The Activating Effect of ESWT on Schwann Cells
In Vitro and In Vivo
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Introduction: Peripheral nerve injuries are common and a frequent cause of hospitalization displaying a major burden to patients and social health-care systems. Extracorporeal shockwave therapy (ESWT) has been shown to accelerate peripheral nerve regeneration but the underlying mechanisms are still unclear. Schwann cells (SCs) are activated after injury, switch from a myelinating to a proliferating, axonal growth promoting state. In this study we investigated the effect of ESWT on SCs and peripheral nerve regeneration on a molecular level.

Methods: Schwann cells have been isolated from motor, sensory and mixed nerves, respectively, using an established protocol. Dissected nerves have been treated with ESWT prior to isolation. Their activation status has been evaluated using FACS analysis. Additionally, an in vivo femoral nerve defect model in the rat has been established. RNA has been extracted from whole nerves at different timepoints after injury to evaluate the influence of ESWT on the expression profiles of injured and regenerating nerves by qPCR.

Results: Myelination markers like P0 are down-regulated in ESWT treated SCs whereas p75 is upregulated, representing an activated state of SCs. This effect is confirmed by in vivo data, where an upregulation of p75 and other pro-regenerative markers is observed up to 10 weeks after injury in the ESWT treated animals.

Discussion: In vitro and in vivo data indicate a strong influence of ESWT on the activation status of Schwann cells.

Conclusion: We hypothesize that ESWT has a beneficial effect on the pro-regenerative status of SCs in vitro and in vivo.