Characteristics of Nonalcoholic Fatty Liver Disease induced in Wistar rats following four different diets

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Background and objective: Nonalcoholic fatty liver disease (NAFLD) is well known to be induced by high fat and high carbohydrates diet. The objective of this study is to establish, in sixteen weeks, a model of nonalcoholic fatty liver disease in Wistar pathogen-free rats following four types of diet.

Methods: 40 healthy Wistar male rats, a month and a half old, weighing 150g on average, were randomly divided into 4 groups of 10. Each group was assigned a diet with the same quantity (15g/rat/day), but with different composition. The moderate fat (MF) group was fed a moderate fat diet (18.5 % proteins, 31.2% fat and 50.3% carbohydrates), the high fat (HF) group was fed a fat-rich diet (51.5%) while the high sucrose group (HS) and the high fructose group (HFr) were fed a carbohydrate-rich diet (60%), of which 60% were sucrose and fructose respectively.

Results: At week 16, the HF group had the highest percentage of cells enriched in fat (40%) with micro and macrovacuolar patterns of steatosis accompanied with mild necro inflammation ($p<0.05$). This group had also the highest weight and liver weight ($p<0.05$).

The HFr group had the highest liver weight (g) /100g body weight, a macrovacuolar steatosis and an increase in plasma triglycerides, ALT and adiponectin as compared to week 1($p<0.05$). This group had a significant higher plasma TNF-α than MF group ($p<0.05$).

Conclusion: 15g/rat/day diet as compared to 25-30g/rat/day usually required, and composed of 51.5% fat or 60% carbohydrates enriched mainly in fructose is capable of inducing characteristics of nonalcoholic fatty liver disease in rats.

Keywords: Nonalcoholic fatty liver disease, Wistar rats, macrovacuolar steatosis, necro inflammation.