

Evaluation of the dietary use of interesterified fat in metabolic parameters and hypothalamic ER stress in rodents

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Abstract

Interesterified fat has been used as an alternative to substitute trans fatty acids in the food industry, the role of this fat in metabolism remains an uncertain controversy. Therefore the purpose of this work was to evaluate the role of this kind of lipids in rat metabolism. Our findings showed that substitution of soybean oil for interesterified fat may worsen some metabolic parameters, additionally changing saturated fat for interesterified fat can slightly improve some parameters observed.

Key words: Interesterified fat, hypothalamus, obesity

Introduction

The actual dietary pattern is characterized by high consumption of lipids, including trans fatty acids. The excess of these types of fatty acids in the diet is capable of modulate the lipid profile rising LDL-c levels and is related to coronary diseases and diabetes. Nowadays, interesterified fat is used as an alternative to the use of trans fatty acids in the food industry.

Therefore, the aim of this work was to evaluate the dietary sources of lipids and their role on metabolic parameters and activation of inflammatory and endoplasmic reticulum stress pathway in hypothalamus of rats fed with interesterified fat.

Results and Discussion

Male Wistar rats were randomly divided into four experimental groups submitted to either chow diet (CT), chow interesterified diet (CT INT), high fat diet (HF SAT) or high fat diet rich in interesterified fat (HF INT) for 8 or 16 weeks. The regioespecific distribution and the composition of fatty acid from the dietary lipids were analyzed.

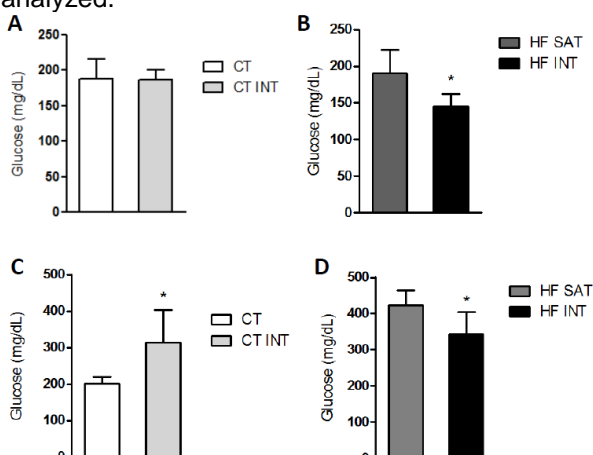


Figure 1. Fasting glucose of groups with 8 or 16 weeks of diet. (A, C) Fasting glucose of CT and CT INT after 8 and 16 weeks

respectively. (B, D) Fasting glucose of HFSAT and HF INT after 8 and 16 weeks respectively. (B,C,D: Student's *t*-test * $p < 0.05$).

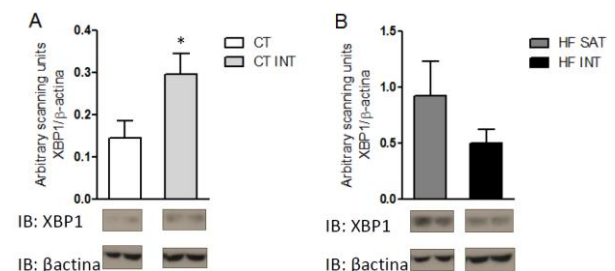


Image 2. Protein levels in hypothalamus assessed by immunoblotting. (A, B) XBP1 levels in CT, CT INT, HF SAT and HF INT groups after 8 weeks of diet. (A: Student's *t*-test * $p < 0.05$).

The group of animals fed with HF INT diet showed lower fasting glucose compared to HF SAT diet in both occasions. Long term of CT INT diet caused higher levels of fasting glucose in relation to CT diet.

Conclusions

These results indicate that substitution of saturated fat for interesterified fat in high fat diets can improve glucose homeostasis and other parameters in rats. Nonetheless, in normocaloric diets the substitution of soybean oil for interesterified soybean oil may worsen glucose homeostasis.

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