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Sulforaphane Downregulates Hepatic Fibroblast Growth Factor 21 (FGF21) of Diet Induced Obese Mice

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Background: Fibroblast growth factor 21 is a hormone-like protein that plays a critical role as an energy regulator. Sulforaphane (SFN) is expected to have potential therapeutic effects in treating obesity. This study aims to investigate the effect of SFN treatment on hepatic gene expression of FGF-21 of diet induced obese mice.

Methods: CD1 male mice and two groups of lean and diet induced obesity (DIO) model after feeding a high fat diet were used. Afterward, both lean and DIO mice were treated for four weeks with either SFN (5mg/kg BW) (n=10) or Vehicle (n=10). After that, blood and liver samples were collected and analyzed. Hepatic FGF-21 gene expression was measured using qRT-PCR.

Results: Treatment of DIO mice with SFN causes a significant reduction in body weight gain (15.42%) compared to DIO-vehicle group, which showed a weight gain by (3.86%), p-value<0.0001. In addition, SFN treatment to lean group did not affect body weight. DIO-SFN treated mice showed a significant reduction in fasting glucose, leptin, and insulin levels compared to DIO-vehicle treated group, p-value<0.05. Hepatic FGF-21 gene expression was significantly upregulated in DIO-vehicle compared to lean-vehicle mice with ~ 3 folds, p-value<0.05. Treatment of DIO with SFN causes a significant downregulation of FGF-21 gene expression by ~9 folds compared with DIO-vehicle treated group, p-value<0.05.

Conclusions: Treatment of DIO mice with SFN causes downregulation of hepatic FGF21 expression in obese

mice. The effects of SFN on FGF21 gene expression could be a direct effect or secondary to weight loss, which warrants further studies. The study was funded by QNRF, NPRP 9 -351-3-075

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