

EFFECTS OF PROTEIN RESTRICTION ON THE METABOLISM OF ADOLESCENT WISTAR RATS

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Introduction

The DOHaD concept points out that insults occurring in periods of great plasticity of organs and systems can have lasting effects on the individual, altering the structure and/or function of organs and systems and thus programmed for the occurrence of diseases in adulthood. Among the main informative insults in the literature that can be programmed for cardiometabolic disorders are the insults related to diet. In the literature, we found that this period of adolescence is not yet available, considering that several studies carried out with adolescent animals do not yet have a defined age pattern. So, it is necessary to characterize this period and explore the mechanisms that may be involved in the cardiometabolic dysfunctions of these animals during adolescence.

Objectives

To evaluate the effects of low-protein diet offered to rats during adolescence on metabolic dysfunction.

Methodology

The research ethics committee approved the study under CEUA (nº 2910011021). 30-day-old Wistar rats were fed a low-protein diet (LP, 4% protein) for 30 days. Control animals (NP) were fed a 20.5% protein diet throughout the protocol. Murinometric parameters were evaluated during adolescence and at 60 days the basal plasmatic values of glucose, cholesterol, triglycerides and HDL-cholesterol were quantified from serum samples collected after euthanasia. And at 60 days, glucose concentrations were quantified in animals submitted to both the oral glucose tolerance test and the intraperitoneal insulin tolerance test. In the statistical evaluation, the area under the curve and the t test (and non-parametric tests) were used. This analysis was performed using graphpad prism software (version 8.0).

Results

Biochemical measurements performed with blood plasma revealed that the LP group had higher levels of glucose ($P=0.0079$), however, levels of triglycerides ($P=0.0024$), total cholesterol ($P=0.0163$) and HDL ($P<0.0001$) were lower in LP animals

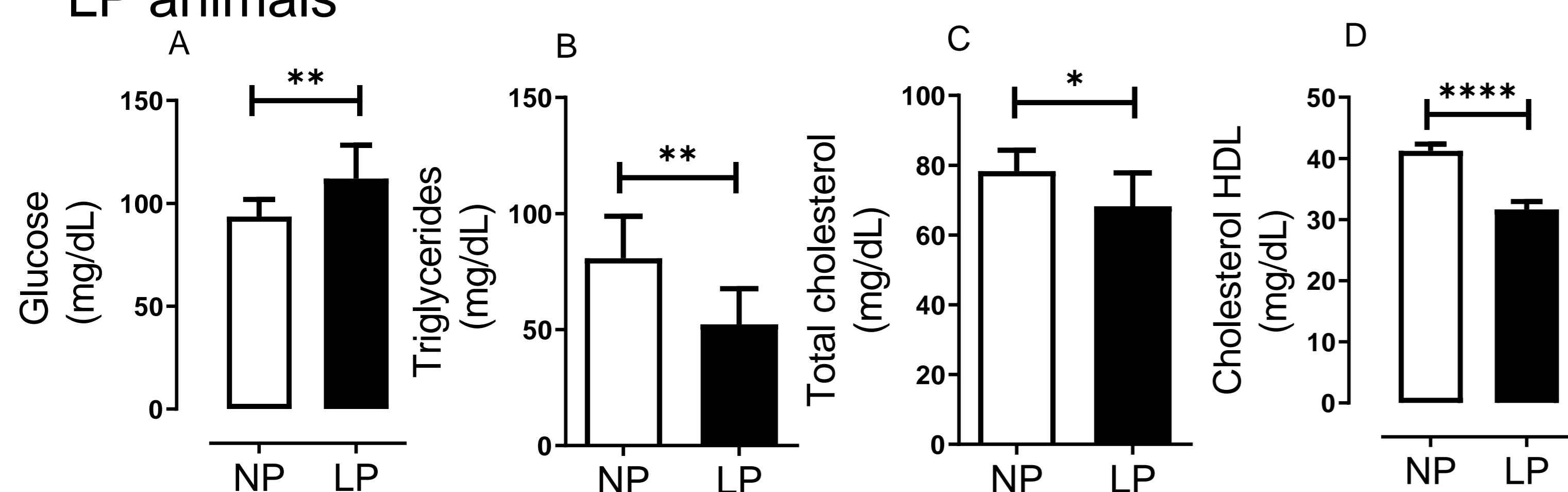


Fig. 1-A: shows the difference in glucose, **B:** Triglycerides, **C:** Total Cholesterol, and **D:** HDL Cholesterol between the NP and LP groups.

