

EFFECT OF CANNABINOID EXPOSURE DURING ADOLESCENCE ON CEREBRAL GLUCOSE METABOLISM IN ADULT RAT



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Introduction: Despite the widespread use of cannabinoids by adolescents, literature on long-term neurobiological effects of cannabinoid-exposure during adolescence is scarce. The aim of this work is to analyze cerebral glucose metabolism in adult rats which had been pre-exposed to cannabinoids.

Materials and Methods: Two groups of female Wistar rats studied: Group A (N=5): the cannabinoid receptor agonist CP-55,940 (0.4 mg/kg) was administered daily from day 28 to 38 post-natal; Group-B (N=5): vehicle, with the same pattern. PET study was performed on day 100 post-natal. 2-Deoxy-2-[F-18] fluoro-D-glucose (FDG) was injected and scan was performed after 35 min. Images were reconstructed by 3-DOSEM and regions of interest (ROIs) were drawn on coronal-sections.

For SPM analysis, image sets were realigned smoothed and a brain mask was applied. Resulting images were analyzed with the SPM2 software.

Results: ROI analysis didn't find any statistically significant region. SPM analysis revealed significantly higher metabolism in amigdalo-entorhinal-area ($p=0.05$) and lower metabolism in frontal cortex ($p=0.05$) in Group-A.

Discussion: Hypo-metabolism in frontal cortex agrees with the metabolic effects of other drugs of abuse reported for humans. Metabolic increase in amigdalo-entorhinal-area has also been reported in humans, and is probably associated with greater emotional liability induced by the adolescent cannabinoid pretreatment.

Conclusions: Results demonstrate that chronic administration of CP-55,940 during adolescence resulted in significant cerebral glucose metabolism changes in the adulthood, suggesting that preexposure to cannabis might alter cerebral activity in the adult brain. SPM presents significant advantages over ROI-analysis when subtle differences are involved.