

13th Global Diabetes Conference and Medicare Expo

August 08-10, 2016 Birmingham, UK

Trigonelline attenuates palmitic acid induced lipid droplet accumulation and lipotoxicity in mouse hepatocytes by down regulation of PPAR- γ via mTOR-Akt signalling

Love Sharma^{1,2,3}, Rachel M Knott¹ and Tasduq Abdullah^{2,3}¹Robert Gordon University, UK²CSIR-Indian Institute of Integrative Medicine, India³Academy of Scientific and Innovative Research, India

Non-alcoholic fatty liver disease (NAFLD) is frequently associated with type 2 diabetes mellitus (T2DM). Trigonelline (TE), a plant alkaloid known for its anti-oxidant and normoglycaemic properties, was analyzed for its anti-steatotic effects. AML-12 hepatocytes and sodium palmitate (SP) were employed as an in-vitro model. AML-12 cells were pretreated with 25 μ M and 50 μ M doses of TE 4 hours before, exposure to 0.25 mM of SP for 24 hours. Key events related to lipo-toxicity and lipid droplet accumulation (via Nile red staining) were analyzed. In-vivo, C57BL/6J male mice (n=6), were divided into four groups as follows: 1) Standard chow (SC); 2) high fructose and high cholesterol diet (HF-HC), 3) HF+HC & TE (50 mg/kg, thrice a week) 4) SC & TE (50 mg/kg, thrice a week). The mice were provided respective diets and TE treatment for 16 weeks. TE treatment in AML-12 cells, prevented SP induced cell death, [34% (SP 0.25mM + TE 0 μ M), 21% (SP 0.25mM+TE 25 μ M/50 μ M)], further evidenced by changes in protein levels (Bcl-2, Bax, cl-PARP and MMP-1). TE reduced SP promoted lipid droplet accumulation and reduced the expression of perilipin analyzed via immunocytochemistry. TE prevented up-regulation of PPAR- γ , SREBP1c, m-TOR, p-mTOR, p-AKT, induced by SP. In-vivo, Group 2 mice were significantly overweight (45 \pm 2.4 g), as compared to Group 3 mice (33 \pm 2.1 g, p<0.01). The level of glucose (355 \pm 47.3 mg/dl), insulin (5.3 \pm 0.3 ng/ml), triglycerides (146 \pm 19.5 mg/dl), and cholesterol (351 \pm 51 mg/dl) were significantly high in Group 2 mice as compared to all other groups. Group 1 and Group 4 were not statistically different in any of the measured values. Hence, our results indicate that TE potentially prevents lipid droplet accumulation and lipotoxicity in liver cells, and it may be suitable as a therapeutic agent to combat NAFLD.

Biography

Love Sharma is a Senior Research Fellow (PhD scholar) at CSIR-IIIM, Jammu. Currently, he is on short term research project (Under Newton-Bhabha Scheme) at School of Pharmacy and Life Sciences, Robert Gordon University, Aberdeen. His area of research includes the metabolic syndrome, therapeutic interventions for non-alcoholic fatty liver disease including in-vitro and in-vivo model development.

lovesharma62@gmail.com
l.sharma@rgu.ac.uk

Notes: