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School of Community Health Sciences
University of Nevada, Las Vegas

The Contributions of Skeletal Muscle PKC Theta to Diet-Induced Obesity

Erika Harness
Joseph S. Marino, Ph.D. University of North Carolina Charlotte
Yvette Huet, Ph.D. University of North Carolina Charlotte
Coordinating Center: University of Nevada Las Vegas

ABSTRACT

Protein Kinase C- Theta (PKCθ) is a gene predominantly expressed in hematopoietic cells and skeletal muscle. In skeletal muscle, PKCθ regulates fat metabolism and insulin sensitivity. PKCθ activity increases in response to high levels of diacylglycerol in the cell, a common outcome of chronic high fat diet consumption and obesity. PKCθ is associated with skeletal muscle metabolic dysfunction, which may exacerbate weight gain and metabolic disease. The purpose of this study was to test the hypothesis that the selective deletion of PKCθ from skeletal muscle protects against diet-induced obesity.

Mice lacking PKCθ in skeletal muscle were created using Cre-Lox recombination. At weaning, control ($PKC\theta^{SkM+/+}$) and knockout ($PKC\theta^{SkM-/-}$) mice were randomly assigned to regular or high fat diet (RD or HFD, respectively) groups. Mouse weights were taken weekly for 15 weeks.

During the 15-week diet intervention, male $PKC\theta^{SkM+/+}$ mice on a HFD became obese. Male $PKC\theta^{SkM-/-}$ mice consuming a HFD showed attenuated weight gain, which was similar to mice on a RD. This trend was not present for female mice, in which weight changed to a similar magnitude independent of diet and genotype. In conclusion, PKC-θ in the skeletal muscle may contribute to the regulation of diet-induced obesity. It is unclear whether these affects are sex specific.

Key Words: Protein Kinase C Theta, Obesity, High fat diet

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