TAT-BH4 protects from spinal cord injury damag

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BH4 domain of the anti-apoptotic protein, Bcl-xL, fused to a membrane transport peptide (TAT-BH4), protects against acute hypoxia/ischemia injury in the brain by preventing endothelial cell apoptosis and inducing neuronal plasticity (Cantara 2004 and 2007, Donnini 2009). The prevention of neuronal and vascular cell death allows damage reduction and tissue recovery from oxidative stress injury, that plays an important role in many chronic CNS diseases, such as spinal cord injury (SCI) (Malaspina 2008).
This study intends to elucidate the protective role of TAT-BH4 in an established murine model of SCI focusing in understanding the role of endothelium.
TAT-BH4 protected spinal cord tissue after 24 hours from damage maintaining it for 10 days rescuing motor neuron functions. This protective effect was due to reduction of apoptotic cell death measured as caspase-3 activity after 24 hours from damage. As inflammation characterized the secondary damage that occurred after SCI (Impellizzeri 2015), iNOS and COX-2 expression was evaluated by western blot in spinal cord tissue 24 hours from damage. TAT-BH4 exerted a protective effect on inflammatory marker expression. TAT-BH4 exerted a positive outcome on endothelium, not only preserving vessels on damaged spinal cord tissues, but also promoting growth factor release as FGF-2 (Fibroblast Growth Factor 2) and VEGF (Vascular Endothelial Growth Factor).
In conclusion these data demonstrate that TAT-BH4 is protective in a murine model of SCI, effect that might be related, at least in part, to growth factor release from endothelial cells.