

Effects of a 10-week fructose diet on glycemia, insulinemia, lipid control and liver weight: a study in rats with non-insulin-dependent diabetes. J Boillot, M Bonnemaire, SW Rizkalla, G Slama (*Hôpital Hôtel-Dieu, Département Diabète, 1 Place du Parvis de Notre-Dame, 75181 Cedex 04, France*)

The aim of this work was to evaluate the long-term metabolic effects of chronic fructose intake in a diabetic animal model. Eighteen Sprague-Dawley rats received streptozotocin (100 µg/g) 1 d after birth. They were weaned at 28 d and then fed for 10 wk on one of 4 isocaloric-isoglucidic diets containing 57% CHO either as starch, glucose, fructose or an equivalent ratio of fructose and starch.

After 10 wk in fasted rats (diet was interrupted the evening before the experiments which took place at 9 am): i), plasma glucose and insulin levels were similar; ii), the response to an intravenous glucose tolerance test (IVGTT) was the same for the mean incremental glucose area

in the 4 groups, but the mean incremental insulin area was significantly lower in the fructose group (0.1 ± 0.1 mU.ml⁻¹.min⁻¹, $m \pm$ SEM) than in the starch (462 ± 254), glucose (914 ± 228) and fructose/starch (335 ± 206) groups ($P < 0.05$; ANOVA); iii), plasma triglyceridemia and cholesterolemia were within the normal range and comparable, respectively for the triglycerides and cholesterol, fructose (87 ± 10 mg/dl; 56 ± 4 mg/dl), fructose/starch (86 ± 13 ; 58 ± 5 mg/dl), glucose (84 ± 6 ; 58 ± 4 mg/dl) and starch (65 ± 7 ; 47 ± 4 mg/dl) (NS). At the end of the study, fructose group mean liver weight was higher (3.0 ± 0.1 g/100 g) than the starch (2.6 ± 0.1), glucose (2.5 ± 0.1) and fructose/starch (2.7 ± 0.1) groups ($P < 0.05$; ANOVA). Epididymal fat-pads were equivalent for weight, adipocyte number and size.

In conclusion, after a 10-wk fructose diet in NIDD rats, fasting glycemia, insulinemia, triglyceridemia and cholesterolemia levels were not different than under a glucose or starch diet; nor were there any differences in epididymal fat-pad weight and cellularity. A lower insulinic response to IVGTT and an increase in liver weight were only obtained with the 57% fructose diet.