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# Differences in the viscoelastic features of white and grey matter in tension

Wei Zhang <sup>a</sup>, Fan Wu <sup>a</sup>, Liang-liang Feng <sup>a</sup>, Run-Run Zhang <sup>a</sup>, Sheng-Bo Yu <sup>b</sup>,  
Cheng-wei Wu <sup>a, \*</sup>

<sup>a</sup> State Key Laboratory of Structural Analysis for Industrial Equipment, Department of Engineering Mechanics, Dalian University of Technology, Dalian 116024, China

<sup>b</sup> Department of Anatomy, College of Basic Medical Sciences, Dalian Medical University, Dalian 116044, China

Abstract: Owing to its higher stiffness, white matter can absorb more energy than grey matter at strain rates of 0.025, 0.15 and 0.25 /s in tension. The reverse trend was observed at low strain rate (0.005 /s) due to the enhanced interactions between biomolecules in white matter, which may originate from the presence of strong polar groups and the stronger hydrogen bonding, as evidenced by differential scanning calorimetry and Fourier transform infrared spectrometer spectra.

Keywords: Brain tissue, Viscoelasticity, Differential scanning calorimetry, Fourier transform infrared spectrometer spectra, Biomechanics

## 1 Introduction

The ever rising concerns on traumatic brain injuries caused by impact loading conditions such as car accidents, blasts, sports or even daily falls have stimulated the mechanical modeling of brain tissue, which may provide referential information for computer-integrated and robot aided surgery, surgeon training and development of protective facilities (Miller, 2001).

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\* Corresponding author. E-mail: cwwu@dlut.edu.cn, Tel/Fax: ++ 86 411 84706353

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