

PO-06-P

Lower hippocampal choline signal in the forced swimming test with in vivo 1H MR spectroscopy: Preliminary findings

Chi-Bong **Choi**¹, Sung-Tak **Hong**¹, Sung-Ho Lee, Cheongsoo **Park**², Hey-Young **Moon**², Kwan Soo **Hong**², Chaejoon **Cheong**², Jeong-Ho Chae³, Bo-Young **Choe**¹

¹Department of Biomedical Engineering, College of Medicine, TheCatholic University of Korea

²MRI Team, Korea Basic Science Institute, Ochang Choongbuk 363-883, Korea

³ Department of Psychiatry, Saint Mary's Hospital, College of Medicine, TheCatholic University of Korea

목적 : Decreased hippocampal choline signal was reported in depression patients in the previous proton magnetic resonance spectroscopy (¹H MRS) studies. The objective of this study was to investigate whether there is choline alteration between controls and rats with a depressed mental status induced by the forced swimming test (FST), an animal model of depression for assessing antidepressant activity.

대상 및 방법 : Experimentally naive twelve male Sprague-Dawley (Charles River, Japan) rats weighting 160 ~ 180g were used as subjects. To extend our previous finding and characterize variation of hippocampal Cho/Cr ratio in animal model of depression, we systematically examined the Cho/Cr ratio in the hippocampus of rats exposed to the FST and controls by using small volume-of-interest (VOI).

결과 : Prior to performing the FST, we investigated interhemispheric differences (left vs. right hippocampus) of metabolite concentration and no significant side effect was found (Cho/Cr and NAA/Cr $p > .05$). Proton MR spectra obtained before exposing the FST from the left hippocampus exhibit a marked reduction in the relative intensity for Cho signal compared with spectra obtained after the FST. Compared with the control animals, the rats subjected to FST-induced depression revealed significantly decreased Cho/Cr ($df = 9, t = 2.443, p = 0.037$) and Cho/NAA ($df = 9, t = 2.287, p = 0.048$) ratios in the left hippocampus while NAA/Cr ($df = 9, t = 0.236, p = 0.819$) ratio remained stable. However, no significant differences in Cho/Cr ($df = 9, t = -0.323, p = 0.754$), Cho/NAA ($df = 9, t = -0.082, p = 0.936$) and NAA/Cr ($df = 9, t = -0.987, p = 0.349$) ratios were observed between controls and FST rats in the right hippocampal region.

결론 : The present study demonstrates that the FST causes a significantly decreased Cho/Cr ratio in the hippocampus as compared with the control subjects, which is in good agreement with previously reported human study results. Our data provides that biochemical perturbation, in other words, decreased Cho/Cr ratio may be crucial in the pathophysiology of depression but

also suggests that a decelerated turnover of membrane is occurring in the hippocampus of the rats with depression. Finally, larger numbers of subjects and antidepressant drug responses need to be investigated to confirm this preliminary finding and to more clearly understand the implications of decreased hippocampal Cho/Cr ratio in the rats exposed to the FST.

감사의 글 : This study was supported by a grant of the Seoul R&BD Program (10550), the Korea Health 21 R&D Project, Ministry of Health & Welfare, Republic of Korea (02-PJ3-PG6-EV07-0002) and a grant (07122KFDA480) from Korea Food & Drug Administration in 2007.