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The role of visceral fat on insulin sensitivity and glucose metabolism in long-living mice

Studies of mice with growth hormone (GH) deficiency or resistance have shown that disruption of the GH axis promotes insulin sensitivity, improves glucose metabolism and is strongly associated with extended longevity and delayed aging. Long-living GH receptor knockout (GHRKO) and GH-deficient Ames dwarf (df/df) mice are obese and more importantly have more visceral fat than their normal counterparts, yet these mice are still very insulin sensitive. Interestingly, our data showed that surgical visceral fat removal (VFR) decreased insulin sensitivity and glucose tolerance in long-living, obese GHRKO and df/df mice in comparison to sham controls, while the same intervention improved insulin sensitivity and glucose tolerance in N mice. Additionally, VFR intervention improved insulin signaling pathway in skeletal muscle in normal mice only, without any alterations in GHRKO animals. We also found that the transplant of visceral fat from GHRKO mice to N mice (N-GHRKO) improved whole body insulin sensitivity when compared with sham-operated mice (N-S) and with mice that received visceral fat from N mice (N-N). Observed improvement of insulin sensitivity was associated to increased phosphorylation levels of insulin receptor and increased expression of *Ppara* and *Ppar γ* in the liver. These findings showed that the same endocrine organ plays different role on insulin sensitivity in GHRKO and df/df mice when compared with N control mice. We hypothesize that this divergent role of VF is due to different secretory pattern in visceral fat, which is mediated by suppression of GH action in adipose tissue.

Biography

Michal Masternak has completed his PhD from Poznan University of Medical Sciences and Post-doctoral studies from Southern Illinois University, School of Medicine in Springfield, IL. He is an Associate Professor at University of Central Florida. He has published more than 76 papers in reputed journals and has been serving as an Editorial Board Member in several scientific journals.

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