

2015/03/21, 13:50~14:00, Room 103

OR041-BN

因皮質脊髓纖維結構變化所造成水分子擴散不等向性的不同
Structural Differences in the Distributions of Fractional Anisotropy Measures Along the
Corticospinal Tract

段正仁^{1,2,3} 陳君明⁴Jeng-Ren Duann^{1,2,3} Chun-Ming Chen⁴中國醫藥大學 臨床醫學驗就所¹ 生醫工程研發中心²; 美國加州大學聖地牙哥校區 神經計算研究所³
中國醫藥大學附設醫院 放射線部⁴*Graduate Institute of Clinical and Medical Science¹, Biomedical Engineering Research Center², China Medical University, Taichung, Taiwan; Institute for Neural Computation³, University of California San Diego, USA
Department of Radiology⁴, China Medical University Hospital, Taichung, Taiwan*

Purpose: Diffusion tensor imaging (DTI) has recently been used to establish the fiber tractography of white matter to reveal the “hot wires” in the brain. In addition, the quantitative measure, fractional anisotropy (FA), derived from DTI data has been used to associate neurological diseases to the changes in fiber tractography. However, in previous studies, the 2D or 3D ROIs obtained from a fiber tract were mostly treated as a whole for computing one single mean FA values for group comparison. In this study, we demonstrated that the FA measures could be altered by the fiber tract structure and should thus be considered in more detail using smaller CST segments.

Materials and Methods: Fourteen healthy subjects participated in this study. They underwent DTI scanning using a 3T MR scanner (GE Excite HDx) at China Medical University Hospital. An SE-EPI pulse sequence with 25 gradient directions was used. The DTI data were analyzed using MedINRIA to find the left and right CST for each individual. Custom Matlab program was used to segment the CST and extract the FA values accordingly for further statistical analysis.

Results: The left and right CST delineated from the subjects' DTI data showed significant differences in the FA measures derived from difference segments along the fiber tract.

Conclusion: Although the mean FA values varied from segment to segment of the CST, all subjects' FA profile along the CST demonstrated a similar trend. It is possible to normalize the CST lengths based on such common profile in future analysis.