Abstract

Endoplasmic reticulum (ER) stress was reported to play a major role in non-alcoholic fatty liver disease (NAFLD) induction and progression. Here, we study the effect of *Zingiber officinale* and omega-3 fatty acids on ER stress for treating NAFLD.

Male Wistar rats were fed on a normal diet (control group) or high-fat diet (HFD) for 8 weeks. The HFD rats were later treated with vehicle, omega-3 or with *Z. officinale* extract. HFD group demonstrated significantly more body weight gain and higher plasma lipid profile, glucose, and hepatic enzymes. The expressions of lipogenic ChREBP and ER stress genes CHOP, XBP1, and GRP78 were increased. This was accompanied by intrahepatic fat accumulation visualized by hepatic morphology and H&E-stained sections. Treatment with *Z. officinale* and omega-3 fatty acids reverted these changes into a normal healthy state. From these results, we prove that both therapeutic approaches can be potential drugs for treating NAFLD besides other ER stress-associated diseases.

Practical applications

The effect of *Zingiber officinale* extract and omega-3 fatty acid on ER stress associated with NAFLD was investigated. The results revealed that *Z. officinale* extract and omega-3 fatty acids significantly inhibited ER stress and intrahepatic fat accumulation with the upper hand for *Z. officinale* extract. Both can be used as future promising therapies for the treatment of NAFLD patients and also treating different diseases that involve ER stress as a pathological modulator like diabetes mellitus, Alzheimer's disease, Parkinson's disease, and cancer.

KEYWORDS

ER stress, high-fat diet, NAFLD, omega-3, steatosis, *Zingiber officinale*