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Modification of the insulin signaling by *Nigella sativa* oil and antidiabetic drugs in streptozotocin-induced diabetic rats

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Nigella sativa (NS) is black seed with different biological activities and its anti-diabetic effect is one of the highly investigated activities. Streptozotocin-induced diabetic rats (fed with a high-fat diet) were treated daily with NS Oil (NSO) in order to study its anti-liver or brain insulin resistance. In the hepatic tissues, the administration of NSO significantly induced the gene expression of insulin receptor compared to NSO-untreated rats. In addition, it up-regulated the expression of insulin-like growth factor 1 and phosphoinositide-3 kinase. On the other hand, the expression of ADAM-17 was down-regulated, whereas the level of TIMP-3 confirmed its down-regulation. In the brain, it corrected the reduced insulin signaling pathway (p-IRS/p-AKT/p-GSK-3 β) resulted from the stimulation of GSK-3 β level. This, in turn, contributed to a decreased Tau phosphorylation along with changes in the protein phosphatase PP2A level. In conclusion, NSO or its combined treatments with anti-diabetic drugs have a possible protective and modifying effect of the insulin resistance through enhancing the hepatic and brain insulin signaling pathway.

Biography

Mahmoud Balbaa has pursued his PhD from Hokkaido University, Japan during the period of 1984-1988. Currently, he is working as a Professor of Biochemistry at Alexandria University, Egypt. He was appointed as the Head of the Biochemistry Department, Alexandria University, Egypt from 2007 to 2009. His research has included the study of enzyme characterization and inhibition, cell signaling and the biochemical parameters in diseases. Based on this research and fellowship training, he has received several awards and honors, such as Post-doctoral Fellowship from the Medical Research Council, Canada and another Post-doctoral Fellowship from AIEJ, Japan. He is serving as an Editorial Member of several reputed journals. He has authored more than 50 research articles.

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