

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.

Animals and methods

Animals

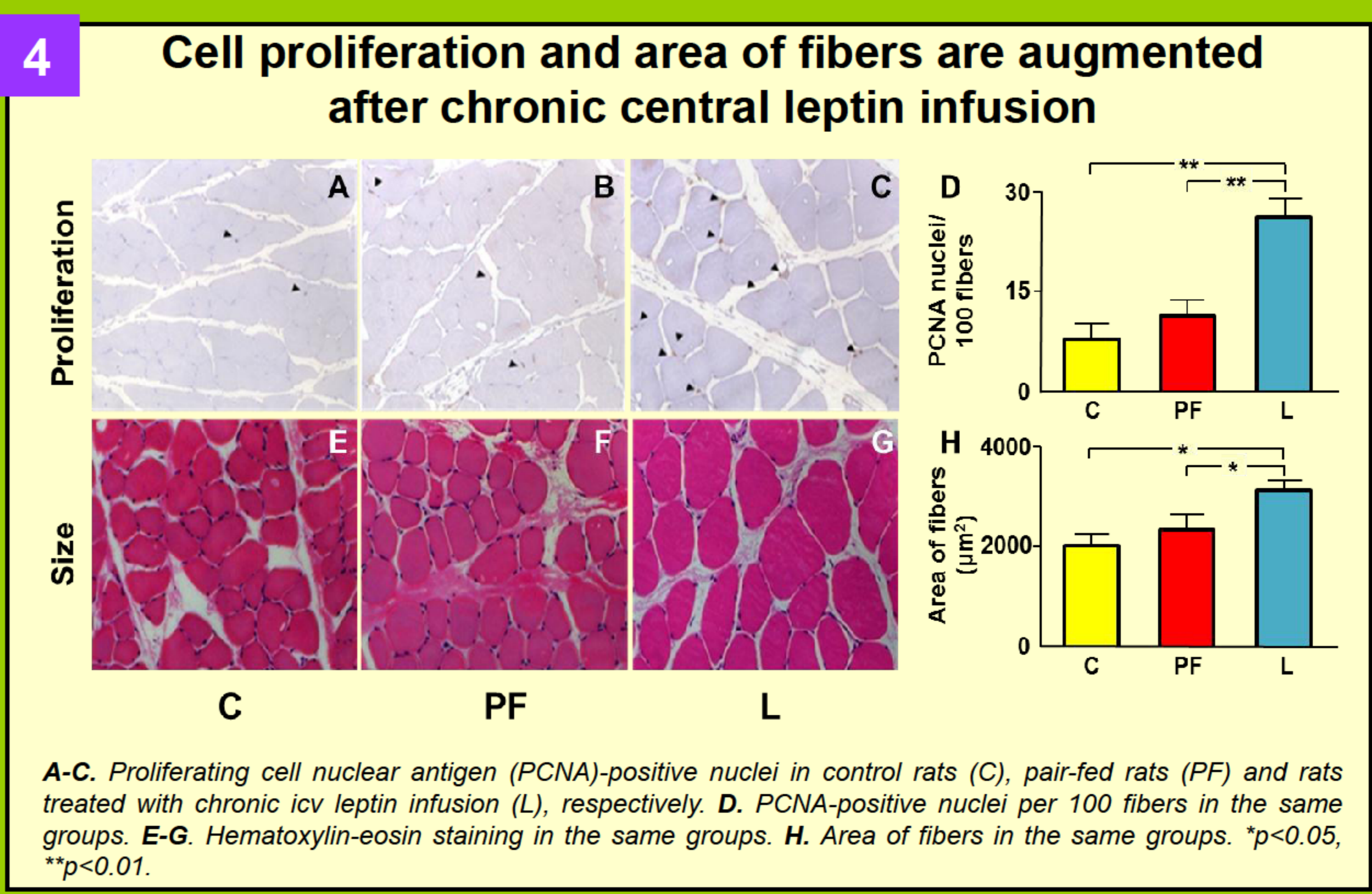
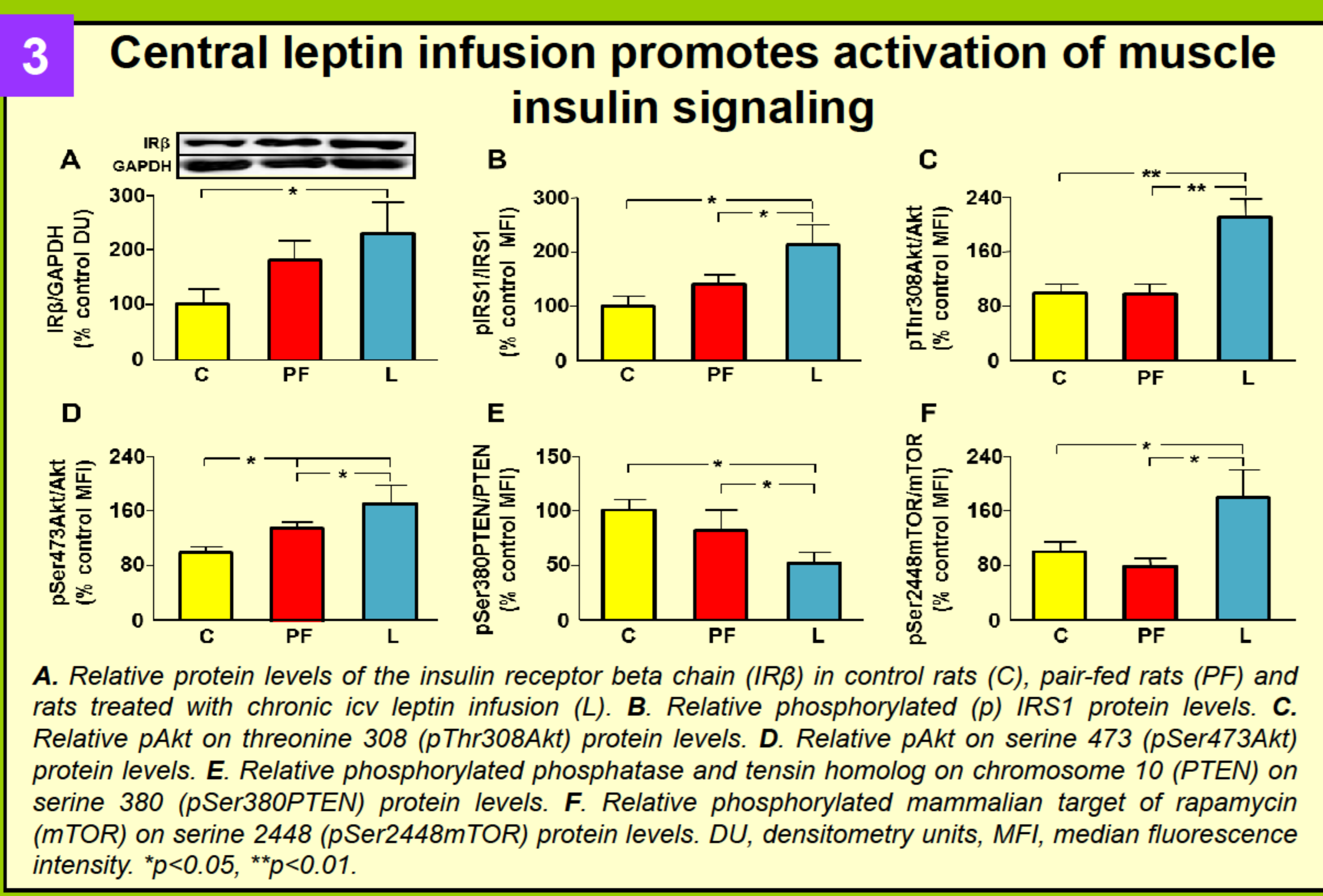
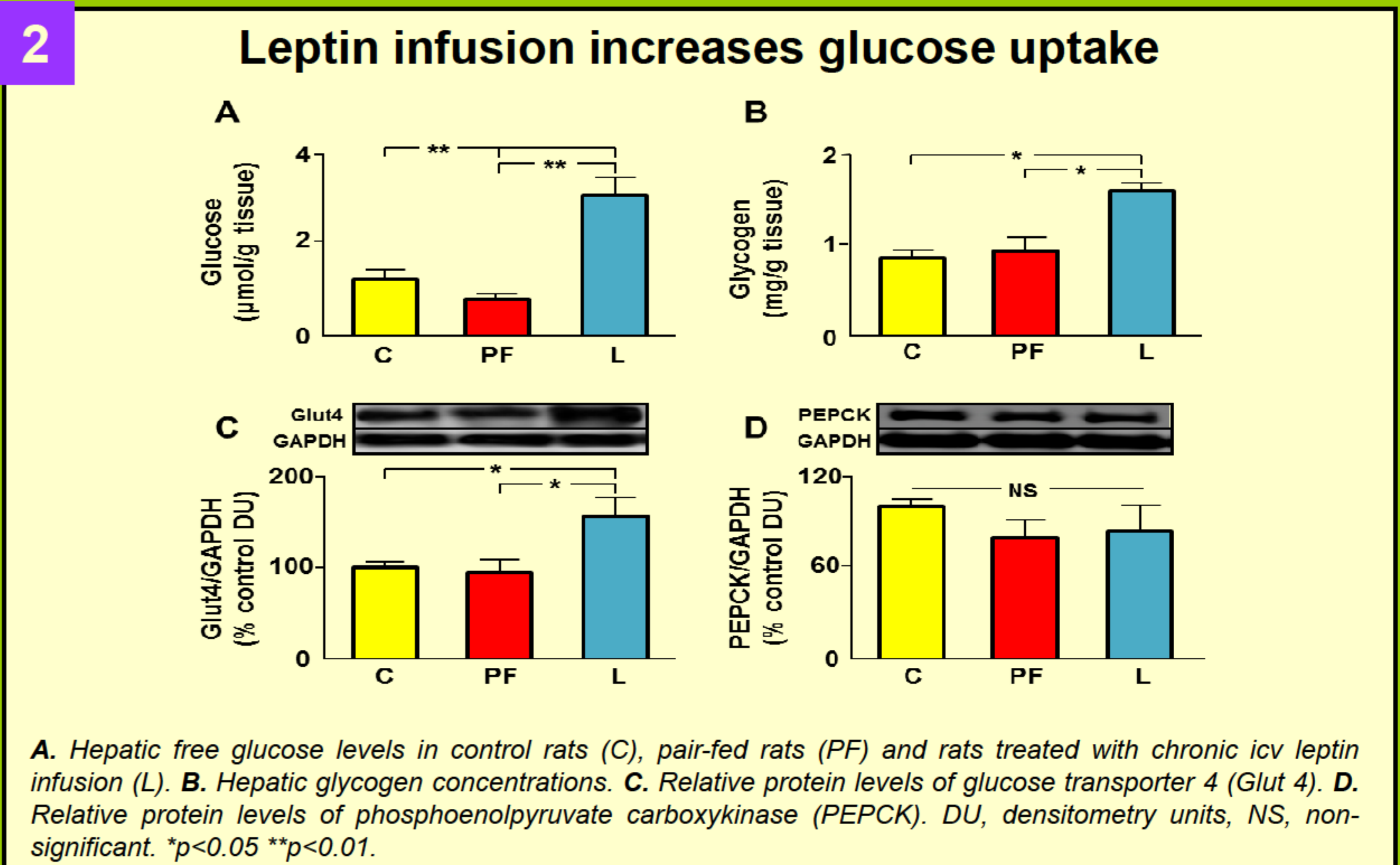
