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# D2 DOPAMINE RECEPTOR AGONISTS INFLUENCE IN THE ANIMAL MODEL OF DIETARY OBESITY

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## Background

Increased caloric intake in dietary obesity (DO) could be driven by central mechanisms regulating reward-seeking behavior. According to the current studies dopamine as a neurotransmitter turns out to regulate food intake [1] by modulating food reward by means of the mesolimbic circuitry of the brain [2]. Medications that block dopamine D2 receptors increase appetite and result in significant weight gain [3] whereas ones that increase brain dopamine concentration are anorexigenic [4]. However, the role of dopamine in pathological consumption and obesity is not clear understood.

Dopaminergic neurotransmission in the ventral basal ganglia plays an integral role in the response to salient rewarding stimuli including drugs of abuse, sex, social bonding, and food [5] and work in animal models suggests leptin modulates central dopamine function [6].

## Objectives

We supposed D2 dopamine receptor agonists to influence weight gain and leptin level in genetically unmodified rats with high caloric diet (HCD) as dietary obesity model.

## Methods

Young male rats (n=48), with body mass equals 183.0±14.0 g, were divided into HCD group (n=24) and control (C) (n=24, standard diet) depends on caloric intake.

During 3 months of research, 8 rats from both groups were daily injected intraperitonealy with D2 dopamine receptor agonist Bromocriptin (Br) (1mg/kg), 8 rodents - dimethyl sulfoxide (DMSO) (1 ml/kg) used as diluent for Br. Length, weight and caloric intake were registered twice a week.

Animals' serum leptin levels were measured by immunoenzyme analysis with standardization relatively to weight (leptin/weight ratio, LWR) at the 1st and 3rd months of experiment.

Rodents' total mobility (TM, assessed as a complex of total distance and speed) was assessed by plus maze test at the same time. Experimental results were compared in subgroups, depends on pharmacological agent with noninjected animals (comparison groups). Nonparametric analysis was performed (SPSS 16.0, p<0.05).

## Results

HCD rats showed weight gain in 1st and 3rd months irrespective to injected agent (p<0.05) (fig. 1).

Weight gain was similar in Br injected HCD rats and HCD group (p>0.05) (fig. 2).

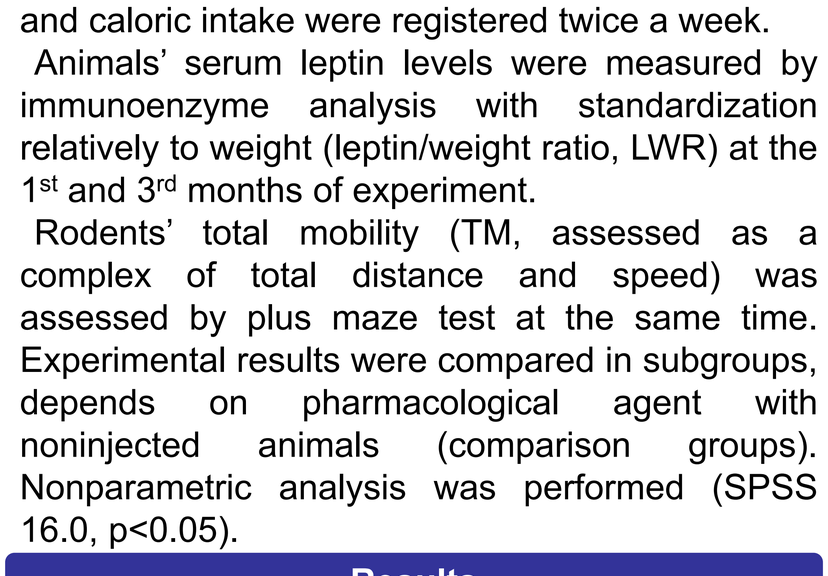


Figure 1. Weight gain in 1st and 3rd months depends on the injected agent
* - p<0.05

