論 文 要 旨

Rubiscolin-6 activates opioid receptors to enhance glucose uptake in skeletal muscle.

（ルビスコリン−６はオピオイド受容体を活性化することで
骨格筋の糖取込みを促進する）

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Abstract

Rubiscolin-6 is an opioid peptide derived from plant ribulose bisphosphate carboxylase/oxygenase (Rubisco). It has been demonstrated that opioid receptors could control glucose homeostasis in skeletal muscle independent of insulin action. Therefore, Rubiscolin-6 may be involved in the control of glucose metabolism. In the present study, we investigated the effect of rubiscolin-6 on glucose uptake in skeletal muscle. Rubiscolin-6-induced glucose uptake was measured using the fluorescent indicator 2-[N-(7-nitrobenz-2-oxa-1,3-diazol-4-yl) amino]-2-deoxyglucose (2-NBDG) in L6 and C2C12 cell lines. The protein expressions of glucose transporter 4 (GLUT4) and AMP-activated protein kinase (AMPK) in L6 cells were observed by Western blotting. The in vivo effects of rubiscolin-6 were characterized in streptozotocin (STZ)-induced diabetic rats. Rubiscolin-6 induced a concentration-dependent increase in glucose uptake levels. The increase of phospho-AMPK (pAMPK) and GLUT4 expressions were also observed in L6 and C2C12 cells. Effects of rubiscolin-6 were blocked by opioid receptor antagonists and/or associated signals inhibitors. Moreover, Rubiscolin-6 produced a dose-dependent reduction of blood glucose and increased GLUT4 expression in STZ-induced diabetic rats. Rubiscolin-6 increases glucose uptake, potentially via an activation of AMPK to enhance GLUT4 translocation after binding to opioid receptors in skeletal muscle.

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