Aramchol™ Reduces Established Fibrosis in MCD Diet Animal Model

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INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) is the most common disease of the liver with a prevalence between 10-40% in Western countries. Its most severe form, Nonalcoholic steatohepatitis (NASH), defined by liver fat accumulation, inflammation and hepatocyte injury. NASH is a progressive disease that can eventually lead to further liver injury, advanced fibrosis, cirrhosis and hepatocellular carcinoma (HCC). Aramchol™ (arachidyl amido cholanoic acid) is a fatty acid-bile acid conjugate which has been shown to reduce liver fat content in patients with nonalcoholic fatty liver disease (NAFLD) and is presently in Phase 2b study (ARREST) for nonalcoholic steatohepatitis (NASH). Here we used a modification of the canonical MCD diet model by adding 0.1% methionine to the diet. This choline deficient diet containing 0.1% methionine (0.1MCD diet) induced steatosis, inflammation and fibrosis. Aramchol™ down regulates steatosis, inflammation and fibrosis via down regulation of SCD 1 and upregulation of Glutathione production and elevation of redox homeostasis.

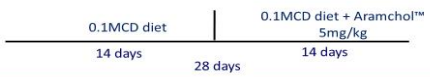
AIM

The aim of this work was to investigate the mechanism of action of Aramchol™ and its potential effect on steatohepatitis and fibrosis using the 0.1% methionine- and choline-deficient (0.1MCD) diet mouse model of NASH.

METHOD

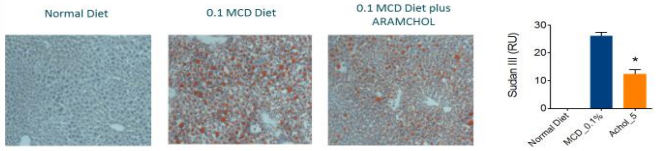
Mice were fed the Methionine and Choline Deficient (MCD) and control diet and were sacrificed after 4 weeks. The MCD diet induces aminotransferase elevation and changes in hepatic histological features, characterized by steatosis, local inflammation, hepatocyte necrosis and fibrosis. These changes occur rapidly and are morphological close to those observed in human NASH. In this study the MCD diet contained 0.1% methionine to minimize and stabilize weight loss. At the end of the second week, after verification of established NASH, 0.1MCD-fed mice were treated orally by gavage with Aramchol™ (5 mg/Kg/day) or vehicle (n=10, each condition). Control diet-fed mice were also treated with vehicle for same duration (n=10). At the end of the experiment, blood and liver samples were obtained.

EXPERIMENTAL DESIGN



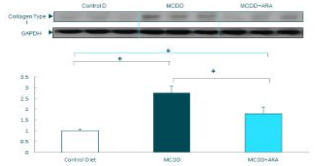
RESULTS

Effect of ARAMCHOL™ on Liver Steatosis in 0.1MCD Diet (histology - sudan III)



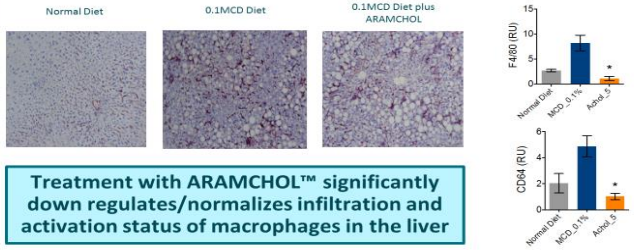
Treatment with ARAMCHOL™ significantly down regulates steatosis in the liver

Effect of ARAMCHOL™ on Collagen Production Liver Extract from 0.1MCD Mice



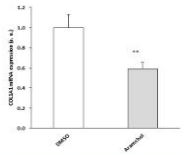
ARAMCHOL™ significantly down regulates Collagen in the liver

Effect of ARAMCHOL™ on Macrophages Activation and Infiltration in 0.1MCD Diet (F4/80 and CD64)



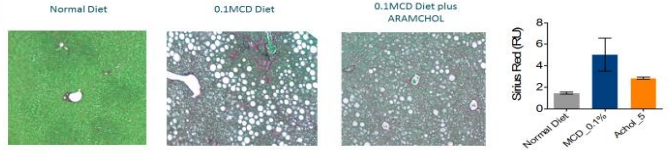
Treatment with ARAMCHOL™ significantly down regulates/normalizes infiltration and activation status of macrophages in the liver

Effect of ARAMCHOL™ on Collagen Production from LX-2 Human Hepatic Stellate Cells



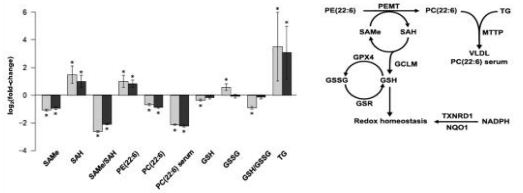
ARAMCHOL™ significantly down regulates Collagen production in LX-2 human hepatic stellate cells

Effect of ARAMCHOL™ on Fibrosis in 0.1MCD Diet (histology – sirius red)



Treatment with ARAMCHOL™ significantly down regulates/normalizes fibrosis in the liver

Effects of ARAMCHOL™ on Liver Biochemistry in 0.1MCD Mice



ARAMCHOL™ significantly Up regulates Glutathione and elevates GSH/GSSG ratio in 0.1 % MCD mice

CONCLUSIONS

- **Aramchol™** has an effect on the three main pathologies of NASH, steatosis, inflammation and fibrosis.
- **Aramchol™** down regulates collagen production from human stellate cells.
- **Aramchol™** effects are mediated through down regulation of SCD 1 and up regulation of Glutathione production.
- The data suggest that the effect of **Aramchol™** on fibrosis is mediated via down regulation of steatosis and inflammation and also direct via down regulation of collagen production from stellate cells.
- These results suggest potential effects of **Aramchol™** on fibrosis in NASH patients.

CONTACT INFORMATION

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