



Line Scan Diffusion Spectrum of the Rat Skeletal Muscle of Neuropathic Model

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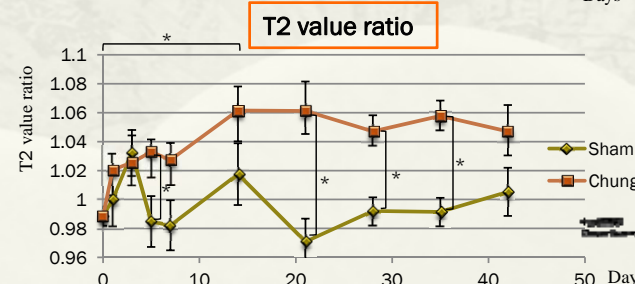
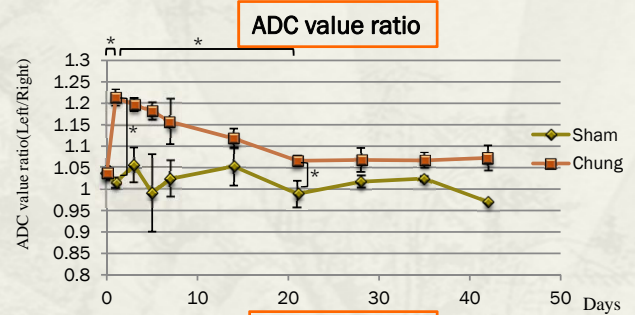
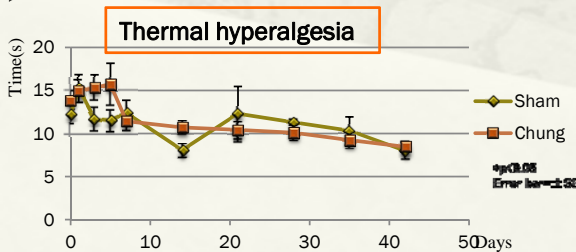
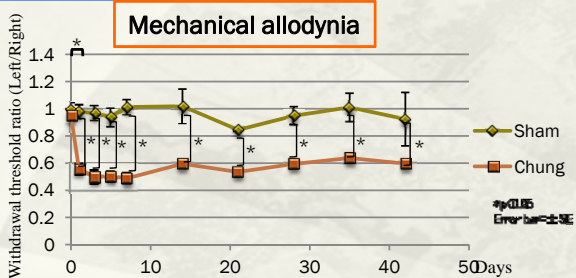
Introduction

- ✓ Edema is one of the main symptoms of complex regional pain syndrome (CRPS).
- ✓ Measuring the degree of edema may be useful to diagnose CRPS.
- ✓ Our hypothesis is diffusion MR spectroscopy (MRS) can detect early edematous changes in skeletal muscle of the rat neuropathic pain model.
- ✓ For this purpose, we sequentially measured the apparent diffusion coefficient (ADC) and T2 values in the lower extremity skeletal muscle to identify time course of the ADC and T2s for early detection of edema in rat models.

Materials & Methods

- ✓ Five female adult Wistar rats weighing 180-200g
- ✓ Removal of the left L6 transverse process and ligated the ipsilateral L5 nerve tightly (Chung model)
- ✓ Mechanical allodynia and heat hyperalgesia were analyzed with the dynamic plantar aesthiometer and hot plate test (set at 50 degrees), respectively.
- ✓ Measurement of the T2s and ADC in the ipsilateral gastrocnemius muscle was performed using a line-scan diffusion spectrum on a 1.5 T MR imager

Results



Conclusion

- ✓ Chung model is the most reliable animal models inducing neuropathic pain in rats, which resembles human CRPS.
- ✓ We could detect the extremely early edematous changes in the affected skeletal muscle in the neuropathic pain animal model using diffusion MRI.
- ✓ T2 ratios increased gradually with a peak at three weeks.
- ✓ ADC ratios jumped up at one day after the surgery and began to decrease at one week.
- ✓ Diffusion MRI can be a useful tool to detect the early edematous change of CRPS affected limbs.