

## Evaluation of behavioral phenotypes in rats showing binge eating behavior

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According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), binge eating disorder (BED) is an eating disorder characterized by repetitive episodes of uncontrolled and excessive food consumption, usually a palatable food, in a short period of time, without the inappropriate compensatory behaviors for limiting weight gain (APA, 2000). Many evidence has shown that BED is a stable condition (i.e., as chronic as bulimia or anorexia nervosa) and is associated with elevated psychiatric comorbidity, including depression and anxiety (Peterson et al., 2012). For example, a large community-based study utilizing rigorous assessment methods including diagnostic interviews, has reported elevated rates of most psychiatric disorders in people with BED relative to those without BED (Javaras et al., 2008). On the basis of these findings, this study has investigated whether depression and anxiety might influence food intake in rats showing binge eating behavior. Binge eating behavior was induced in female Sprague-Dawley rats by providing limited access to a discretionary source of dietary fat (margarine) for a brief period of time (2hr) (Corwin et al., 1998). Rats were divided into three different experimental groups: *High Restriction* (HR) group, with limited (2h) access to margarine for three days a week, *Low Restriction* (LR) group, with daily limited (2h) access to margarine, and *Control* (C) group, with no access to margarine. All animals had *ad libitum* access to water and regular chow pellets throughout the entire study. Once binge-type eating behavior was established (Induction phase, 3-4 weeks: HR group consumed significantly more margarine than LR group during the three days of limited access), behavioral tests (forced swimming and elevated plus maze tests) were performed either in the pre-binge (90' before the episode of binge) and the post-binge (90' later the episode of binge) periods during the limited access to margarine.

Forced swimming results showed that there are no significant differences among all the three experimental groups during the pre-binge and post-binge periods.

However, in the plus maze test that we used to disclose a potential anxious phenotype, we found that the binge group (HR) is much more anxious than no binge group (LR) before access to margarine (pre-binge period), and that this condition is significantly reduced in the post-binge period. In conclusion, this study demonstrates that female rats with limited access to a palatable food develop anxiety-like behaviors that lead to consumption of margarine in a binge-like manner.

### References:

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