Mitigating Spinal Cord Injury

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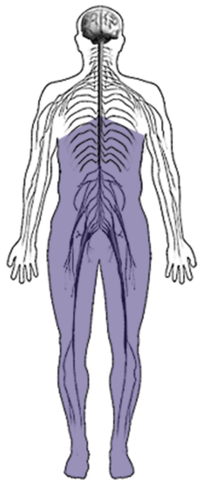
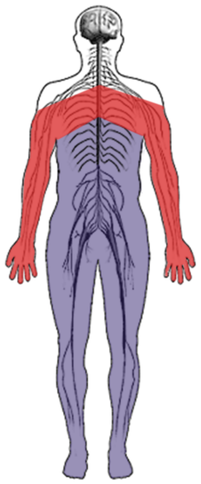


Neuroprotectants offer the potential to reduce the severity of long-term disability in spinal cord injury patients

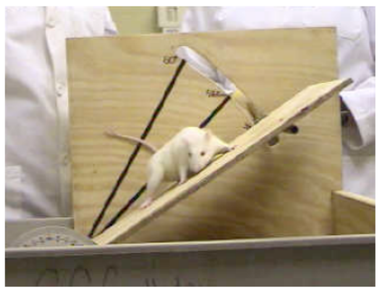


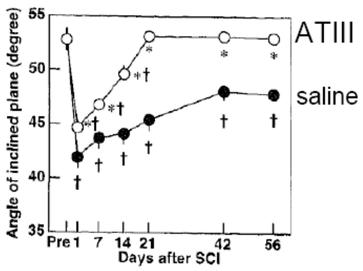
Trauma to the spinal cord causes immediate loss of function below the level of the injury.

Then, in the hours and days after the accident, the body's secondary injury response may extend cord damage upwards and increase the severity of long-term disability.

The goal of this project is to develop an effective neuroprotectant without side effects.

How would your life change if you became one of the15,000 Americans to suffer a spinal cord injury this year?





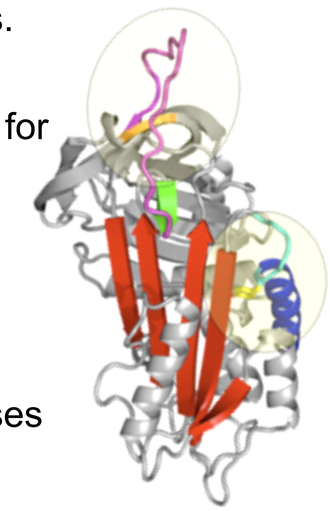
Taoka Y, Okajima K, Uchiba M.
J Neurotrauma. 2004 Dec;21(12):1818-30.

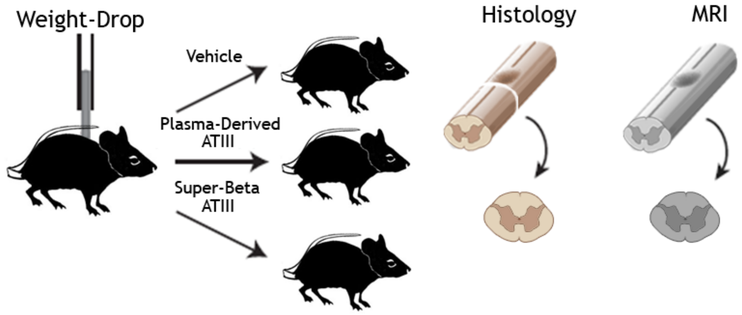
Neuroprotectants, such as high-dose plasma-derived ATIII (antithrombin III), mitigate sensory and motor function loss by reducing the secondary response to spinal cord trauma.

ATIII is an anticoagulant and anti-inflammatory protein with neuroprotectant properties.

High doses of plasma-derived ATIII are required for neuroprotection, but also increase bleeding risk.

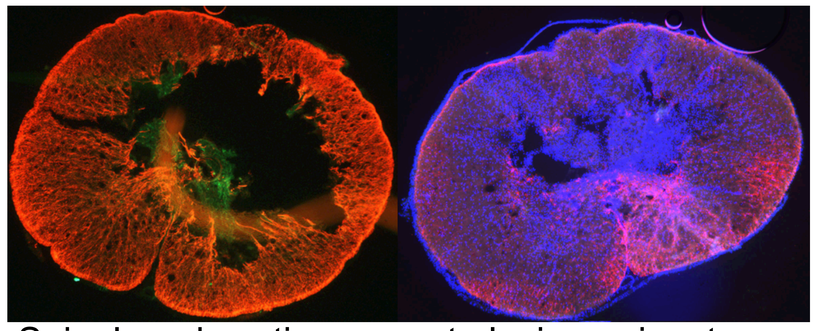
We have engineered a "super-beta" ATIII that is designed to provide neuroprotection at low doses and without increased bleeding risk.





A rat spinal cord injury model will be used to compare the efficacies of low-dose "super-beta" ATIII *vs.* high-dose plasma-derived ATIII.

This work requires pilot studies for correlating MRI-based lesion measurements with histology and for determining the biological mechanism(s) of ATIII neuroprotection.



Spinal cord sections near to lesion epicenter
(prepared in collaboration with P. Tresco, UU Bioengineering)

Free-floating preparation (left) permits measurement of lesion cavity as a well-defined black region.

Solid preparation (right) reveals that, at 7 days after contusion, the cavity is occupied by a cellular infiltrate.