

Linoleic acid promotes mitochondrial biogenesis and maintains mitochondrial structure for prevention of streptozotocin damage in RIN-m5F cells.

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Abstract

Linoleic acid (LA) improves insulin resistance and prevents diabetes. To investigate whether linoleic acid could protect against streptozotocin (STZ)-induced cell death, rat RIN-m5F cells were exposed to STZ. SL and SO groups consisted of cells treated with STZ and then LA or oleic acid (OA) respectively. STZ treatment decreased the mitochondrial membrane potential in the STZ, SO, and SL groups. Cells of the SL group had more intact mitochondria. Increased mRNA expression of mitochondrial DNA (mtDNA) and nuclear DNA (nDNA), as well as of the mitochondrial biogenesis regulators peroxisome proliferator activated receptor gamma coactivator-1alpha (PGC-1alpha), and mitochondrial transcription factor A (Tfam), were found in the LA group. The insulin content was significantly decreased in all three groups. These results suggest that the effects of LA on cell viability after STZ damage occur through maintenance of mitochondrial structure and increased mitochondrial biogenesis.