Effects of acute intermittent hypoxia, a simulating model of obstructive sleep apnea, on lipolytic/lipogenic functions in human adipose tissue

Background: Postprandially, adipose tissue (AT) plays a pivotal role by storing dietary fat through the hydrolysis of plasma triglycerides (TG) by the lipoprotein lipase (LPL) (intravascular lipolysis), and/or inhibiting fatty acid and glycerol delivery to nonadipose tissues (intracellular lipolysis) (1). Animal models of obstructive sleep apnea (OSA) conclusively demonstrate impairment in AT lipolytic functions, which leads to high lipid levels and increase cardiovascular risk (2). This observation remains to be tested in humans.

Objective: Characterize the lipolytic functions of adipocytes isolated from healthy humans acutely exposed to intermittent hypoxia (IH) after a meal.

Methods: Using a randomized crossover design, 10 healthy men (body fat: 9-19%) were subjected to 6 h of normoxia (21% oxygen, control session) or intermittent hypoxia (pulsed medical nitrogen, simulated OSA session) following the consumption of liquid meal. Subcutaneous abdominal adipose tissue biopsies were performed before and 3-h following the meal in each experimental session.

Results: Oxyhemoglobin desaturation was induced at a rate of 19.7 events/h. Neither meal nor IHaffected subcutaneous abdominal adipose tissue LPL activity. Lipolytic responses to catecholamine or isoproterenol (β-adrenergic agonist) and antilipolytic response to α_2-agonist assessed in isolated subcutaneous abdominal adipocyte were similar between normoxia and IH sessions.

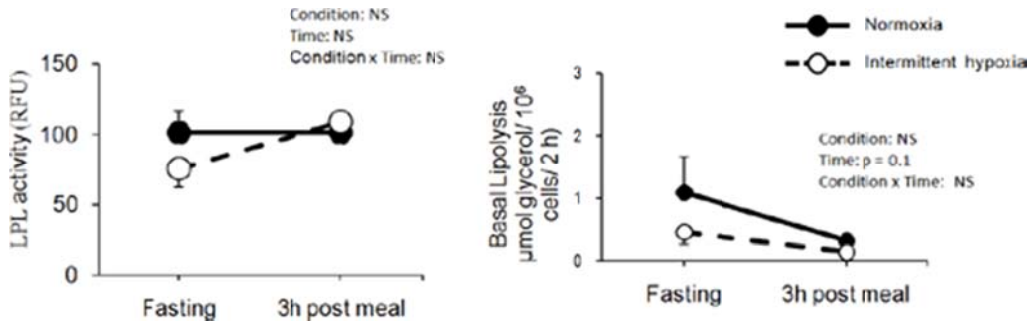

Figure 1. Subcutaneous adipose tissue lipoprotein lipase (LPL) activity and basal lipolysis before and 3 h after a meal under normoxia and intermittent hypoxia.

Conclusions: In healthy individuals, acute intermittent hypoxia does not seem to alter the lipolytic responses of subcutaneous abdominal adipocytes.

References:

(1) Samra SJ (2000). *Proc of the Nutr Soc* **59**; 441-446.

(2) Jun JC *et al.* (2012). *AJP EndocrinolMetab* **303**; E377-388.