Carotid sinus nerve resection prevents cognitive dysfunction in an animal model of dysmetabolism

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Background

Major causes of morbidity and mortality worldwide

- Insulin resistance
- Central Insulin resistance

Neurodegenerative Disorders
- Carotid Bodies (CBs)
- CBs are overactivated in states of dysmetabolism

CBs information integrated in the brain via CSN

Oxygen and Metabolic Sensors

Modulation of CB activity prevented and reversed dysmetabolic features

Experimental Design

15 weeks of diet

12 weeks of diet

HTHSu

HTHSu with CSN resection

Biochemical Analysis

14 weeks of diet before CSN resection

17 weeks of diet

10 weeks of diet after CSN resection

22 weeks of diet

Metabolic Profile

- Caloric intake
- Weight Gain
- Insulin Sensitivity (ITT)
- Glucose Tolerance (ITT)

Behavioural Tests

- Open field (DF): motor capacity
- Y-maze: memory and cognition

Figure 1. Metabolic Profile of CTL and HTHSu animals before and 5 weeks after CSN resection. Effect of HTHSu diet and CSN resection on A), D) weight gain, B), E) caloric intake, and C), F) liquid intake. Data are represented as mean ± SEM. 2WAY ANOVA tests * p < 0.05, ** p < 0.01, *** p < 0.001. N= 6-7 animals

Figure 2. Effect of HTHSu diet and CSN resection on insulin sensitivity and glucose tolerance in the HTHSu animals. A) Constant of Insulin Tolerance Test (KITT) before CSN resection, and C) 5 weeks after CSN resection. B) Glucose tolerance depicted as glucose excursion curves, and as the area under the curve (AUC) obtained from the glucose excursion curves, before CSN resection, and D) 5 weeks after surgery.

Figure 3. Behaviour Phenotyping of HTHSu and CTL animals after CSN resection. Effect of HTHSu diet and CSN resection on A) open field test, B) block test and C) y-maze test. Data are represented as mean ± SEM. 2WAY ANOVA tests * p < 0.05, ** p < 0.01, *** p < 0.001. N= 6-7 animals

Figure 4. Carotid body modulation might protect against hypercaloric diets induced-cognitive impairment

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