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Depot specific regulation of glucose intake and insulin sensitivity in HIV lipodystrophy

D Kamin¹, C Hadigan¹, J Liebau¹, S Mazza¹, S Barrow², M Torriani³, R Rubin⁴, S Weiss², A Fischman² and S Grinspoon¹

¹Program in Nutritional Metabolism, Massachusetts General Hospital, Boston, MA, USA; ²Nuclear Medicine Division, Massachusetts General Hospital, Boston, MA, USA; ³Division of Musculoskeletal Radiology, Massachusetts General Hospital, Boston, MA, USA; ⁴Infectious Diseases Division, Brigham and Women's Hospital, Boston, MA, USA

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BACKGROUND: Altered fat distribution is associated with insulin resistance in HIV, but little is known about regional glucose metabolism in fat and muscle depots in this patient population. The aim of the present study was to quantify regional fat, muscle and whole body glucose disposal in HIV-infected men with lipodystrophy.

METHODS: Whole body glucose disposal was determined by hyperinsulinaemic clamp technique (80mU/m²/min) in six HIV-infected men and five age–weight-matched healthy volunteers. Regional glucose uptake in muscle, subcutaneous and visceral adipose tissue (VAT) was quantified in fasting and insulin-stimulated states using 2[18F]fluoro-2-deoxy-D-glucose (FDG) positron emission tomography (PET).

RESULTS: HIV-infected subjects with lipodystrophy had significantly increased glucose uptake into subcutaneous adipose tissue (3.8±0.4 vs 2.3±0.5 mmol/kg tissue/min, $P<0.05$) in the fasted state. Glucose uptake into VAT did not differ between groups. VAT area was inversely related with whole body glucose disposal, insulin sensitivity, and muscle glucose uptake during insulin stimulation. VAT area was highly predictive of whole body glucose disposal ($r^2=0.94$, $P<0.0001$). This may be mediated by adiponectin, which was significantly associated with VAT area ($r=-0.75$, $P=0.008$) and whole body glucose disposal ($r=0.80$, $P=0.003$).

CONCLUSIONS: This is the first study to directly demonstrate increased glucose uptake in subcutaneous fat of lipotrophic patients, which may partially compensate for loss of subcutaneous adipose tissue. Furthermore, we demonstrate a clear relationship between VAT and glucose metabolism in multiple fat and muscle depots, suggesting the crucial importance of this depot in the regulation of glucose and highlighting the significant potential role of adiponectin in this process.



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