

PGC-1 α Is Indispensable in Purple Potato Promoted Intestinal Epithelial Differentiation and Mitochondrial Biogenesis

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Objectives: Purple potato (PP) is a good dietary source of polyphenol and promotes gut epithelial health. The objective of this study is to examine the impact of PP extract on mitochondrial biogenesis and evaluate the role of peroxisome proliferator-activated receptor gamma coactivator (PGC)-1 α in this.

Methods: In cultured colonic epithelial Caco-2 cells, the effects of PP extract on PGC-1 α , cell differentiation, and markers of mitochondrial biogenesis, including mitochondrial DNA content, mitochondrial enzyme gene expression, and levels of metabolic intermediates, were first evaluated. Then, inhibition of PGC-1 α induced by either inhibitor

SR-18,292 or siRNA-mediated knockdown were used to evaluate its role in PP extract-promoted differentiation and mitochondrial biogenesis.

Results: PP extract up-regulated the level of PGC-1 α , mitochondrial gene expression, mitochondrial DNA (mtDNA) copy number, and the level of citric acid cycle metabolites in Caco-2 cells. Inhibition of PGC-1 α eliminated the enhancing effects of PP extract on the expression of differentiation markers, mitochondrial metabolites and mtDNA content, as well as the mRNA expression of mitochondria-encoded proteins.

Conclusions: PP extract promoted the differentiation of intestinal epithelial cells, mitochondrial biogenesis and oxidative metabolism, which is in a PGC-1 α -dependent way.

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