Title: A freshwater fish-based diet alleviates liver steatosis by modulating gut microbiota and metabolites: a clinical randomized controlled trial in Chinese patients with nonalcoholic fatty liver disease

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**Figure S1.** A container for weighing cooking oil and electronic scale (Le Xin electronic kitchen scale KS-1).

**Figure S2.** Home visit and nutrition education.
Figure S3. The flow of participant recruitment and withdrawal.

Figure S4. The metabolic phenotypes in patients with NAFLD. (A) Relative change of hepatic fat content. Boxes show the means ± SD. (B) Serum AST level. Boxes show the means ± SD. (C) Serum TC level. Boxes show the medians (IQRs). (D) Serum LDL-c level. Boxes show the medians (IQRs). (E) Serum FINS level. Boxes show the means ± SD. (F) Serum HOMA-IR level. Boxes show the means ± SD. (G)
Serum CRP level. Boxes show the medians (IQRs). (H) Serum TNF-α level. Boxes show the means ± SD. F group, freshwater fish group; F/M group, freshwater fish/red meat group; AST, aspartate aminotransferase; TC, total cholesterol; LDL-c, low-density lipoprotein cholesterol; FINS, fasting insulin; HOMA-IR, homeostasis model assessment for insulin resistance; CRP, C-reactive protein; TNF-α, tumor necrosis factor-α.

**Figure S5.** The abundances of the gut microbiota that change significantly in patients with NAFLD. (A) the abundances of the gut microbiota at the phylum level. (B) the abundances of Proteobacteria. Boxes show the means ± SD. (C) the abundances of the gut microbiota at the genus level. (D) the abundances of Faecalibacterium. Boxes show the means ± SD. (E-F) the abundances of Prevotella_9 and Escherichia-Shigella. Boxes show the medians (IQRs). (G) the associations between bacterial abundance and metabolic phenotypes. F group, freshwater fish group; F/M group, freshwater fish/red meat group.
Figure S6. The SCFAs related to the gut microbiome. (A-E) Total SCFAs, PA, BA, VA and AA. Boxes show the means ± SD. (F) the associations between bacterial abundance and SCFAs. F group, freshwater fish group; F/M group, freshwater fish/red meat group; SCFAs, short chain fatty acids; PA, propionic acid; BA, butyric acid; VA, valeric acid; AA, acetic acid.

Figure S7. The BAs related to the gut microbiome. (A-C) CDCA, DCA and UDCA. Boxes show the means ± SD. (D-F) TCA, GCA and GCDCA Boxes show the
medians (IQRs). (G) the associations between bacterial abundance and BAs. F group, freshwater fish group; F/M group, freshwater fish/red meat group; BAs, bile acids; CDCA, chenodeoxycholic acid; DCA, deoxycholic acid; UDCA, ursodeoxycholic acid; TCA, taurocholic acid; GCA, glycocholic acid; GCDCG, glycochenodeoxycholic acid.