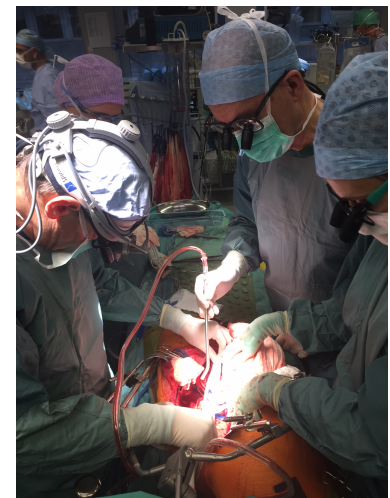
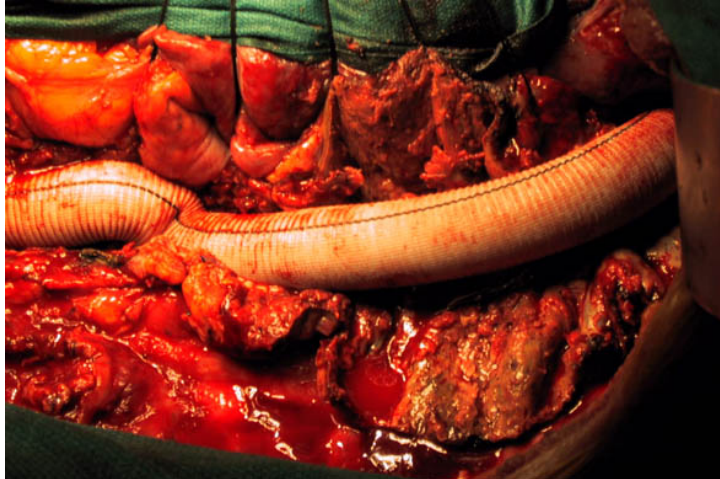


Shock wave treatment reduces neuronal degeneration upon spinal cord ischemia and improves symptoms in a first-in-man trial

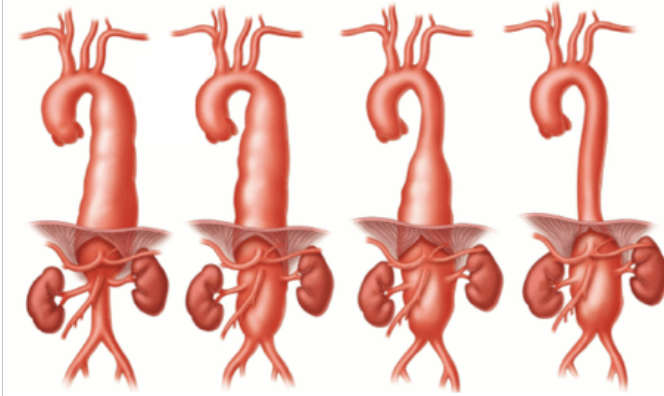
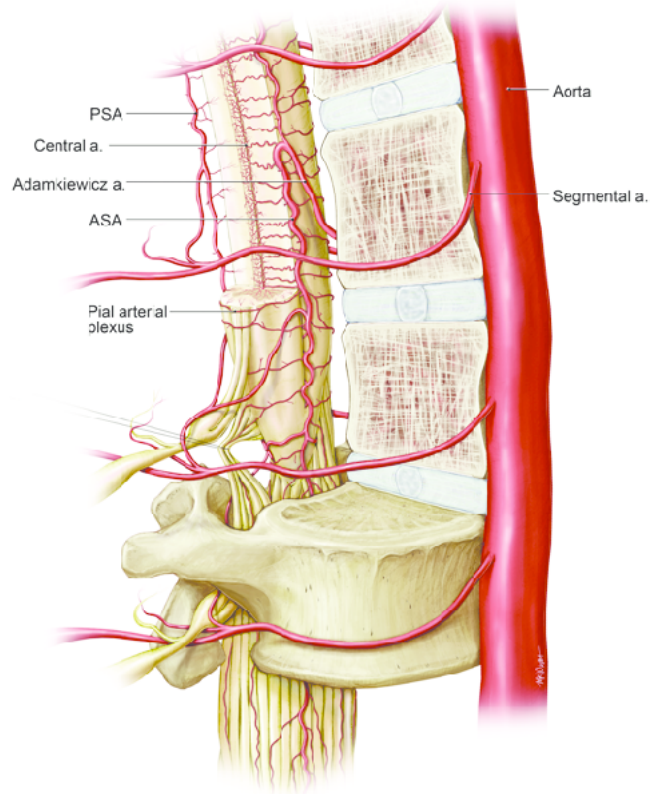
Tepeköylü C, Lobenwein D, Nägele F, Graber M, Pölzl L, Hirsch J,
Kirchmair E, Knoflach M, Grimm M, Holfeld J.

