Pérez Ternero *et al.*: *Intrinsic Activity*, 2015; **3**(Suppl. 2):A1.19
http://www.intrinsicactivity.org/2015/3/S2/A1.19
published online: 9 September 2015

21st Scientific Symposium of the Austrian Pharmacological Society: Joint Meeting with the British Pharmacological Society and the Pharmacological Societies of Croatia, Serbia and Slovenia

Graz, 16–18 September 2015

MEETING ABSTRACT

A1.19

Rice bran enzymatic extract reduces hyperlipidemia and related hepatic steatosis in ApoE$^{-/-}$ mice

Cristina PÉREZ TERNERO, María D. HERRERA and María ÁLVAREZ DE SOTOMAYOR*

Department of Pharmacology, School of Pharmacy, University of Seville, Spain

Background: ApoE$^{-/-}$ mice spontaneously develop nonalcoholic fatty liver disease secondary to hyperlipidemia. Rice bran has been associated with lipid-lowering and anti-inflammatory properties in several rodent, primate and human models. We aimed to evaluate the impact of a rice bran enzymatic extract (RBEE) diet supplementation on hepatic steatosis.

Methods: Seven-week-old ApoE$^{-/-}$ mice were fed a high fat diet (HF) supplemented or not with 1% or 5% RBEE (w/w) for 23 weeks. Wild-type C57BL/6J mice were kept under standard diet for the same period as the healthy controls. Serum total cholesterol, HDL-C, triglycerides, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) were measured with commercial kits. Extraction of lipids from liver and feces was performed following the Folch method. HMG-CoA / mevalonate ratio, determined spectrophotometrically, served as estimation of HMG-CoA reductase activity. Lipid droplets in the liver were visualized by Oil Red O staining. PPARα protein expression was measured by western blot from liver homogenates.

Results: ApoE$^{-/-}$ mice were characterized by increased total cholesterol ($p < 0.001$) and triglycerides ($p < 0.001$), and reduced HDL-C ($p < 0.001$). 5% RBEE diet supplementation reduced total cholesterol ($p < 0.01$) and triglycerides ($p < 0.05$) while both, 1% and 5%, supplements augmented HDL-C ($p < 0.01$ and $p < 0.001$ for 1% and 5%, respectively). Increased ALT ($p < 0.01$) and AST ($p < 0.05$) were induced by HF diet. RBEE supplementation was able to reduce AST increase regardless of the dose ($p < 0.001$) but had no effect on ALT levels. HMG-CoA reductase activity was downregulated by 1% ($p < 0.01$) and 5% ($p < 0.05$) RBEE supplements. Finally, 5% RBEE diet supplementation increased cholesterol excretion in feces ($p < 0.01$) and elevated levels of PPARα protein expression in the liver. As a result of all above, liver steatosis observed in HF-fed mice ($p < 0.001$) was sharply reduced by 1% RBEE diet supplementation as shown by Folch extraction ($p < 0.001$) and Oil Red O staining ($p < 0.001$). Oil Red O staining was also lower for the 5% RBEE group.

Discussion: Among the bioactive compounds present in RBEE are phytosterols, γ-oryzanol and tocols. The serum lipid pattern may be improved due to greater fecal exception induced by phytosterols and γ-oryzanol, coupled with the inhibition of cholesterol synthesis through reduction of HMG-CoA reductase activity. This fact, combined with the induction of liver PPARα expression resulted in the improvement of steatosis induced by the high fat diet. These results suggest that RBEE supplementation might be beneficial for the prevention of hyperlipidemia and related hepatic steatosis.

Acknowledgements: C.P.T. is a recipient of a FPU fellowship from the Spanish Government.

*Corresponding author e-mail: *aldesoto@us.es*