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Influence of calmodulin dependent protein kinase (CaMK)II on lipid droplets in rat skeletal muscle and its relevance to mitochondria function

Ademola Ayeleso and **Emmanuel Mukwevho**
North-West University, South Africa

Activation of calmodulin dependent protein kinase (CaMK)II has beneficial roles in metabolism and health. Lipid droplets inhibit insulin-sensitive glucose transporters, accounting for insulin resistance in type 2 diabetes. ATP synthesis in the mitochondria is also decreased in type 2 diabetes subjects. The aim of the study was to examine the role of (CaMK)II activation on lipid droplets and mitochondria function in rat skeletal muscle. Induction of (CaMK)II in the male Wistar rats was done through exercise and the inhibition of exercise-induced (CaMK)II was achieved by administration of KN93. Gastrocnemius muscles were extracted from rats in the control, exercise and exercise + KN93 groups. Transmission electron microscopy (TEM) was used to determine lipid droplet size/number and mitochondria size. ATP synthesis was done using CellTiter-Glo luminescent assay. The results showed that exercise-induced (CaMK)II activation significantly decreased lipid droplet size and number. There was also a significant increase in the mitochondrial size and ATP synthesis due exercise-induced (CaMK)II activation. In conclusion, the study showed that exercise through the induction (CaMK)II can help to regulate lipid droplets formation and improve mitochondria function. Hence, may help to reduce risk of type 2 diabetes and obesity.

Biography

Ademola Ayeleso has completed his Doctoral degree in the Department of Biomedical Sciences, Cape Peninsula University of Technology, South Africa in 2013. He is presently a Post-doctoral Research Fellow under the headship of Prof. Emmanuel Mukwevho at the North-West University, South Africa. His research has focused more on therapeutic approaches to the management of diabetes mellitus.

ademola.ayeleso@gmail.com

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