

Effects of probiotic bacteria on selected parameters of lipid profile and fat tissue in rats on high-fat diet deficient in iron

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Introduction

Gut microbiota plays crucial role in the metabolism of dietary fats. Probiotics are effective in ameliorating the quality of intestinal microbiota. Probiotic bacteria exert favorable effect on lipid profile by decreasing serum levels of triglycerides (TG), total cholesterol (TC) and low-density lipoprotein (LDL) cholesterol. Also, probiotics modify iron (Fe) metabolism in not fully investigated manner. Effect of probiotic supply on lipid profile in conditions of iron deficit remains unclear. High dietary fat intake significantly disturbs both lipid and iron metabolism. Thus, the aim of our study was to investigate the influence of oral probiotic supplementation on selected parameters of lipid metabolism in rats on high-fat diet (HFD) deficient in iron.

Results

There were no differences in LDL, HDL, TG and TC serum levels between the analyzed groups. Fat mass was significantly higher in the HF group compared to the C group.

Table 1. The serum concentrations of biochemical parameters

Group	LDL [mg/dl]	HDL [mg/dl]	TC [mg/dl]	TG [mg/dl]
C	9.38±4.70	75.54±16.33	92.36±22.32	86.72±11.31
HF	6.16±1.30	66.73±11.00	76.38±13.74	101.16±20.73
HFDEF	5.70±1.99	60.98±14.45	69.83±16.00	74.98±9.29
HFDEFLp	7.23±1.63	66.28±9.90	75.84±11.13	79.06±12.89

Data are presented as mean ± SD

Table 2. The body composition analysis

Group	Fat Mass [g]
C	123.5±38.8 ^a
HF	243.6±83.9 ^b
HFDEF	216.0±34.5 ^{ab}
HFDEFLp	226.3±116.4 ^{ab}

Data are presented as mean ± SD. SD: standard deviation.

^{a,b} significantly different ($p < 0.05$). Tukey's test was implemented.

Conclusion

Oral probiotic *L. plantarum* supplementation does not present potential to influence selected parameters of lipid metabolism and fat tissue mass in rats on HFD deficient in Fe.

Methods

This two-stage study was performed on Wistar rats. In the first stage (8 weeks) the rats were divided into three groups and fed either a control diet (group C; n=8), a HFD (group HF; n=8), or a HFD deficient in Fe (group HFDEF; n=16).

In the second stage (8 weeks), the first two groups continued on their original diets, while the third group was divided into two groups and fed HFD deficient in Fe (group HFDEF; n=8) or HFD deficient in Fe with probiotic *Lactobacillus plantarum* oral supply (group HFDEFLp; n=8).

After 8 weeks of the second stage, body composition analysis was performed, the animals were sacrificed, and their blood samples were analyzed. The study design is shown in Fig. 1.

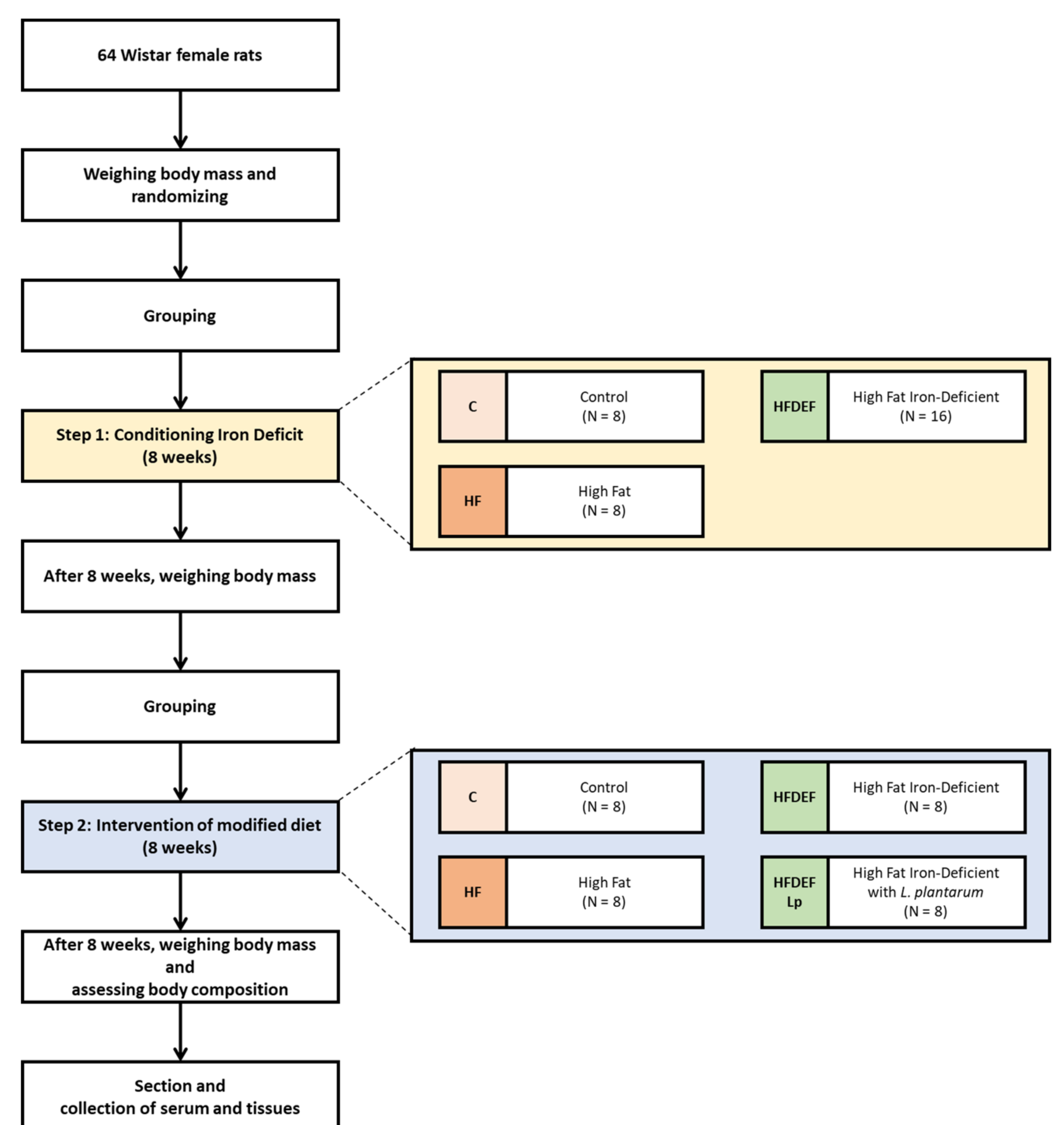


Figure 1. Research design of the intervention study

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