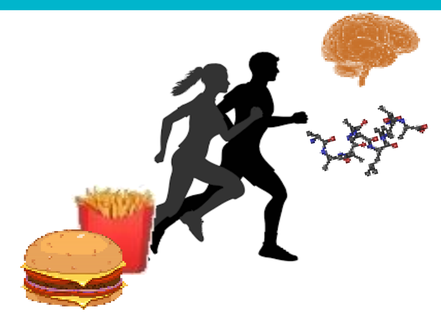
Muscle-to-Brain communication in the context of obesity: impact of physical exercise?



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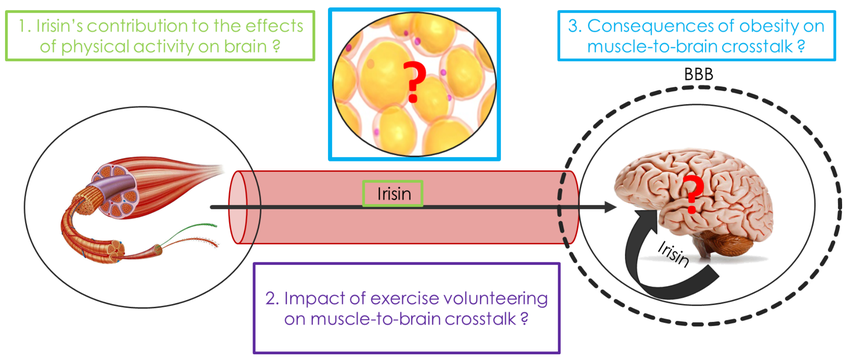
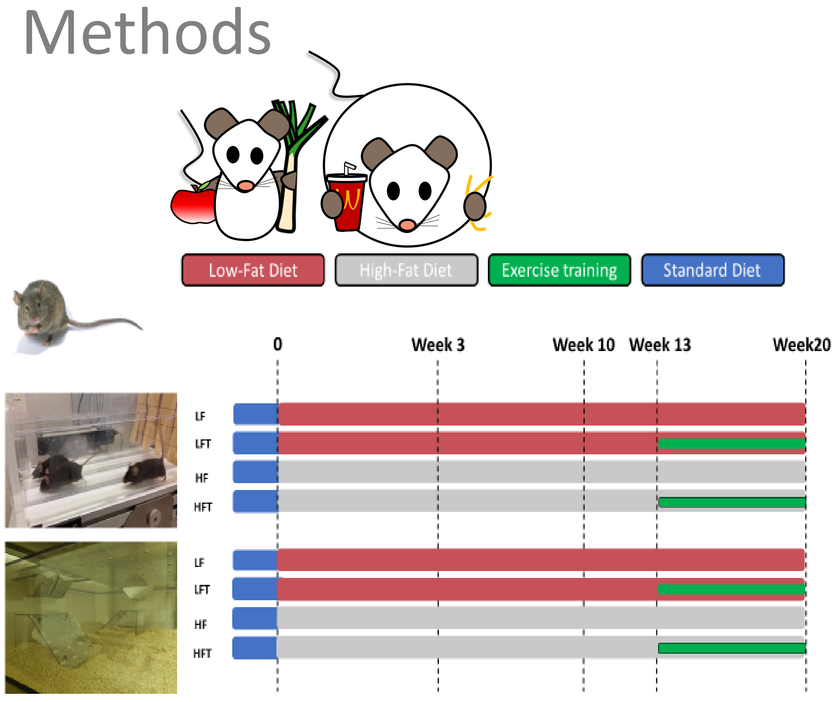
Aims