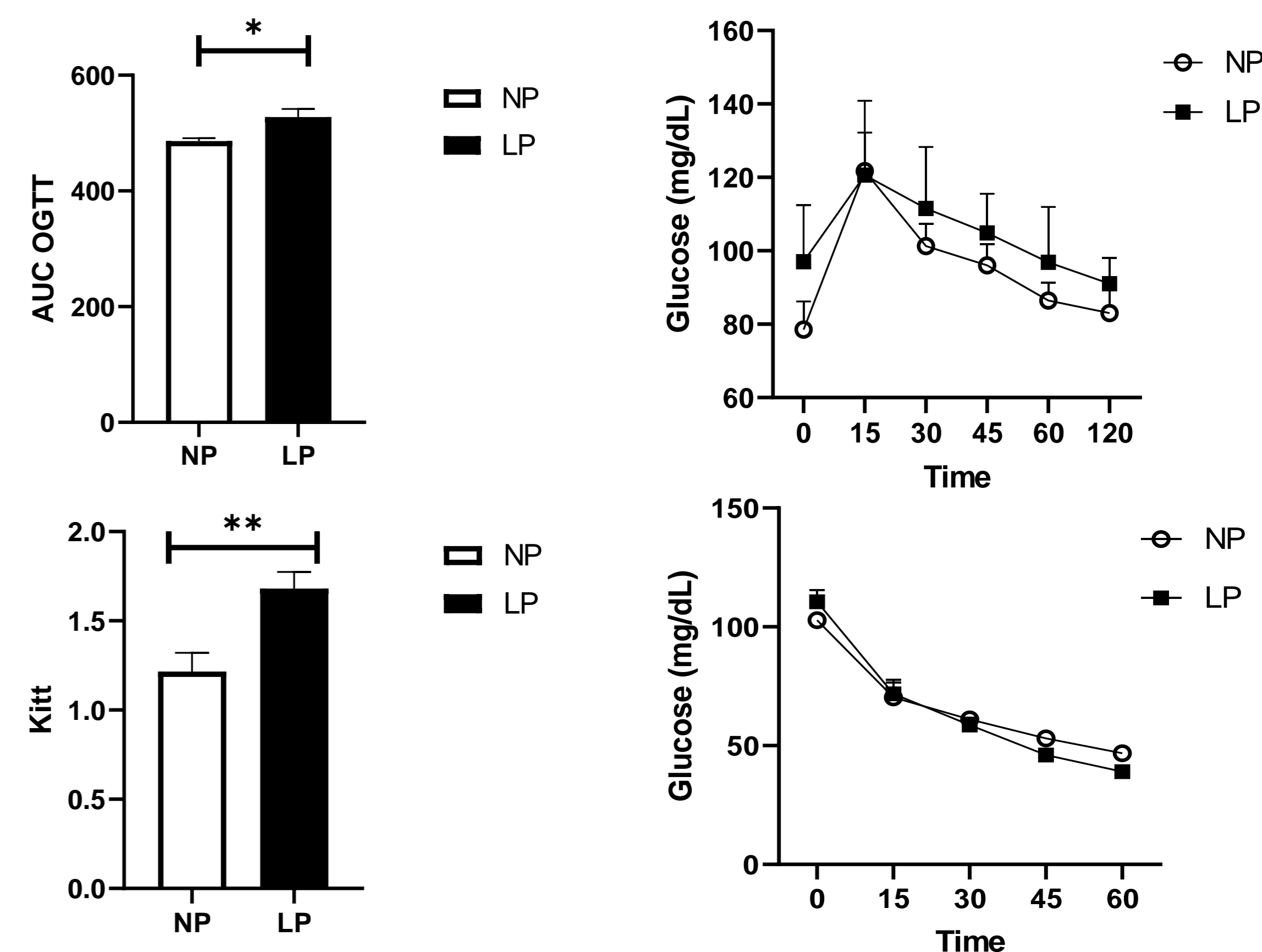


Fig. 2. A: Area Over the Glucose Curve. **B:** Area Over the KITT Curve.

When assessing glucose metabolism, the LP group had a lower glucose tolerance ($P=0.0183$) and a higher insulin tolerance ($P=0.0073$).

The LP group had lower body weight ($P=0.0027$) and naso-anal length ($P=0.0001$), in addition, it showed a reduction in food consumption ($P=0.0512$).

Conclusions

We conclude that protein restriction induces metabolic, biochemical and biometric dysfunctions during adolescence. Thus, these results demonstrate that malnourished animals are at greater risk for the development of metabolic syndrome in adulthood.

Acknowledgment

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References

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