University Clinic of Cardiac Surgery
Innsbruck Medical University, Austria

thoraco-abdominal aneurysm

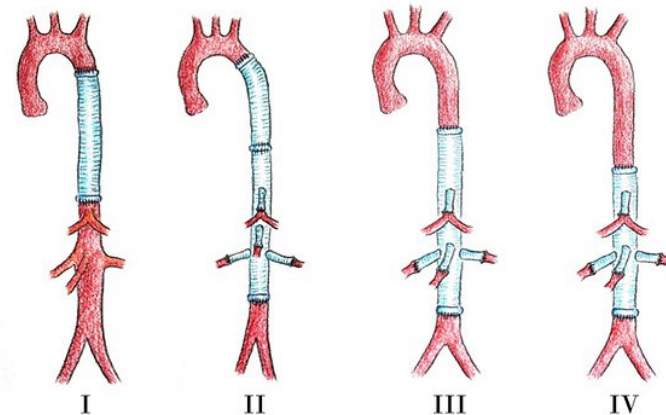


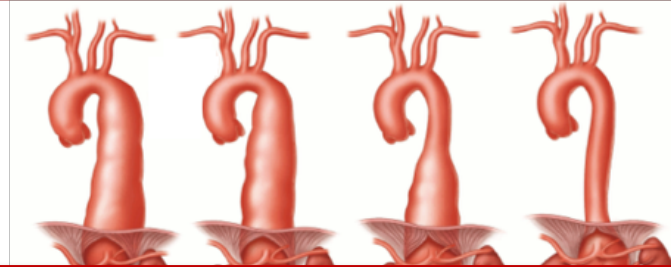
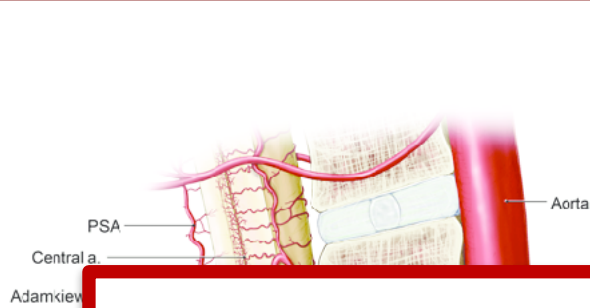
spinal cord ischemia



Type	I	II	III	V
SCI	7%	4%	15%	31%

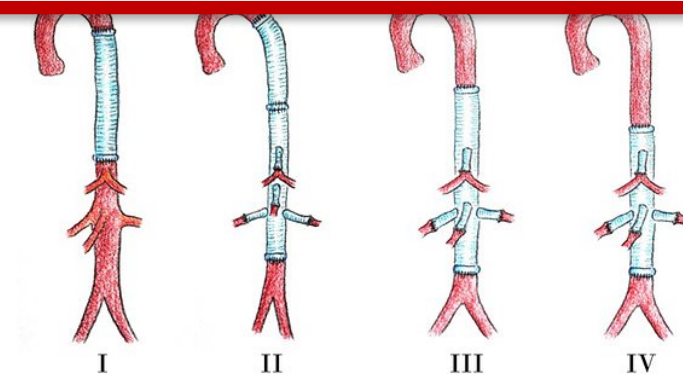
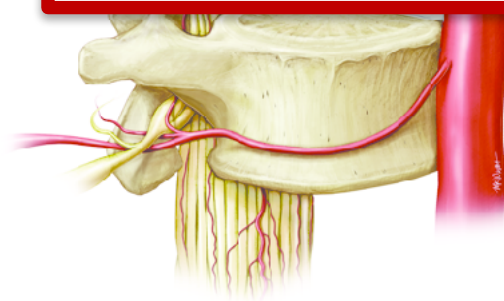
Shenaq SA, Svensson LG. J Cardiothorac Vasc Anesth 1993

