Deep body composition phenotyping during weight cycling: relevance to metabolic efficiency and metabolic risk.

Abstract:

Weight cycling may lead to adverse effects on metabolic efficiency (i.e. adaptive thermogenesis or ‘metabolic slowing’) and metabolic risks (e.g. increased risk for insulin resistance and the metabolic syndrome). In order to investigate these topics, the partitioning of fat and lean mass (i.e. the change in the proportion of both compartments) needs to be extended to the organ and tissue level because metabolic risk differs between adipose tissue depots and lean mass is metabolically heterogeneous being composed of organs and tissues differing in metabolic rate. Contrary to data obtained with severe weight loss and regain in lean people, weight cycling most likely has no adverse effects on fat distribution and metabolic risk in obese patients. There is even evidence for an increased ability of fat storage in subcutaneous fat depots (at the trunk in men and at the limbs in women) with weight cycling that may provide a certain protection from ectopic lipid deposition and thus explain the preservation of a favourable metabolic profile despite weight regain. On the other hand, the mass-specific metabolic rate of lean mass may increase with weight gain and decrease with weight loss mainly because of an increase and respective decrease in the proportion (and/or activity) of metabolically active organ mass. Obese people could therefore have a higher slope of the regression line between resting energy expenditure (REE) and fat-free mass
that leads to an overestimation of metabolic efficiency when applied to normalize REE data after weight loss. Furthermore, in addressing the impact of macronutrient composition of the diet on partitioning of lean and fat mass, and the old controversy about whether a calorie is a calorie, we discuss recent evidence in support of a low glycaemic weight maintenance diet in countering weight regain and challenge this concept for weight loss by proposing the opposite.