WALNUTS CONSUMPTION MODULATES ENDOGENOUS METABOLIC CONVERSION TOWARDS LONG-CHAIN FATTY ACIDS AND AFFECTS INDIVIDUAL FATTY ACID CONTENT IN PLASMA AND LIVER OF FRUCTOSE-FED RATS

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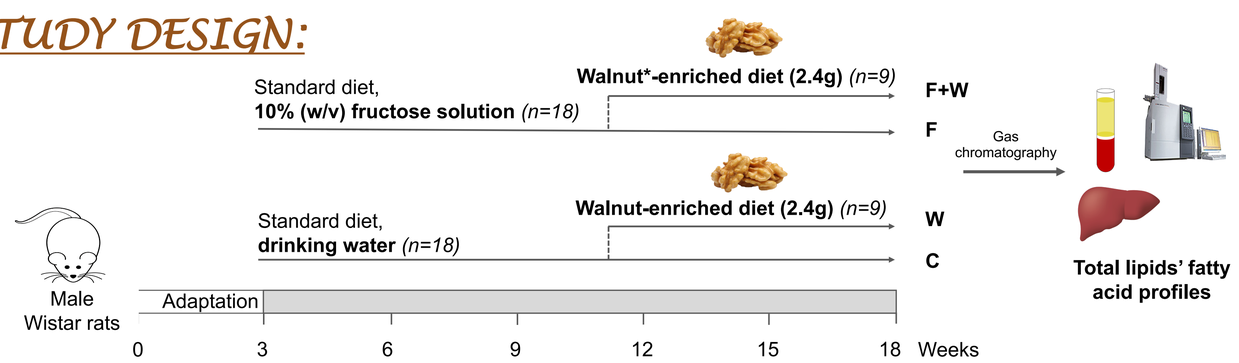
INTRODUCTION:

Disturbed plasma and tissue fatty acid profiles have been linked with metabolic syndrome, a cluster of metabolic abnormalities associated with increased cardiovascular disease risk. Walnuts are rich in dietary fats, and growing evidence suggests various cardiometabolic benefits of their consumption. However, no previous study investigated the metabolic breakdown of fats contained in walnuts following their consumption. **This study aimed to evaluate the impact of 6-week walnut consumption on plasma and liver fatty acid metabolic conversion toward longer-chain products and individual fatty acid composition in rats with a cluster of metabolic disturbances.**

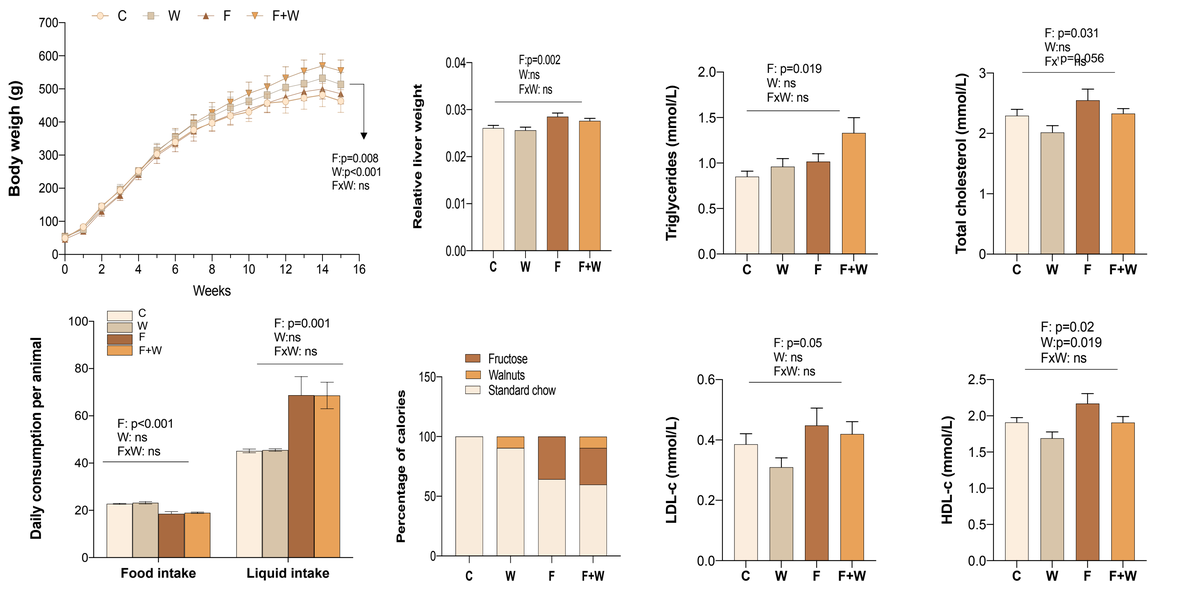
STUDY DESIGN:



*linoleic acid (63.2%), oleic acid (14.5%), α linolenic (11.2%), palmitic acid (7% of total fatty acids in walnuts)