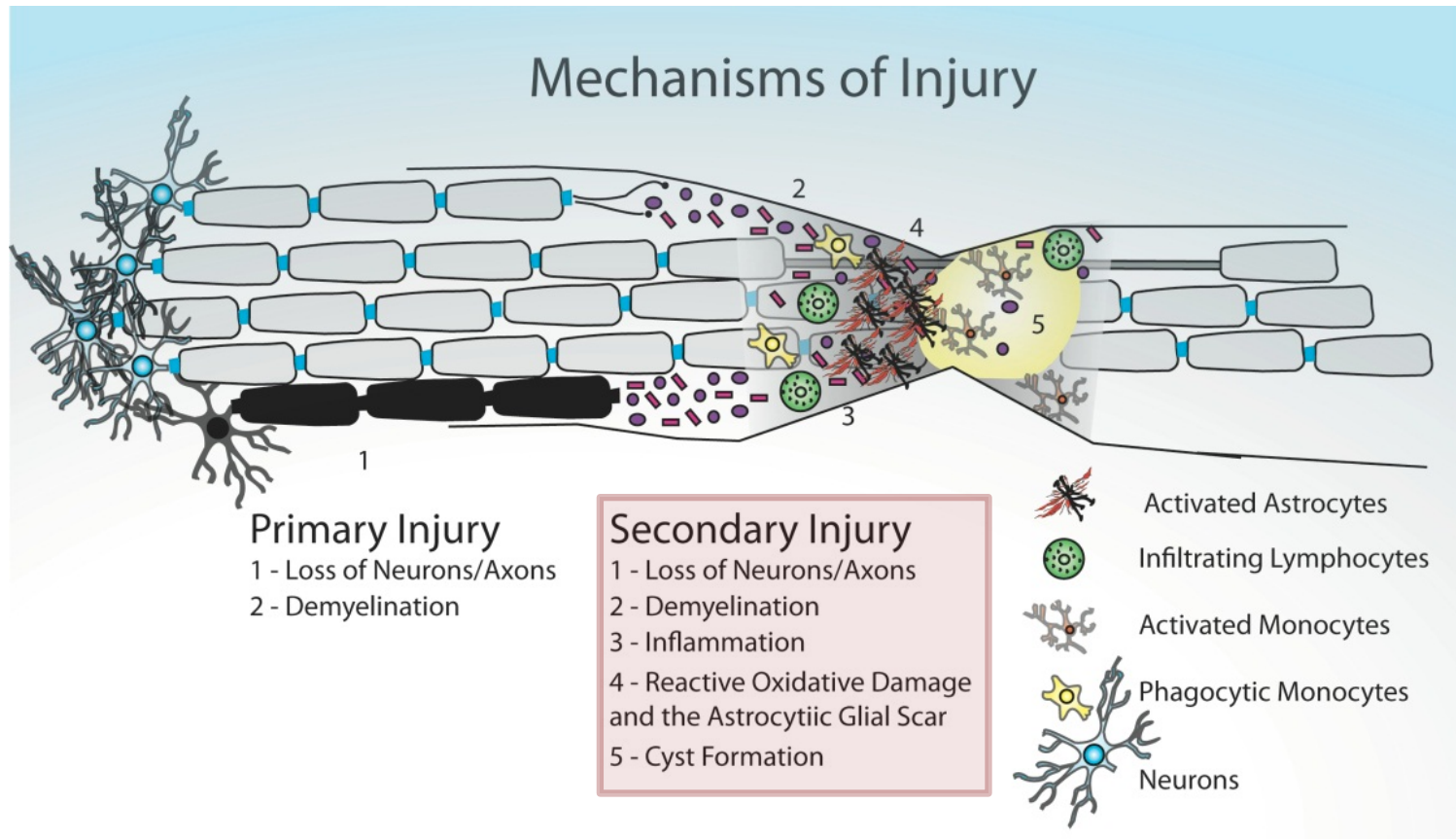


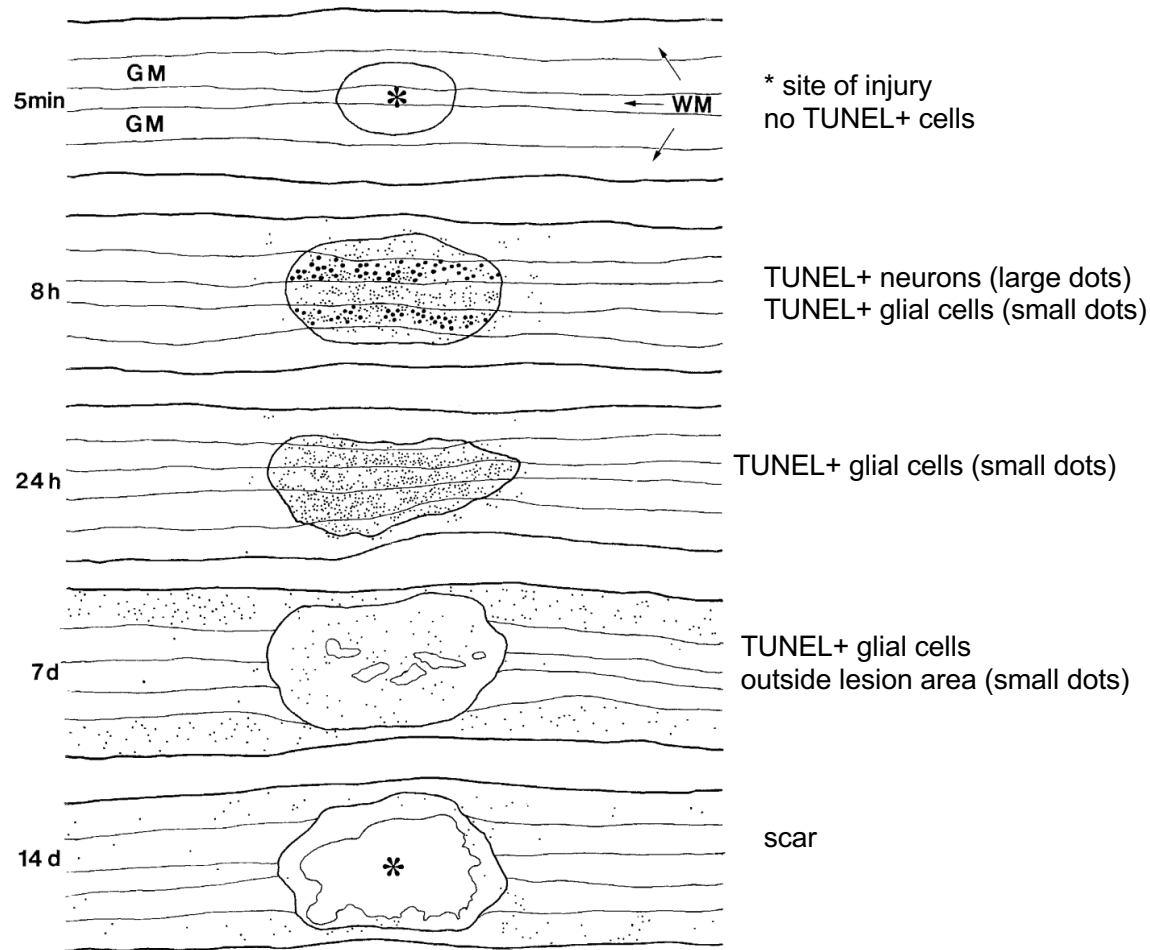
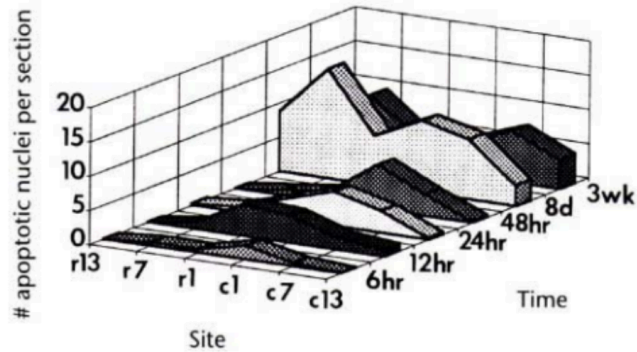


No causal treatment option !

ac Vasc Anesth

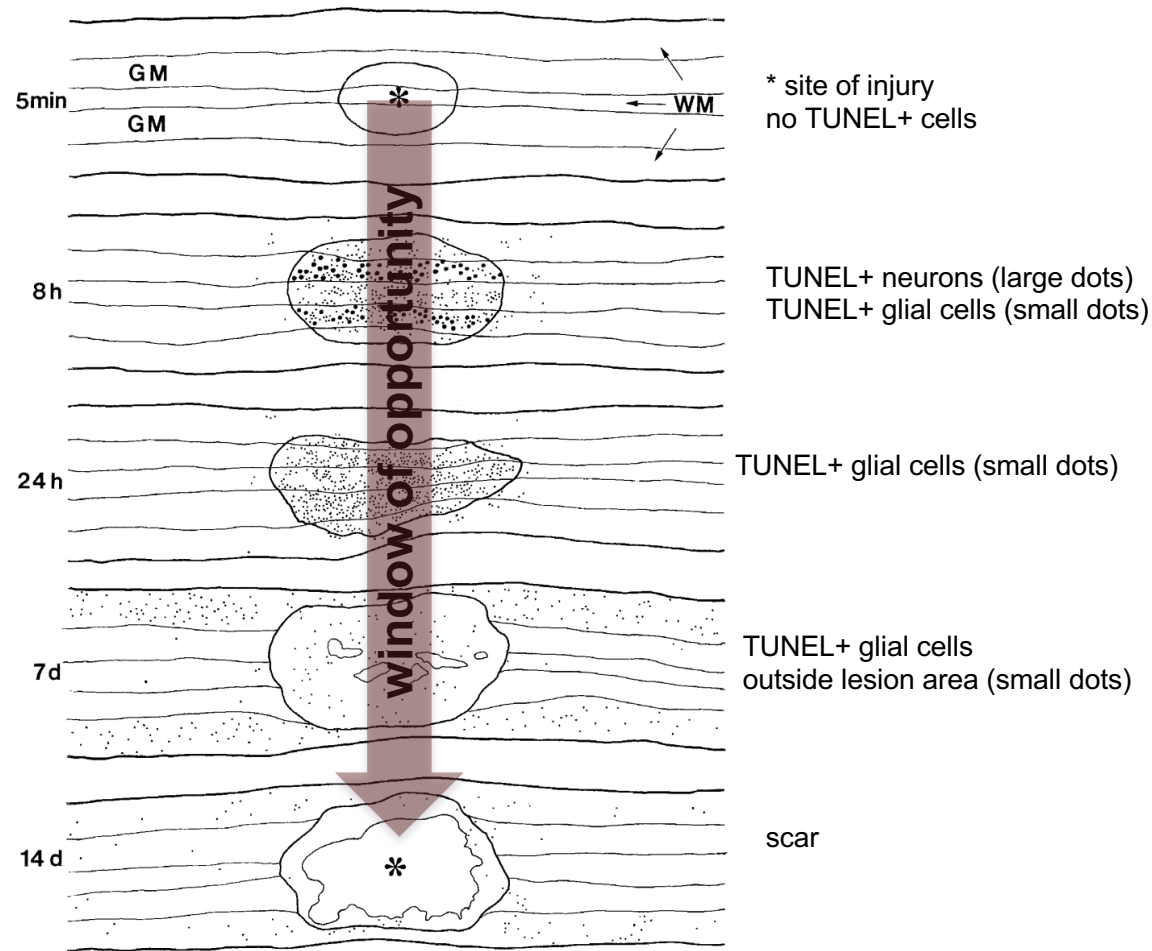
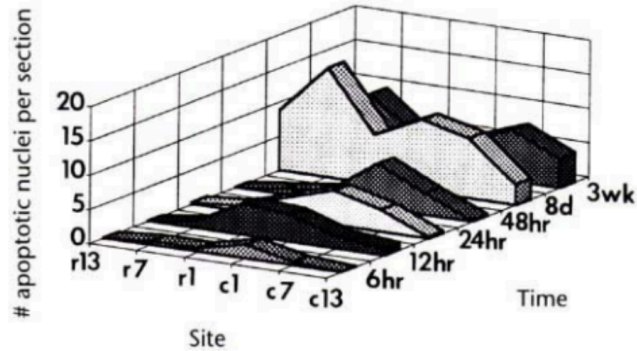






