Agonism of GPR120 regulates markers of skeletal muscle metabolism

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Background/Aims: G-protein coupled receptor 120 (GPR120) is activated endogenously by omega 3 fatty acids and is a novel target for small molecule agonists and antagonists. GPR120 agonists have been shown to exert anti-inflammatory effects, as well as potentially mediating adipogenesis, spontaneous taste preference for lipids, fatty acid sensing, gastrointestinal peptide release and insulin signalling. However, the tissue-specific effects of GPR120 agonists are still under investigation. Thus, this work aimed to determine if GPR120 agonists regulate mRNA expression of key genes involved in glucose and fatty acid oxidation in cultured skeletal muscle myotubes.

Methods: Cultured C2C12 myotubes were treated for 6 hours with TUG-891 (a GPR120 agonist) at three different doses (1.7 nM, 17 nM and 170 nM) before determination of mRNA expression *via* 'real-time' PCR.

Results: At 17 nM there was a significant decrease in PGC1α mRNAs ($n = 8$-9/group; $p \leq 0.05$). However, at 170 nM the expression of PGC1α was rescued to beyond that of control ($n = 8$-9/group; $p \leq 0.05$). CPTI, PDK4, IRS-1 and ACCα mRNA expression was also increased by 170 nM TUG-891 ($n = 8$-9/group; $P \leq 0.05$).

Conclusions: GPR120 activation regulates expression of genetic markers of metabolism in skeletal muscle myotubes. However, whether these changes will ultimately occur to the benefit or detriment of skeletal muscle metabolic function remains to be determined.

LMC was supported by National Heart Foundation of Australia.