Activation of insulin signaling in gastrocnemius after central leptin infusion is associated with an increase in proliferation and muscle fiber size

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Background
Skeletal muscle is the largest tissue involved in the insulin-stimulated disposal of glucose, with its size being controlled by hormonal status, among other factors. Leptin plays a primary role in the regulation of glucose homeostasis with a substantial degree of insulin and leptin cross-talk in muscle. However, the relationship between the leptin’s central effects on insulin sensitivity in muscle and associated structural changes remain unclear.

Hypothesis and objective
We hypothesized that chronic central leptin infusion modifies muscle proliferation and fiber size through activation of insulin sensitivity. Thus, we analyzed whether the possible changes in insulin signaling and glucose uptake in the gastrocnemius are associated with structural modifications.

Results

1. Serum hormone levels

2. Leptin infusion increases glucose uptake

3. Central leptin infusion promotes activation of muscle insulin signaling

4. Cell proliferation and area of fibers are augmented after chronic central leptin infusion

Conclusion
Central leptin promotes an increase in muscle proliferation and size related to improved insulin sensitivity.