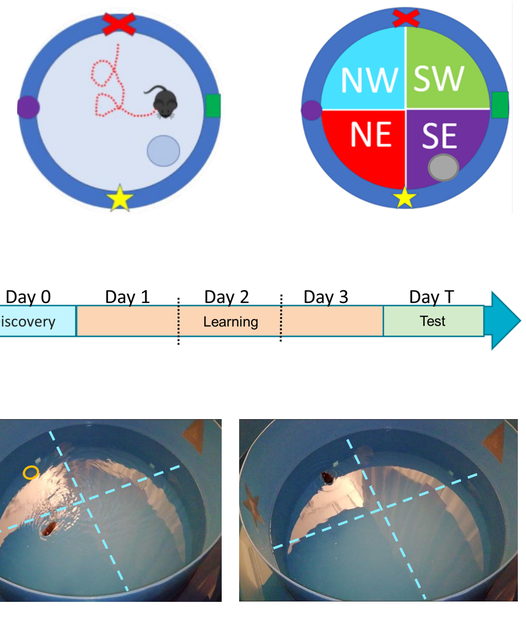


Exercise training (ET) has been shown to be beneficial in managing **obesity**-related disorders. ET was reported to have positive effects on the **brain**. Our project aims to define the role of **irisin** in this context. **Irisin** is an exercise-induced myokine also expressed in the hippocampus,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

