurons degenerate and the muscles are no longer stimulated and stop working. Movements, walking and speech become increasingly difficult and patients tend to pass away an average of two to five years after diagnosis, generally due to respiratory failure.

Paralysis is accompanied by other symptoms, which can be highly disabling on a daily basis. Spasms (or spasticity) are an exaggerated muscular response to a stimulus; they produce long and involuntary muscle contractions, coupled with pain. Spasticity is frequently observed in ALS. Until now, it was attributed to the loss of central motor neurons.

In this study, Inserm researchers have shown that these spasms are, in fact, linked to the degeneration of another type of serotonin-producing neurons located on the brain.

They have observed - both in patients with ALS and in a transgenic mouse model - that serotonergic neurons waste away as the disease develops and that serotonin levels in the spinal cord sharply decreased before the motor-related symptoms appeared.

Furthermore, some molecules active against serotonin receptors eliminate spasms in transgenic mice suffering from ALS. This research demonstrates that neuron degeneration in ALS is not limited to the motor system in its strictest sense. For Luc Dupuis "molecules acting on serotonin receptors 5-HT2B and C could be antispastic for ALS patients over the long-term".

This work is protected by a patent filed by Inserm Transfert.

Sources

Degeneration of serotonin neurons in amyotrophic lateral sclerosis: a link to spasticity

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