日 時　2007年7月12日(木) 15:00-16:00
場 所　山手2号館2階西　生理研セミナー室
演 者　Said Ghandour 教授(ルイ パストゥール大学)
演 題　Myelination Abnormalities and Recovery Assessment by DT-MRI in vivo: Fine Microstructural Analysis of Brain White Matter
要 旨

Diffusion tensor magnetic resonance imaging (DT-MRI) was applied for in vivo quantification of myelin loss and recovery in several animal models of myelin abnormalities. A transgenic mouse (Oligo-TTK) expressing the herpes simplex virus 1 thymidine kinase gene (hsv1-tk) in oligodendrocytes was studied along with dysmyelinated jimpy male mice, a model of Pelizaeus-Merzbacher disease and the heterozygous females, career of jimpy mutation. Myelin loss and axonal abnormalities differentially affect values of DT-MRI parameters in the brain of transgenic mice. A significant increase of radial diffusion attributed to the lack of myelin was observed in white matter tracts in all dysmyelinated mice. In dysmyelinated transgenic mice, lower axial diffusion values were consistent with the histological observation of axonal modifications including reduced axonal caliber and overexpression of neurofilaments and III β-tubulin. DT-MRI data of jimpy brain were compared to those obtained from dysmyelination of (Oligo-TTK) transgenic mice, which have a mild astrocyte hypertrophy, and from recovering jimpy females, presented with reduced astrocyte hypertrophy. The amplified magnitude of radial and axial diffusions in jimpy males was attributed principally to the pronounced astrocyte hypertrophy in jimpy brain. We showed clearly that myelination and axonal changes as well as astrocyte hypertrophy play a role in the degree of diffusion anisotropy. Importantly, myelin reparation during brain postnatal development induced a decrease in the magnitude of radial diffusion and an increase in anisotropy values compared to the same brain before recovery. The progressive increase in axial diffusion values was attributed to the gain in normal axonal morphology.

世話人　池中一裕(分子神経生理)