

APOSEC protein concentrate reduces damage in case of spinal cord injuries

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In tests conducted on animals, the APOSEC protein concentrate extracted from white blood cells has reduced the severity of damage after an accident involving spinal cord injuries when the agent was injected in the abdominal cavity 40 minutes after the acute lesion. As a result, severe consequential paralyses can be prevented. This is the central result of a study that was conducted by a research group under the guidance of Hendrik Jan Ankersmit in the Clinical Department of Thoracic Surgery of MedUni Vienna and that was published in the top journal *Experimental Neurology*. The study was conducted within the scope of the doctoral thesis of Thomas Haider, the MD PhD student and medical assistant of the Casualty Surgery.

"This agent could have even helped Samuel Koch after the accident during the 'Wetten dass ...' show", said Hendrik Jan Ankersmit, Head of the Christian Doppler Laboratory for Diagnostics and Regeneration of Heart and Thoracic Inspections at MedUni Vienna convincingly based on pre-clinical results. "It seems that APOSEC influences the severity of paralyses decisively."

APOSEC is a soluble protein extracted from [white blood cells](#) under irradiation. The extraction of white [blood cells](#) as "bio-reactors" is easy and its cost can be compared with a conventional blood donation. The agent could be produced and stored for a later use and hence it is easily available in a freeze-dried form as an "Off-the-shelf" if necessary. In 2012, Ankersmit and his team had proven that APOSEC hinders the scarring of the heart muscle to a large extent in case of a heart attack.

The research scientists use humane virus-inactivated APOSEC (blood donor centre Linz, Prim. Gabriel), whose usage for clinical tests on human beings has been approved by the Austrian Agency for Food Security (AGES). During the tests on animals, a [spinal cord](#) was deliberately damaged in an experiment. The active agent was injected in the time frame between 40 minutes and one day after the incident.

The result: Damages were considerable lower as compared to those in control animals and correlated positively with the neurological rehabilitation. In addition, it was shown that APOSEC also boosts the regeneration through vascularisation after such injuries. The earlier the agent was administered, the better was the effect observed. The increased release of neuroprotective proteins (CXCL1 and BDNF) by APOSEC seems to be responsible for this. CXCL1 is responsible for vascularisation and the brain derived neurotrophic factor protects brain tissues.

Damage in case of an apoplectic fit is reduced by 30 percent

The research group has also proven that the injection of APOSEC shows positive effects even during an experimental acute apoplectic fit. Damages caused in animals due to an apoplectic fit were reduced by 30 percent. Ankersmit: "The infarct volume is thus considerably reduced." This study was conducted by Patrick Altmann, a graduate student of the CD laboratory and the current research associate of the Neurological Department of MedUni Vienna.

Clinically relevant: At present, the research scientists has started a cooperation with the University Hospital for Clinical Pharmacology in MedUni Vienna to improve the healing of skin wounds using endogenous APOSEC (ClinicalTrials.gov Identifier: NCT02284360).

This academic clinical study is the world's first Secretome-based regeneration study for skin and is financed by the Christian Doppler research company.

More information: "The Secretome of Apoptotic Human Peripheral Blood Mononuclear Cells Attenuates Secondary Damage Following Spinal Cord Injury in Rats." *Exp Neurol*. 2015 Mar 19. pii: S0014-4886(15)00081-3. [DOI: 10.1016/j.expneurol.2015.03.013](https://doi.org/10.1016/j.expneurol.2015.03.013)

"Secretomes of apoptotic mononuclear cells ameliorate neurological damage in rats with focal ischemia." [DOI: 10.12688/f1000research.4219.2](https://doi.org/10.12688/f1000research.4219.2)

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