The significance of capillary density to insulin sensitivity in skeletal muscle

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Aim: The aim of the present study was to elucidate whether an increased capillary density in skeletal muscle induced by α-adrenergic blockade would lead to improved insulin-stimulated glucose uptake.

Methods: Seven inactive subjects with insulin resistance underwent a 4-week period in which they received an oral dose (2 mg) of the α-adrenergic antagonist Terazosin. During the intervention period, blood pressure and muscle blood flow was measured regularly. Before and after the intervention period body composition, maximal oxygen uptake and insulin sensitivity (Hyperinsulinemic Euglycemic Clamp) were assessed. Two biopsies were obtained from the thigh muscle (m.v. lateralis) before and after the clamp.

Results: After Terazosin treatment, GIR was significantly improved by 21% (p< 0.05) compared to baseline. Maximal oxygen uptake, body composition, resting blood pressure and muscle flow were unaltered. No change in basal or insulin-stimulated phosphorylation of Akt2 at Thr308 or Ser473 was observed. Analysis of capillarization is in progress.

Conclusion: The present study shows that four weeks of an adrenergic blockade in insulin resistant individuals improves insulin stimulated glucose uptake. Although capillary analysis was not yet completed at the time of this abstract, the lack of change in insulin signaling suggests that the improved insulin sensitivity was associated with an increase in muscle capillarization as observed in our previous study on rodents.