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CHRONIC ANTIPSYCHOTIC INDUCED METABOLIC SYNDROME IN THE RAT: MODIFICATION OF ADIPOCYTES FOLLOWING BEHAVIORAL MANIPULATIONS: A PILOT STUDY

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Abstract

OBJECTIVE: It is critical to understand the mechanism through which antipsychotics influence energy expenditure, inducing metabolic syndrome (MetS). This mechanism must involve changes in thermogenesis via brown adipose tissue (BAT). This study aimed to examine the distribution and activity of BAT, using microPET/CT scanning and stimulate the "britening" process, which transforms white adipocyte cells into cells with BAT-like characteristics, following environmental manipulations.

MATERIAL - METHOD: 24 female Sprague-Dawley rats were subjected to one of two drug conditions [DRUGTx: 1. Olanzapine (DRUGTx-OL) vs 2. Vehicle (DRUGTx-VEH), n=12]. OL dose was chosen according to Andersen and Pouzet model for schizophrenia (Andersen et al, 2001). Animals from each drug condition were subjected to one of 4, 25-day behavioural treatments [BEHTx: a. control (BEHTx-CON), b. cold exposure (BEHTx-CE), c. Environmental Enrichment (BEHTx-EE), d. Chronic Unpredictable Stress (BEHTx-CUS); n=3]. Measures taken were Standardized Uptake Value (SUV) and total BAT volume (TBATV). The biomarker corticosterone was also monitored. Descriptive statistics were used (final N=19).

RESULTS: Group means across the micro PET/CT sessions were calculated. An increase in SUV mean was noted after DRUGTx, with a reduction after BEHTx. An increase in TBATV means was observed in all groups after DRUGTx, with a reduction after BEHTx. However, the VEH-EE group demonstrated increased TBATV after BEHTx. Corticosterone (ng/ml) concentration tended to be lower in DRUGTx-OL groups.

CONCLUSIONS: Chronic OL treatment followed by BEHTx seemed to modify BAT activity in the predicted direction and also influence corticosterone levels. These results confirm the appropriateness of the methods used for further investigation of our main hypotheses.

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