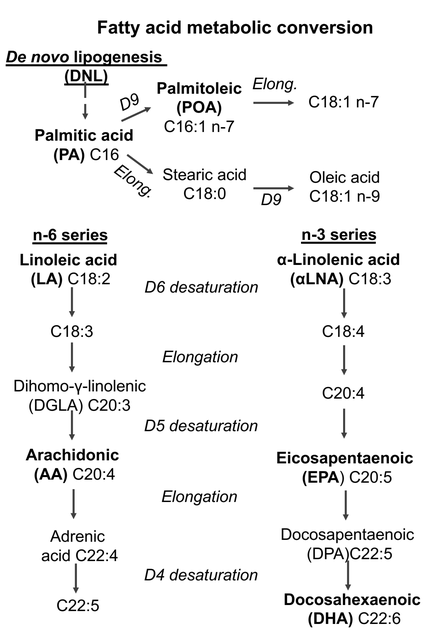
RESULTS:

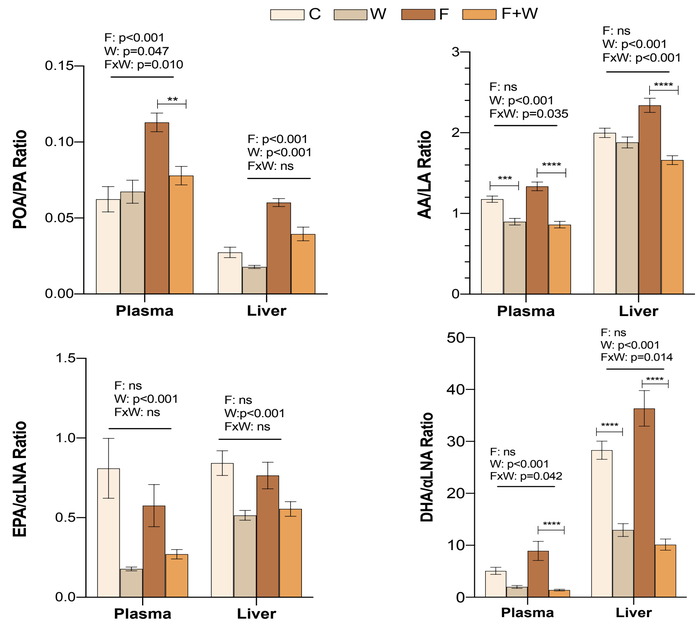
1) Effects of walnut consumption on body weight and blood lipid profiles



Both fructose and walnut consumption significantly increased final body weight, while walnut feeding had no effect on relative liver weight. Fructose increased serum triglycerides, total cholesterol (TC), LDL-c and HDL-c, while walnuts reduced HDL-c and tended to reduce TC, in healthy and animals at metabolic risk.

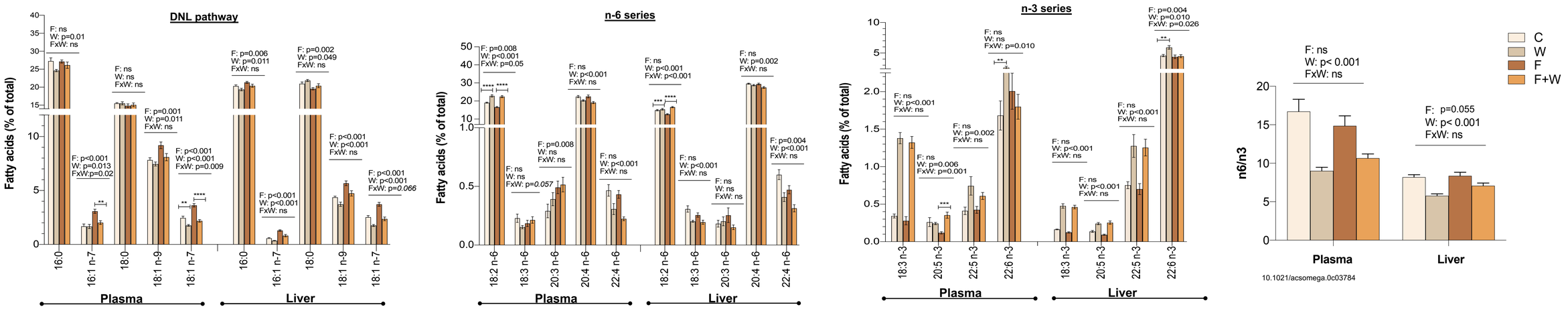
2) Effects of walnuts on metabolic conversion towards long-chain fatty acids





Walnut consumption decreased AA/LA and POA/PA in plasma and liver total lipids. It also significantly affected DHA/αLNA, with up to a 4-fold decrease in the animals at metabolic risk.

3) Effects of walnuts consumption on individual fatty acid profiles and n-6/n-3 ratio



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Walnuts consumption increased LA and EPA levels and decreased PAO in rat plasma, while increasing liver LA and DHA levels. Independently of the fructose-induced metabolic risk, walnuts induced up to a 3-fold increase in αLNA and decreased AA in both tissues. They also reduced PA, OA, and adrenic acid levels and increased DPA content. Finally, the addition of walnut kernels into daily consumption lowered tissue omega-6/omega-3 (n6/n3) ratio in rats upon 6-weeks consumption.

CONCLUSION

In conclusion, the result of this study suggest the beneficial effects of walnuts on endogenic conversion towards long-chain fatty acids, n-6/n-3 ratio and individual fatty acid profiles in rats and highlight the promising potential of walnuts in the prevention and treatment of metabolic syndrome. Further mechanistic studies should explain the background of the observed effects, and nutritional studies in humans should focus on a safe daily amount of walnuts to avoid excessive caloric intake but still pertain to walnuts' health-promoting properties.

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