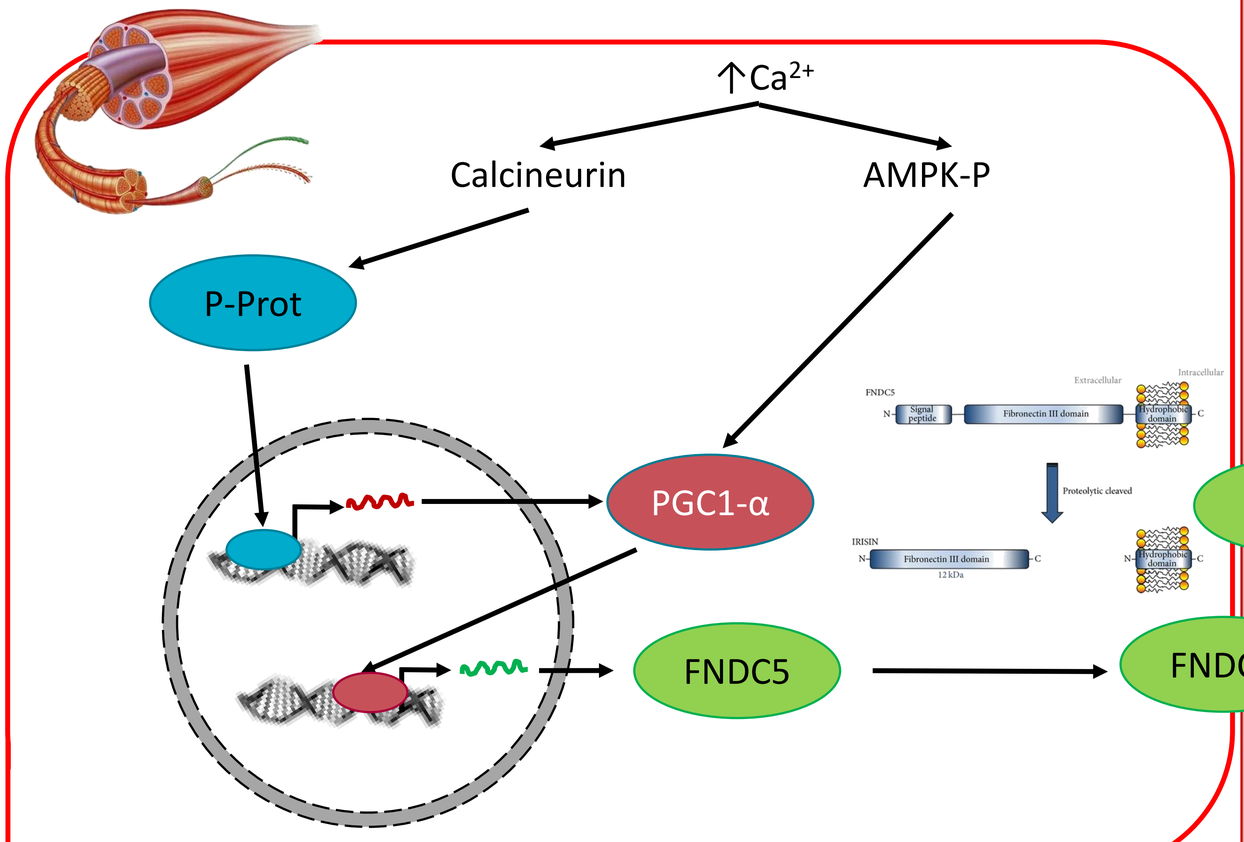
Methods

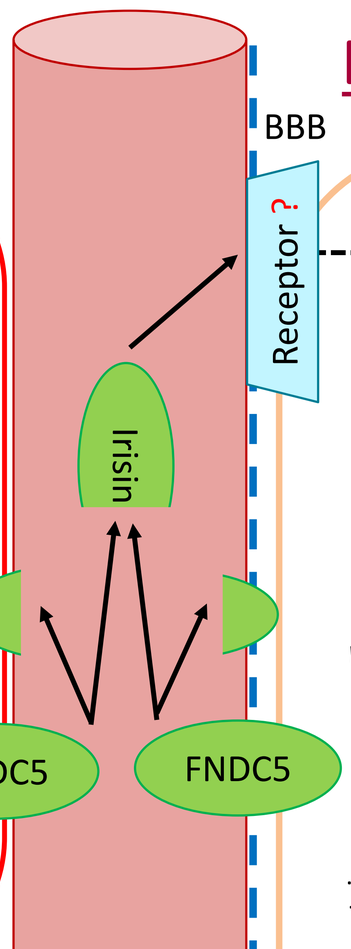


Morris Water Maze

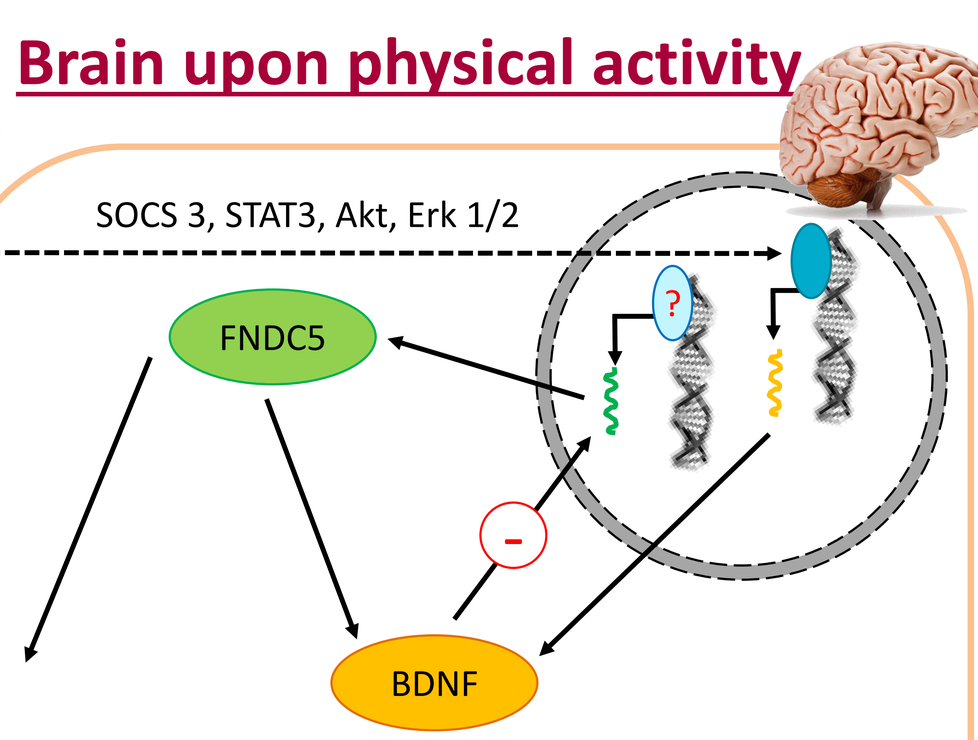


Muscle in physical activity

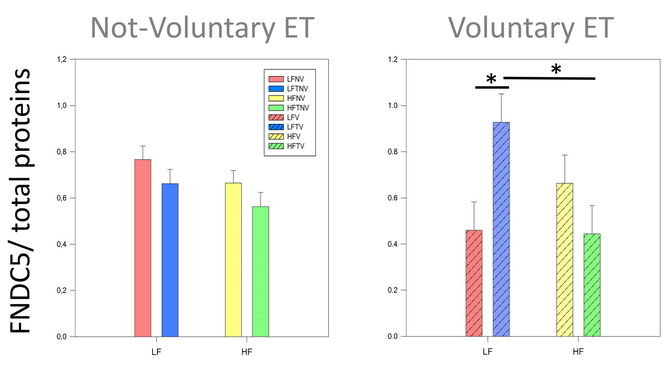




Brain upon physical activity



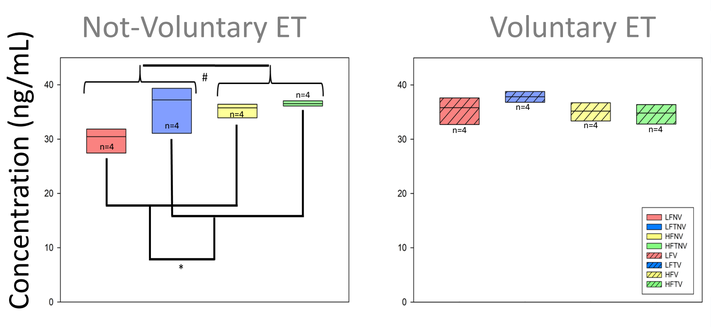
FNDC5 level



FNDC5 level. FNDC5/total protein ratio in *gastrocnemius* was determined by denaturant PAGE-SDS followed by a Western Blot. Ratio was obtained after densitometric analysis. Two Way ANOVA,

* : p < 0,05

