

## S33-03

### IMAGING USUAL ADDICTIONS : TOBACCO, CANABIS AND ALCOHOL

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**Background:** Brain models of drug addiction are being tackled in humans, using PET and MRI.

#### Results:

1. Whereas tobacco and cannabis do not interact directly with dopamine sites, positron emission tomography detected lower availability in sites regulating the catecholamines homeostasis, notably in dopamine transporter sites in striatal and in extrastriatal regions. This further supports repeated and long term substance use progress towards an adaptive diminished basal dopamine level that would contribute to the switch to an addicted brain.
2. Alcohol: abnormalities in brain macro- and micro- structure were searched in detoxified alcohol-dependents with preserved psychosocial functioning:

- Brain function (fMRI): fronto-cerebellar overactivation detected during an auditory language task in alcohol-dependents may reflect the compensatory effort required for patients to maintain the same level of performance as controls.

- Brain macrostructure (MRI). Widespread lower white matter volumes, and lower grey matter volumes in the frontal lobe, insula, hippocampus, thalami and cerebellum, were detected. Poorer neuropsychological performance correlated with smaller grey matter volumes in these regions and with lower white matter volume in the brainstem.

- Brain microstructure (DTI): tractography of white matter fiber bundles revealed that brainstem bundles alteration may contribute to cognitive flexibility impairment. Regression analyses showed memory scores were related to brain microstructure in parahippocampal areas, frontal cortex, and left temporal cortex. This suggest diffusion imaging (DTI) is a useful probe to early alcohol-induced brain alterations.

**Conclusion:** While indices of dopamine down-regulation are consistency detected in several drug addictions, even "socially-adapted" alcohol dependence may induce change in brain structure.

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