Aims

Exercise training (ET) has been shown to be beneficial in managing obesity-related disorders. ET was reported to have positive effects on the brain. Our project aims to define the role of *irisin* in this context. *Irisin* is an exercise-induced myokine also expressed in the hippocampus, an essential brain area for learning and memory.

Methods

**Morris Water Maze**

- Day 0: Discovery
- Day 1: Day 2: Day 3: Day 7: Test

**Brain upon physical activity**

- **BDNF**
  - **BDNF level**: BDNF/total protein was determined by denaturant PAGE-SDS followed by a Western Blot. Ratio was obtained after densitometric analysis. Three Way ANOVA, *p* < 0.05 and p < 0.05 T Vs UT in Not-Voluntary

**Memory**

- **Time in SE.** During test day, time spent in the platform quad. was measured. Two Way ANOVA, **p** < 0.05 NV Vs V

**Learning**

- **Latency.** During learning period, time taken by mouse to reach the platform was measured and is called latency. One Way ANOVA on Repeated Measures, **p** < 0.05 Day 1 Vs Day 3

**Conclusion**

Enrichment, in mice submitted to voluntary ET, improves spatial learning and memory particularly in obese animals. In brain, not-voluntary ET and high-fat diet improve BDNF protein level. *Irisin* plasmatic level is also enhanced by not-voluntary ET and high-fat diet. In muscles, FNDC5 protein level is increased by ET in mice with enrichment and low-fat diet. Further studies are now necessary to better understand the contribution of *Irisin* in ET benefits on brain function.

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