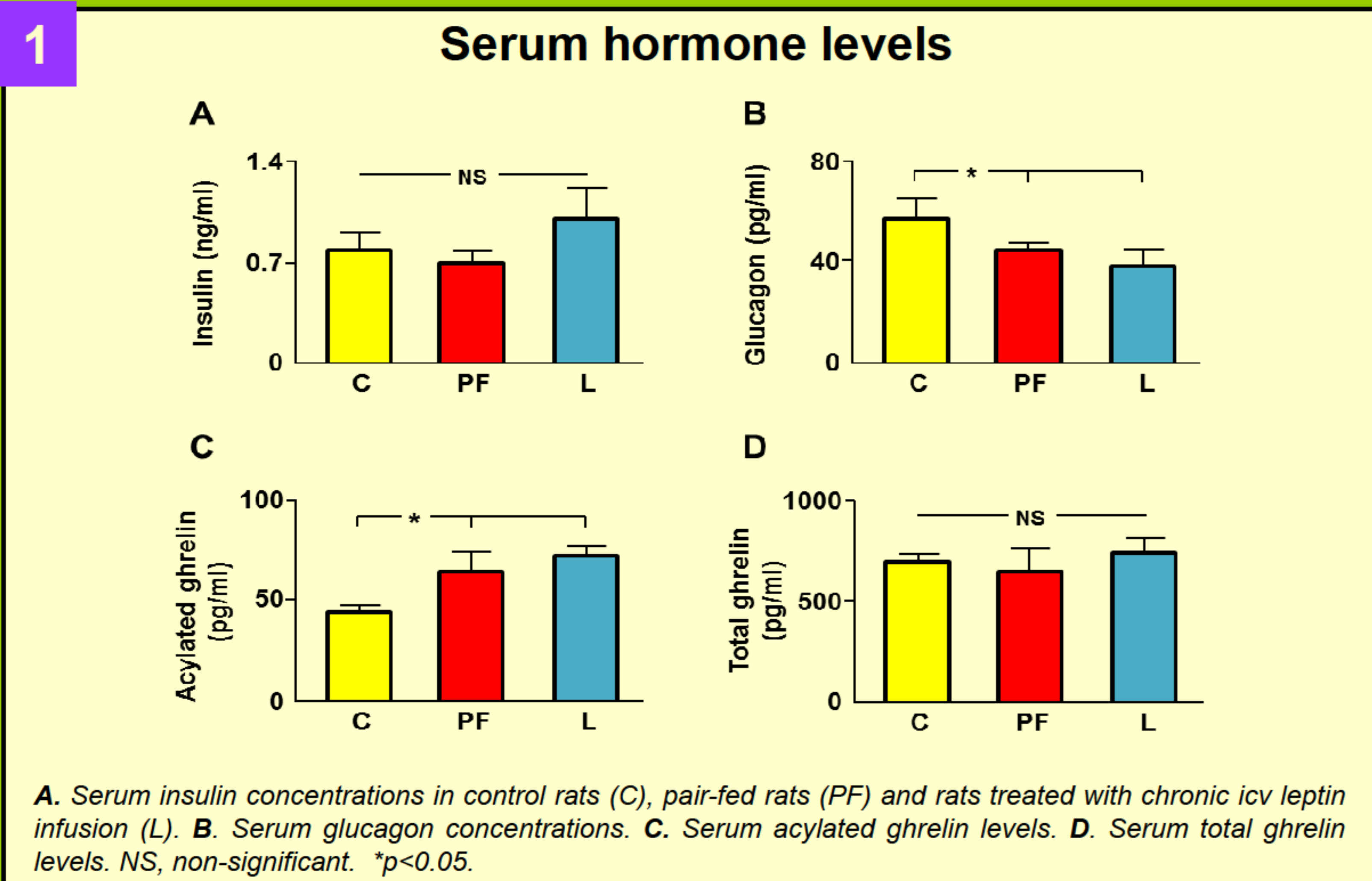
Eighteen male Wistar rats:

- Controls (C, icv saline during 14 days)
- Pair-feds (PF, icv saline plus caloric restriction)
- Leptin (L, icv leptin, 12 µg/day during 14 days)

Methods

- Serum insulin and glucagon: ELISA
- Serum acylated and total ghrelin: RIA
- Muscle glucose and glycogen: colorimetric method
- Glut4, PEPCK and insulin receptor: Western blot
- Insulin signaling: multiplexed bead immunoassay
- Proliferating cell nuclear antigen: immunohistochemistry
- Size of fibers: hematoxylin-eosin staining. Area determined with the program Axiovision 4.6 (Zeiss)

Results



Conclusion

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