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## **The role of mitochondrial dynamics in liver of patients with type 2 diabetes**

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**Introduction:** The functioning of mitochondria is disrupted and is associated with a decrease in ATP synthesis and organelle division during obesity under conditions of oxidative stress and increased production of ROS. The aim of the study was to evaluate the expression of genes associated with mitochondrial division / fusion processes in obese patients with type 2 diabetes.

**Methodology & Theoretical Orientation:** The expression level of genes was determined by real-time PCR. Calculations of the level of relative expression of the studied genes and the significance of differences were determined relative to the control group in the REST program.

**Findings:** An increase in the level of gene expression of the pro-inflammatory transcription factor NF- $\kappa$ B (2 times relatively healthy donors,  $p < 0.05$ ) in patients with obesity with type 2 diabetes in liver biopsy specimens showed inflammation in the liver parenchyma, whereas in patients without type 2 diabetes of this type, on the contrary, was lower (100 times,  $p < 0.05$ ) of control values. In obese patients with type 2 diabetes, the level of TFAM gene expression increased by 1.3 times ( $p < 0.05$ ), and in obese patients without it, it did not change relative to the control. In patients with obesity with type 2 diabetes, the expression level of the MFN2 and DRP1 gene did not change, and in patients with obesity without it, it decreased by 8.7 times and 100 times, respectively, relative to the control ( $p < 0.05$ ). In this study, in patients with obesity without type 2 diabetes, a decrease in the expression of genes characterizing mitochondrial division and fusion — DRP1 and MFN2 — was recorded; accordingly, a deficiency of proteins involved in mitochondrial fusion may indicate a decrease in cellular respiration and metabolism.

**Conclusion & Significance:** Thus, an increase in the level of TFAM gene expression in obese patients with type 2 diabetes mellitus indicates an increase in mtDNA transcription, while mitochondrial dysfunction mediated by an increase in the expression level of mitochondrial transcription factor A (TFAM), in the presence of an inflammatory process in the liver in obese patients, may be a factor contributing to the formation of type 2 diabetes.

### **Biography**

Daria Skuratovskaia is a researcher at the Center for Immunology and Cellular Biotechnology. She is the participant of many grants and the author of many articles. She also has her own patent.

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