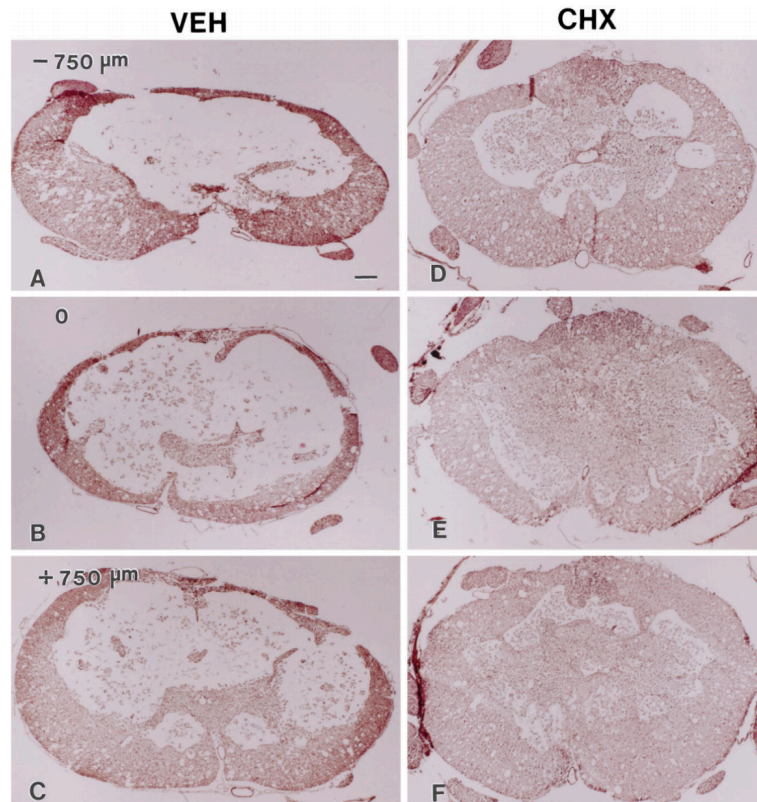
Liu et al., J Neurosci 1997

Crowe et al., Nature Med 1997 www.carelab.at



Liu et al., J Neurosci 1997

Crowe et al., Nature Med 1997 www.carelab.at

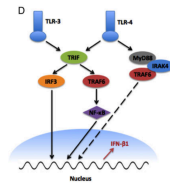
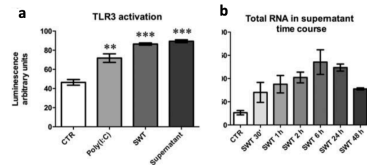




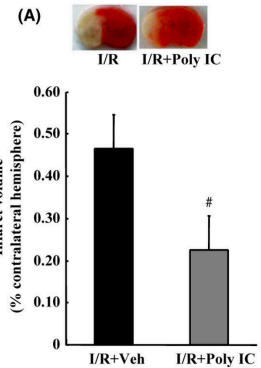
Cardiovascular Research (2016) 109, 331–343
doi:10.1093/cvr/cwv272

Toll-like receptor 3 signalling mediates angiogenic response upon shock wave treatment of ischaemic muscle

Johannes Holfeld¹, Can Tepeköylü¹, Christin Reissig², Daniela Lobenwein¹, Bertram Scheller², Elke Kirchmair¹, Radoslaw Kozaryn¹, Karin Albrecht-Schgoer³, Christoph Krapf¹, Karin Zins⁴, Anja Urbschat³, Kai Zacharowski², Michael Grimm¹, Rudolf Kirchmair³, and Patrick Paulus^{6*}

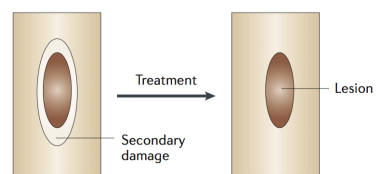


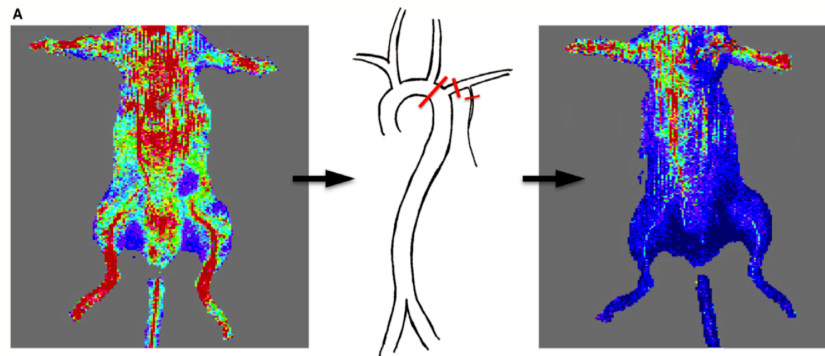
Accession code	Gene and classification	poly I:C
Growth, differentiation and neuroprotection		
	Fibroblast growth factor receptor 4 (FGF4R)	23.24
	Ephrin type-B receptor 1 (EPHT2)	13.31
	Tumor necrosis factor-inducible protein-6 (TSG-6)	10.88
	Ciliary neurotrophic factor isoforms B&C (CNTF)	4.86
	Neurotrophin-4 (NT-4)	3.91
	Granulocyte-macrophage colony-stimulating factor Receptor-α	3.78
	Ret proto-oncogene (RET)	3.63
	Leukemia inhibitory factor (LIF)	3.47
	Granulocyte-macrophage colony stimulating factor (GM-CSF)	3.44
	Vascular endothelial growth factor C (VEGF-C)	3.34
	Embryonic growth/differentiation factor 1 (GDF-1)	2.84
	Glial growth factor (neuregulin 1, GGF1)	2.73
	Pleiotrophin (neurite growth promoting factor 1, PTN)	2.61
	Insulin-like growth factor binding protein 6 (IGFBP6)	2.64
	Migration inhibitory factor-related protein 8 (MRP8)	2.57
	Brain-derived neurotrophic factor (BDNF)	2.48
	Transforming growth factor β2 (TGF-β2)	2.46
	Glial growth factor 2 (neuregulin; GGF2)	2.20
	Hepatoid differentiation protein (EDF)	2.11
	Hepatocyte growth factor activator (HGF activator)	1.25
	Growth inhibitory factor, metallothionein-III (MT-III)	1.33

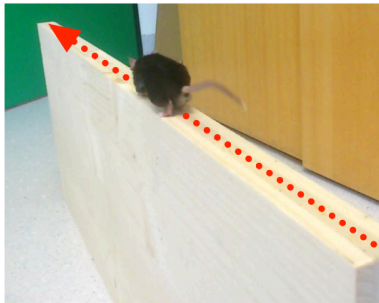
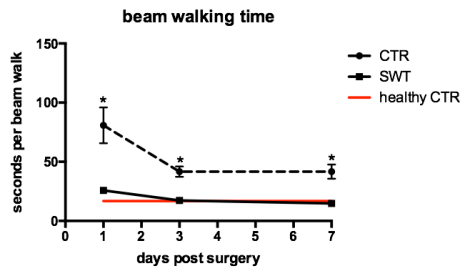
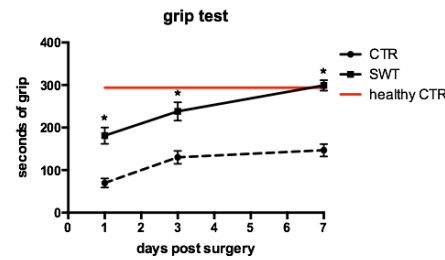
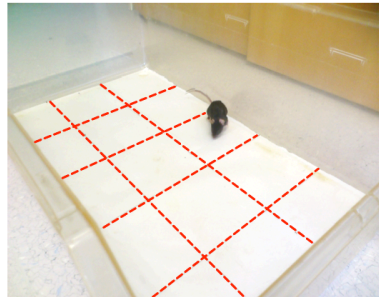
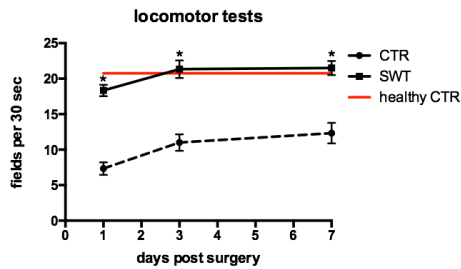
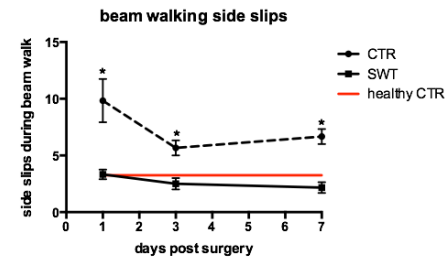
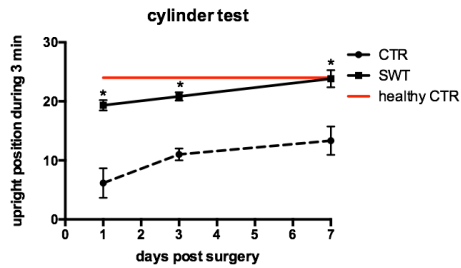