## Results

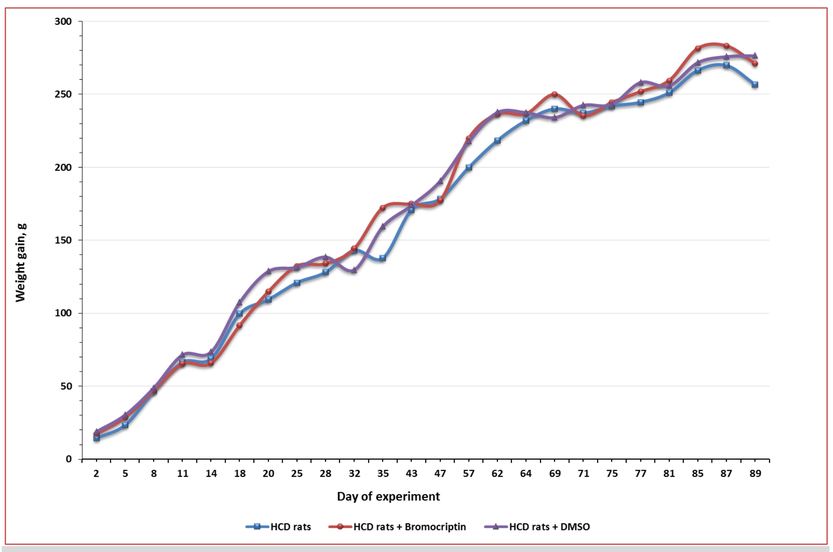


Figure 2. Three-month weight gain dynamics in HCD rats depends on the type of injected agent (p>0.05).

TM had no changes in HCD group after 1 month (fig. 3, 4) whereas open arm visits significantly decreased in HCD one (p<0.05) (fig. 5).

TM diminished after 3 month compared to C rodents and to the same group after 1 month (p>0.05) (fig. 3, 4).

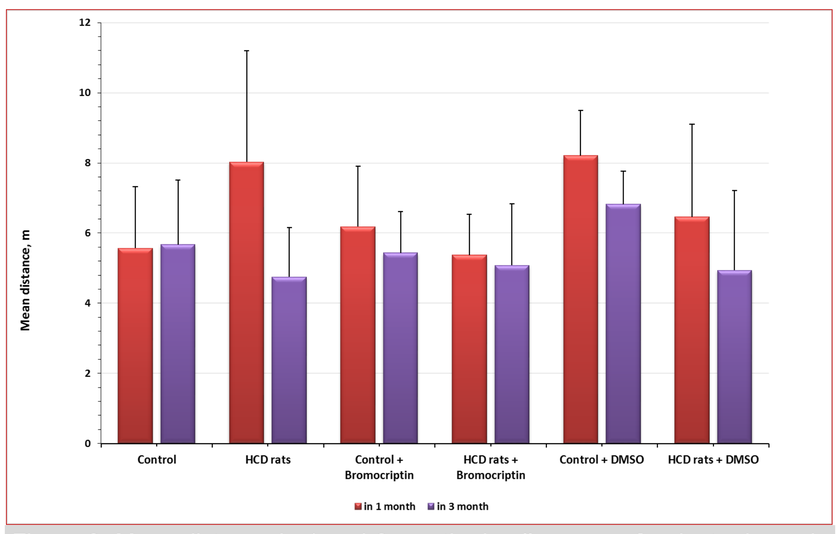


Figure 3. Mean distance in 1 and 3 months in all groups of rodents depends on the type of injected agent

