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**Functional imaging of theory of mind and empathy:  
comparative study between drug addicts and normal persons in a  
nonverbal task.**

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Purpose : The aim of this study is to assess distinctions between drug addicts and normal persons using story cartoons involved with theory of mind(ToM) and empathy theory.

Subject and Methods : Seventeen right-handed, drug addicted male participants were recruited from the patient population and eleven right-handed, healthy mail participants were recruited from the general population in this study. The mean age of drug addicts were 36.5 years(range = 31-52 years) and the normal persons were 35.8 years(range = 33-39 years). Functional magnetic resonance (fMRI) images were acquired using a 3.0T GE HD scanner. 160 volumes were acquired and fMRI raw data were analyzed by testing the BOLD differences between the active and the control task using SPM2.

Result : The social brain regions are known to medial prefrontal cortex(MPFC), adjacent paracingulate cortex, posterior superior temporal sulcus(pSTS), adjacent temporo-parietal junction(TPJ), amygdala, temporal poles. Three brain areas-medial prefrontal cortex, superior temporal sulcus, and the temporal poles are- consistently activated in association with theory of mind and the others with empathy.

In the ToM task, the drug addicts and normal showed the similar activation area in the occipital lobe , medial prefrontal cortex(MPFC), temporal lobe. However, in the empathy task, drug addicts were activated in the occipital lobe, parietal lobe more than normal and the normal persons were activated in prefrontal and frontal lobe area and also orbito-prefrontal cortex and amygdala.

Conclusion : In this study, drug addict group and normal group showed the similar activation region in the ToM task. However, in the empathy task, drug addict group had different result from normal group. Therefore, we think that drug addict group have some problem with a empathy system or emotional control system.