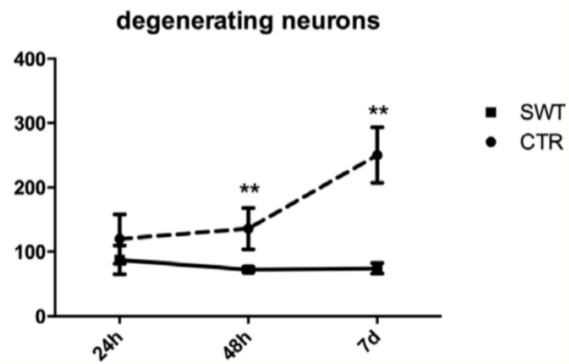
Li et al., CNS Neurosci Ther 2015
Bsibsi et al., Glia 2006

Hypothesis:

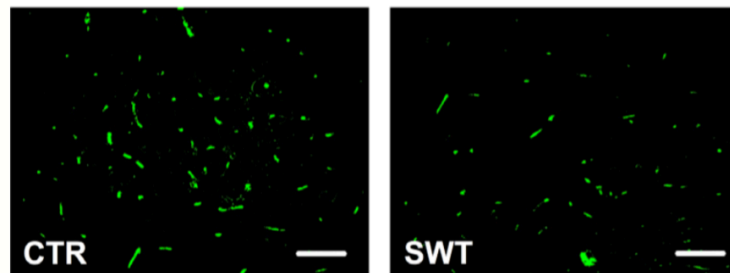




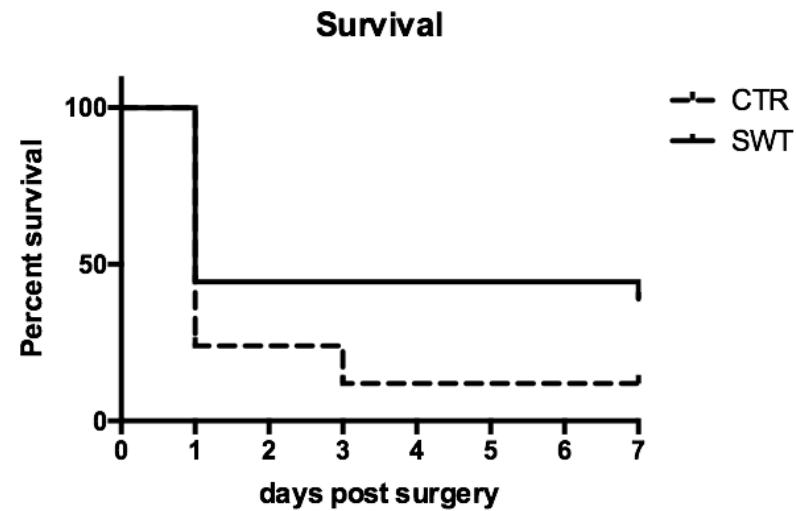




B



improved neuronal survival in human spinal cords



- **SWT improves functional outcome and survival** in a murine model of spinal cord ischemia
- **SWT reduces secondary injury** by stimulation of survival pathways
- **SWT improves symptoms** in patients with spinal cord ischemia



promising therapy for patients with spinal cord ischemia



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