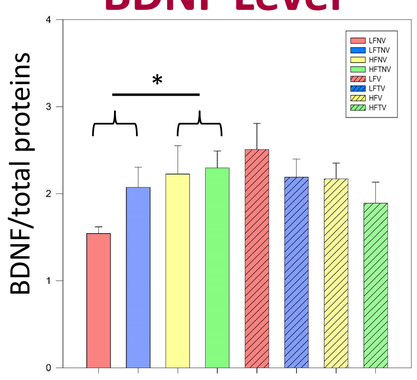
Irisin plasmatic level



Irisin plasmatic level. After 20 Weeks. Irisin concentration was measured by competitive ELISA. Two Way ANOVA,

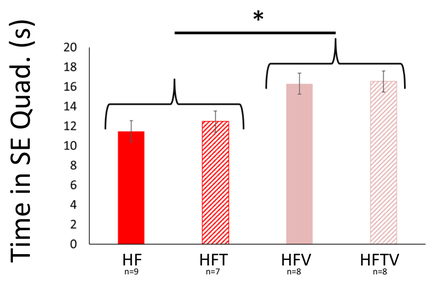
* : p < 0,05 UT Vs T ; # : p = 0,05 LF Vs HF

BDNF Level



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

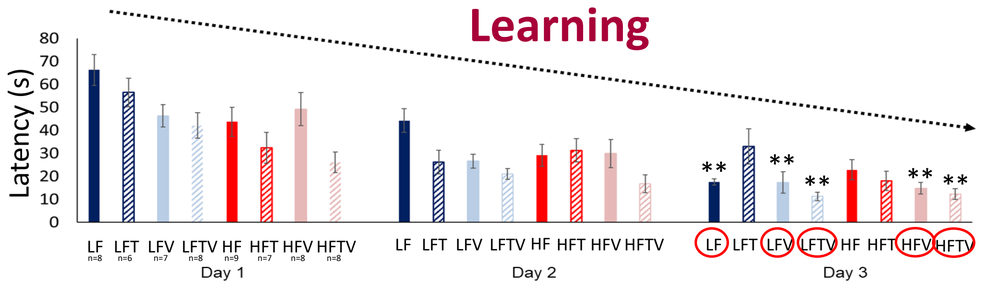
Memory



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.

Aknowledgements

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