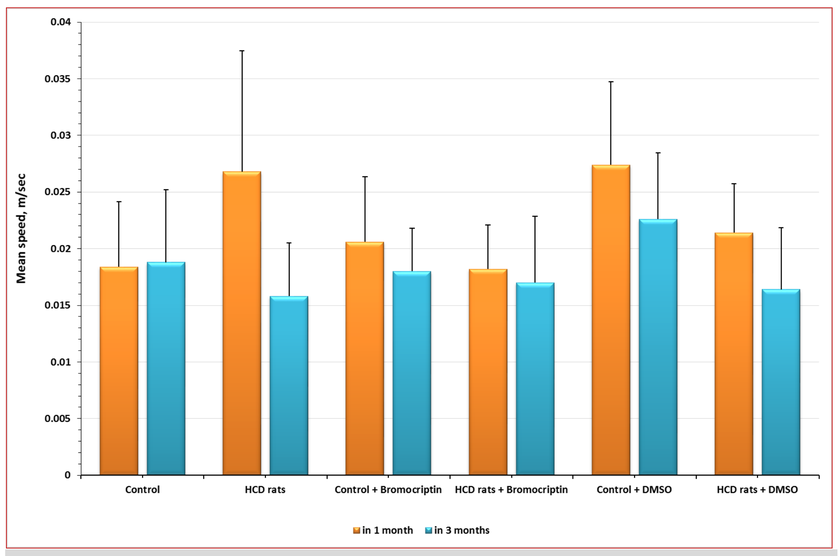


Figure 4. Mean speed in 1 and 3 months in all groups of rodents depends on the type of injected agent

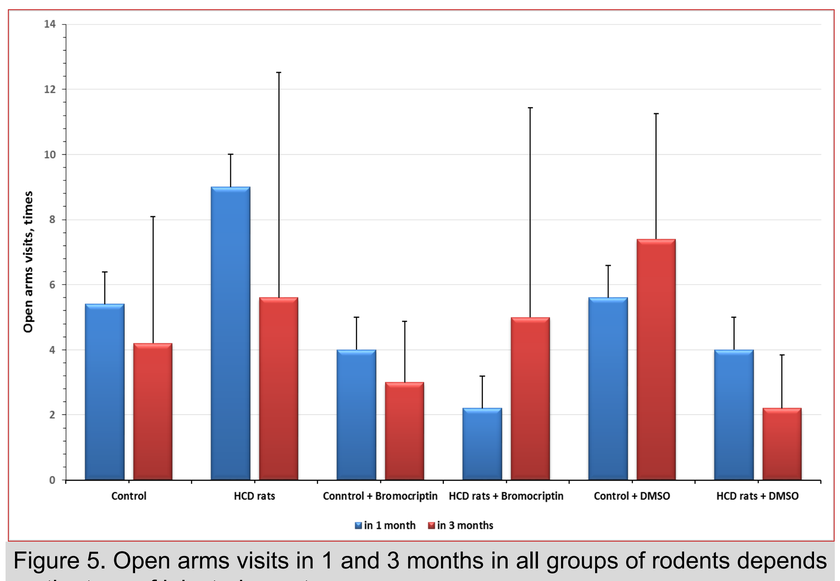


Figure 5. Open arms visits in 1 and 3 months in all groups of rodents depends on the type of injected agent

Br injected HDC rats showed TM decrease (fig. 3, 4) and closed arm time increase in 1 month relative to HDC group (fig. 6). These changes were leveled in 3 months.

## Results

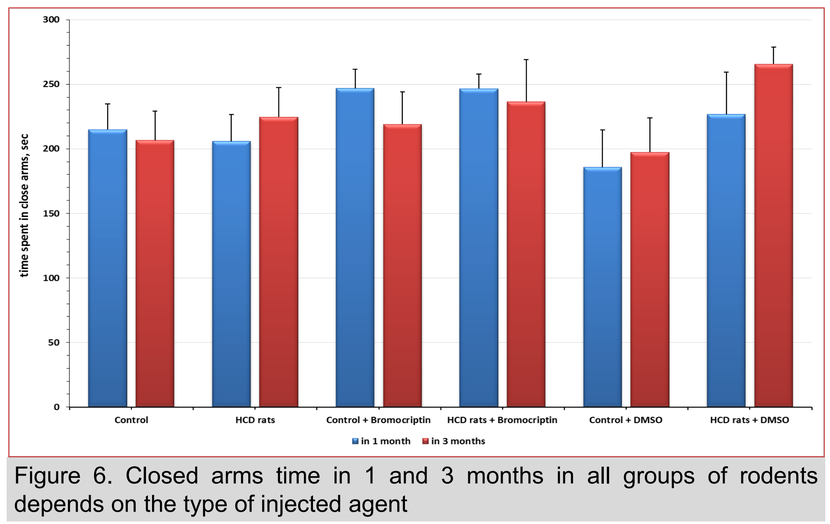


Figure 6. Closed arms time in 1 and 3 months in all groups of rodents depends on the type of injected agent

Leptin trended to decrease after 3 month of Bromocriptin injections in HCD rats (p>0.05), but LWC reduced significantly (p=0.028) related to the HCD rodents (fig. 7).

