

Gelatin accelerates healing of the blood brain barrier in acute brain injury

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Researchers already know that gelatin-covered electrode implants cause less damage to brain tissue than electrodes with no gelatin coating. Researchers at the Neuronano Research Centre (NRC) at Lund University in Sweden have now shown that microglia, the brain's cleansing cells, and the enzymes that the cells use in the cleaning process, change in the presence of gelatin.

"Knowledge about the beneficial effects of gelatin could be significant for [brain](#) surgery, but also in the development of brain implants," say the researchers behind the study.

Our brains are surrounded by a blood brain barrier which protects the brain from harmful substances that could enter it via the bloodstream. When the barrier is penetrated, as in the case of biopsy or [brain surgery](#) for example, leaks can occur and cause serious inflammation.

Researchers at the NRC have previously shown that gelatin accelerates brain tissue healing and reduces damage to nerve cells in the case of electrode implants, but only now are they starting to understand how.

The researchers used sedated rats to investigate how the brain is repaired after being subjected to an injury. Gelatin-coated needles were used in one group, and needles without gelatin in the other.

"The use of gelatin-coated needles reduced or eliminated the leakage of molecules (which normally don't get through) through the [blood brain](#)

[barrier](#) within twenty-four hours. Without gelatin, the leakage continued for up to three days," says Lucas Kumosa, one of the researchers behind the study, which was recently published in the research journal *Acta Biomaterialia*.

Fewer inflammatory cleaning cells

When there is an injury to the brain, microglial cells – the brain's cleaning cells – gather at the site. They clean up, but can also damage the nerve cell tissue through enzymes they release. In their study, the researchers observed a change in which cleaning cells moved towards the injury site.

"When we used gelatin, we saw only a small number of the inflammatory [microglial cells](#). Instead, we observed [cells](#) of a different kind, that are anti-inflammatory, which we believe could be significant in accelerating healing," explains Lucas Kumosa.

The hypothesis is that the potentially damaging enzymes are occupied with the gelatin instead.

"Gelatin is a protein and its decomposition releases amino-acids that we believe could promote the reconstruction of blood vessels and tissue," explains Jens Schouenborg, professor of neurophysiology at Lund University.

Surgical significance

Research is currently underway on how electrodes implanted in the brain could be used in the treatment of various diseases, such as epilepsy or Parkinson's. A major challenge has been to find ways of reducing damage to the area when using such implants.

"Although the research field of brain electrodes is promising, it has been a challenge to find solutions that don't damage the [brain tissue](#). Knowledge of how injuries heal faster with [gelatin](#) could therefore be significant for the development of surgical treatment as well," says Jens Schouenborg.

More information: Lucas S. Kumosa et al. Gelatin promotes rapid restoration of the blood brain barrier after acute brain injury, *Acta Biomaterialia* (2017). [DOI: 10.1016/j.actbio.2017.10.020](https://doi.org/10.1016/j.actbio.2017.10.020)

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