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## Validation of Endogenous Control Genes in Human Adipose Tissue: Relevance to Obesity and Obesity-associated Type 2 Diabetes Mellitus

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## Abstract

The aim of the present study was to test the influence of obesity and the presence of type 2 diabetes mellitus (T2DM) on the expression of ten housekeeping genes and of the 18S rRNA in a group of human adipose tissue samples from the omental and subcutaneous depot. Adipose tissue biopsies were obtained by laparoscopic surgery from lean and obese patients. After the extraction, mRNA levels in adipose tissue samples were quantified by real-time PCR using the commercial *Human Endogenous Control Plates*. From the genes analyzed, 18S rRNA exhibited the most stable expression levels in both depots regardless of the pathophysiological conditions of obesity and obesity-associated T2DM. Contrarily, GAPD was the gene with the highest variation in its expression levels, being upregulated (8.0-fold) in the obese group and downregulated (3.5-fold) in obesity-associated T2DM. Our results show that 18S rRNA may be the most suitable gene for normalization in expression studies performed in human adipose tissue samples obtained from patients suffering from obesity and/or obesity-associated T2DM, whereas GAPD is less appropriate for comparison purposes under these circumstances.



## Key words

Obesity - type 2 diabetes mellitus - real-time PCR - adipose tissue - housekeeping gene expression

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