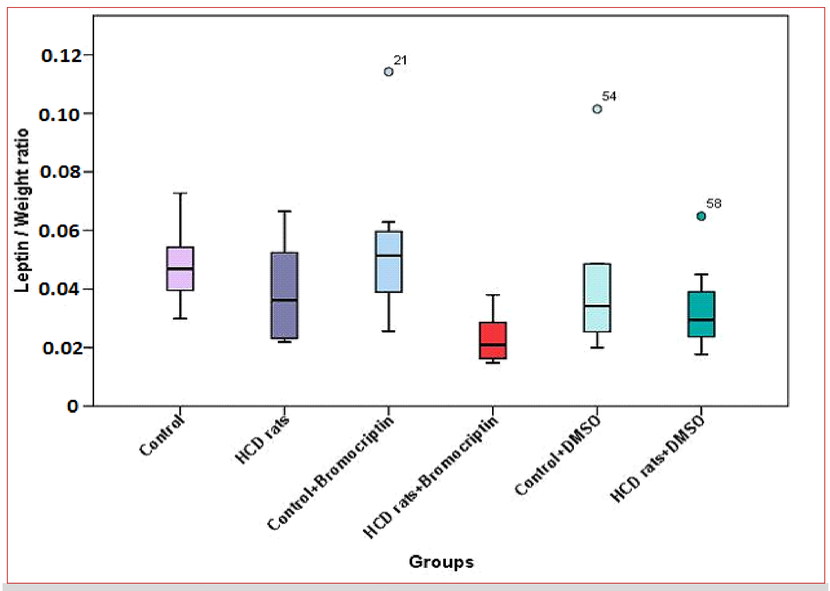


Figure 7. Leptin / Weight ratio differences between rodents depends on caloric intake and injected agent.

Leptin (fig. 8a) and LWR levels (fig. 8b) were extensively lower in Bromocriptin injected HCD group at 3rd month in regard to 1st (p<0.05).

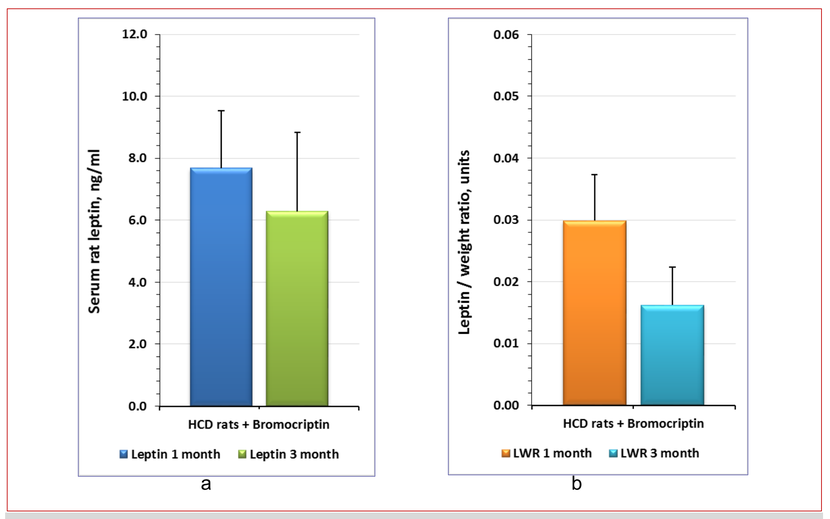


Figure 8. Serum leptin (a) (p=0.05) and Leptin / Weight ratio (b) (p=0.021) levels in Bromocriptin injected HCD rats in 1 and 3 month of experiment.

## Conclusions

Leptin and LWC changes without weight gain and total mobility modifications in Bromocriptin injected HCD rat give a reason to suppose that long term Bromocriptin administration prevent obesity in genetically unmodified HCD rats.

## References

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