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Changes in epigenetic marks during adipogenesis and in mature adipocytes induced by excess of palmitic, stearic and oleic acids

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Preadipocytes develop from mesenchymal stem cells, and stimulated by specific agents, differentiate into mature adipocytes. Adipogenesis is characterized by changes in cell morphology and well documented changes in expression of complex transcription factors. Adipogenesis is highly controlled process by numerous mechanisms, including epigenetic regulation. The influence of dietary factors on the adipogenesis is very well documented as well as that some dietary factors modulate epigenome. A question requiring an answer is whether the nutrition factors modulated adipogenesis via DNA methylation. We analyzed the influence of the palmitic, stearic and oleic acids excess on global and site-specific DNA methylation during adipogenesis and in mature adipocytes. 3T3-L1 fibroblasts were used as the cell model, five time points during adipogenesis were chosen. First, we analyzed the influence of fatty acids excess on adipogenesis at chosen time points. The expression rate of transcription factors, DNA methyltransferases and global DNA methylation were measured at specific time point of cells differentiation. Second, the phonotype of mature adipocytes was analyzed. For that reason, the expression rate of genes belonging to insulin signaling pathway, lipids metabolism, adipokines and cytokines were analyzed. Additionally, the insulin sensitivity and the secretion of adipokines and cytokines were determined. Finally, the site-specific methylation pattern of genes promoters that showed divergences in gene expression was established. We showed that all fatty acids might influence in different manners global and site specific DNA methylation pattern in mature adipocytes leading to changes in adipocytes phenotype. No differences were seen at earlier stage of adipogenesis.

Biography

Malgorzata Malodobra-Mazur has completed her PhD in 2010 year from Wroclaw Medical University, Wroclaw, Poland and Post-doctoral studies from Nencki Institute of Experimental Biology, Warswa, Poland. Furthermore, she performed an Internship at Joslin Diabetes Center, Harvard Medical School, Boston, USA. She is a Principal Investigator of two scientific grants funed by National Science Center, Poland and Nutricia Fundation, Poland. She has published more than 10 papers in reputed journals.

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