

Abstract Submitted  
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**Diffusion tensor magnetic resonance imaging of regeneration/degeneration after rat sciatic nerve injury** MIN SIG HWANG, Biomed. Engineering, University of Florida, GEORGE PERRIN, Dept. of Neuroscience, University of Florida, DAVID MUIR, Dept. of Neuroscience, Dept. of Pediatrics, University of Florida, THOMAS MARECI, Dept. of Biomed. Engineering, Dept. of Biochem & Molecular Biology, University of Florida — Diffusion tensor imaging was performed to investigate myelination and demyelination spatiotemporally in cut or crushed excised rat sciatic nerves in a 17.6 T magnet with a solenoid RF coil. Orientation independent measures of water diffusion, fractional anisotropy (FA) and averaged diffusivity ( $\langle D \rangle$ ), were examined as MR parameters for the quantification of the myelin within the major peripheral nerve. Crushed nerves initially demonstrated decreased FA, followed by increase to FA of normal nerve with time. At 14 days post injury, FA of the nerve is high, 0.85, at the site proximal to the injury then FA decreases in a proximodistal gradient because the nerve remains more demyelinated toward the distal area. Cut sciatic nerves displayed a prolonged decrease of FA with time after injury. Also FA correlates with  $\langle D \rangle$  in these nerves. Therefore FA or  $\langle D \rangle$  may be a good indicator of myelination and demyelination in rat sciatic nerves and FA appears to be a more sensitive indicator of myelin.

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