**DIET INDUCED HEPATIC STEATOSIS IN RAT**


*Department of Histology and Embryology, School of Medicine
**Department of Physiology, School of Dentistry, University of Zagreb

Introduction

New investigations show that liver steatosis associated with high fat diet is one of the commonest liver disease today. So far, it was not clearly established how feeding with high quantity of different kinds of fats acts on liver and does it produce steatosis. The aim of the study was to investigate the effect of high level of sunflower oil dietary intake on the liver in rat.

Material and methods

Animals and diet

In all experiments, male adult Wistar rats weighing 250-325 g were used. Rats were housed individually in wire cages in a temperature-controlled room (21± 1 °C) on a 12–h light-dark cycle, with free access to food and water. Experimental group of animals was feeding with high-fat diet. High fat diet was preparing by adding 30 % of sunflower oil to standard food. After that, in the terms of energy, the high-fat diet contained 30% carbohydrates, 16 % protein and 54 % fat. Control group of animals was feeding with standard food containing 57 % carbohydrates, 32% protein and 11 % fat. The experiments were lasted for 3 weeks. The principles of animal care (NIH publication No. 85-23, revised 1996) were applied. The rats were anaesthetized with Phenobarbital (10 mg/100 g body weight).

Histological analysis

The liver was removed and cut in blocks. The part of the liver tissue was immediately frozen and cut to 10 μm thick sections. The frozen sections were stained with H and E as well as with Sudan IV, Sudan III i IV and Oil Red O for neutral lipids. The other part of the liver tissue was cut in blocks with sides of about 0.5 mm, which were placed in mixture of 2.5 % glutaraldehyde and 0.8 % paraformaldehyde in 0.1 M phosphate buffer. The specimens were postfixed in 1% osmium tetroxide, dehydrated and embedded in Durcopan. 1μm-thick semithin sections were cut and stained with toluidine blue.

Results

All rats treated with high fat diet (sunflower oil) presented a steatotic liver. The areas of diffuse steatosis were mixed with focal steatosis. The liver cells occupied by fat were distended, while hepatic sinusoids between them were narrowed. The glucose production in hepatocytes isolated from rats on high fat diet was 79% higher compared with controls on standard diet.

Conclusion

The liver of animals feeding with high fat diet (sunflower oil) showed steatosis already after 3 weeks of experiment. This indicate that high sunflower diet induce the change in morphology as well as in metabolism of hepatocytes.

References:


Fig. 1. Control group. Toluidine blue. 600x

Fig. 2. Steatosis. Toludine blue. 600x