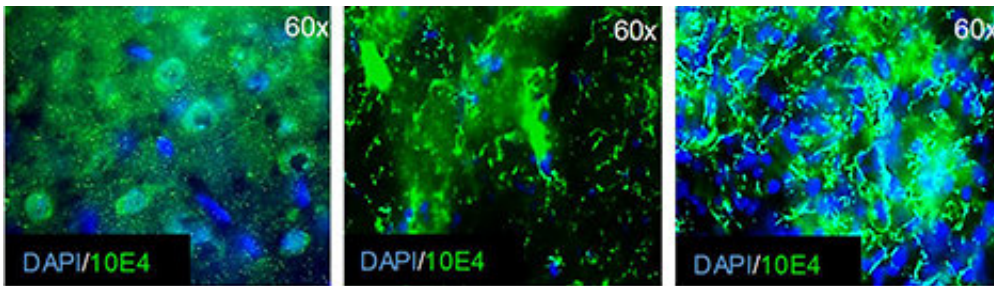


# Stroke: Preventing the damage by acting on the neuronal environment?

November 16 2018

---



At left, normal animals. Middle, in untreated animals after a stroke, the matrix is dislocated and brain cells degenerate. At right, in animals treated following a stroke, the organization of the matrix is reestablished, and the cells are preserved. Credit: Xavier Laffray / CRRET

To protect neurons and limit the damage after a stroke, researchers from the CNRS, the University of Caen-Normandie, University Paris-Est Créteil, and the company OTR3 have targeted the matrix that surrounds and supports brain cells. Their results, just published in the journal *Theranostics*, have confirmed this strategy on rats, and will lead to a clinical study between now and late 2019.

With over 300 cases per day in France, stroke is the leading cause of handicap among adults, and the second cause of death. Eighty to 85 percent are caused by the occlusion of a cerebral artery by a blood clot (ischemic stroke), with nearby neurons dying because of oxygen deprivation. The only existing treatment involves eliminating the blood

clot, which is only possible during the first few hours following a stroke, and consequently available only for a minority of patients. Moreover, brain lesions can persist and worsen long after the start of a stroke, with no [treatment](#) being currently available to slow them, or to improve functional recovery.

Numerous avenues of research are studying how to protect neurons from this degeneration. However, treatments attacking this degeneration have only met with clinical failure, which prompted a team led by a CNRS researcher, Myriam Bernaudin, to take an interest in a little explored domain: the environment of the cells, known as the [extracellular matrix](#). This matrix, which offers the cells structural support and houses growth factors, ends up being disorganized following a stroke, thereby amplifying neuronal death. The team from the laboratory Imagerie et stratégies thérapeutiques des pathologies cérébrales et tumorales (CNRS/UNICAEN/CEA) thus approached colleagues specializing in the extracellular matrix at the laboratory Croissance, réparation et régénération tissulaires (CNRS/UPEC), along with the biotechnology company OTR3, which had already brought to market "matrix therapy" treatments for the healing of cutaneous or corneal ulcers.

The [researchers](#) demonstrated on rats the effectiveness of this new approach in protecting the brain and improving functional recovery after an ischemic stroke. The intravenous injection of an agent that mimics certain structural components of the extracellular matrix, known as heparan sulfates, protects and reconstitutes this [matrix](#), promotes the development of new neurons and the regeneration of blood vessels, and improves the recovery of sensory and motor functions.

It is therefore a promising avenue for limiting the aftereffects of a [stroke](#), one that would complement existing techniques for eliminating [blood clots](#). Pilot clinical trials should begin between now and late 2019.

**More information:** Yacine Khelif et al. A heparan sulfate-based matrix therapy reduces brain damage and enhances functional recovery following stroke, . *Theranostics*, 12 November 2018. [DOI: 10.7150/thno.28252](https://doi.org/10.7150/thno.28252)

Provided by CNRS

Citation: Stroke: Preventing the damage by acting on the neuronal environment? (2018, November 16) retrieved 19 April 2024 from <https://medicalxpress.com/news/2018-11-neuronal-environment.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.