

Effect of Fermentable Carbohydrate on Arterial Hypertension in Nephrectomized Rats: Comparison with Angiotensin-Converting Enzyme Inhibitors

Hassan Younes¹, Khalil Helou², Céline Demougeot³, Jean-Claude Alphonse⁴

1Department of Nutrition and Health Sciences, Institut Polytechnique LaSalle Beauvais, Beauvais, France

2Department on Nutrition, Faculty of Pharmacy, Saint-Joseph University, Beirut, Lebanon.

3Laboratory of Physiology-Pharmacology-Preventive Nutrition, Faculty of Pharmacy, Besançon, France.

4Department of Nephrology, Hospital of Clermont-Ferrand, France

Correspondence e-mail address : hassan.younes@lasalle-beauvais.fr

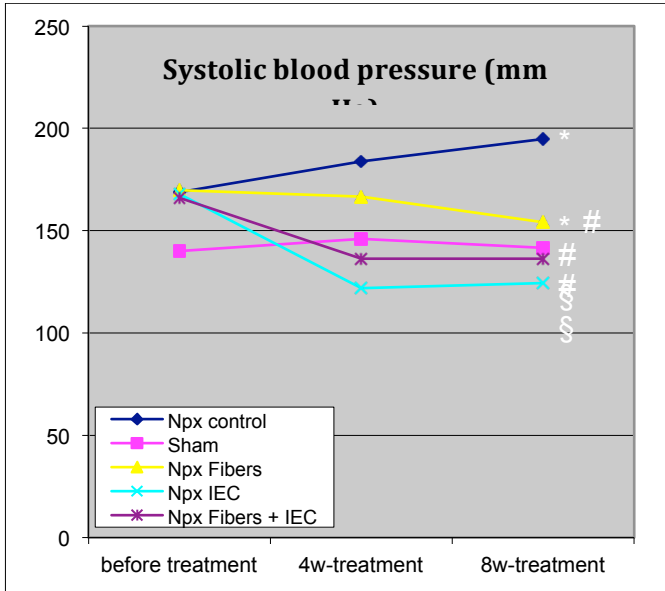
Several works reported beneficial effects of fermentable carbohydrate (FC) consumption on the prevention of digestive and metabolic disorders, particularly on hypercholesterolemia, diabetes and uremia. In uremic nephrectomized (Npx) rats and in chronic renal failure (CRF) patients, we have shown that feeding FC stimulated the nitrogen excretion by the digestive route via the stimulation of urea enterohepatic cycle and reduced the urinary N excretion with a concomitant decrease in the plasma urea concentration. However, the question about the effect of FC on arterial hypertension (HT) had not been studied. The aims of this work were (i) to study the impact of FC enriched-diets on HT and (ii) to compare this effect with that obtained with the angiotensin-converting enzyme (ACE) inhibitors and by consequence, its beneficial effects to slow down the progression of CRF.

The influence of FC on HT was investigated for 12 weeks in 50 Npx rats, distributed in 5 groups of 10 rats each : sham, Npx control, Npx rats enriched in FC, Npx rats treated with ACE inhibitors and the last group receiving FC + ACE inhibitors. After nephrectomy, all rats were observed for 4 weeks without treatment. Then, they received treatment (FC or ACE inhibitors or both) for 8 weeks. The systolic blood pressure was measured before treatment, after 4w-treatment and 8w-treatment.

We have shown that feeding FC significantly decreased the HT after 8w-treatment, compared to the Npx control group (from 195 to 154 mm Hg). As waited, the ACE inhibitors significantly decreased HT (from 195 to 124 mm Hg). But, this hypotensive effect of ACE inhibitors was less in the presence of fibers. In the same time, we have shown that feeding FC prevented the increase of plasma creatinin after 8w-treatment, compared to the Npx control group (from 122 to 81 $\mu\text{mol/l}$), as effective as ACE inhibitors (from 122 to 78 $\mu\text{mol/l}$).

In conclusion, FC feeding in Npx rats is as effective as ACE inhibitors in decreasing HT and prevents plasma creatinin increase. These results raise an important question: does FC have a nephro-protector effect similar to that of ACE inhibitors?

Moreover, it was been observed that when FC and ACE inhibitors are associated in diet, the effect of ACE inhibitors on blood pressure is reduced, but it remains significant. The question that arises is whether the status of good and poor responders to IEC is not related to the high-fiber diet?



* P < 0.05, different from sham-operated rats after two-way ANOVA.

P < 0.05, different from NPX