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Letters to the editor

Response to: MAFLD treatment: emphasizing the concept of "homology of medicine and food"

Dear Editor:

We sincerely appreciate the opportunity to respond to the letter by Zhang et al. titled "Response to: MAFLD treatment: emphasizing the concept of "homology of medicine and food" [1]. We commend the authors for proposing the integration of traditional Chinese medicine (TCM) concepts, particularly the "homology of medicine and food," into modern therapeutic strategies for metabolic dysfunction-associated fatty liver disease (MAFLD). This perspective aligns closely with the current trend of leveraging natural compounds and dietary interventions to address complex metabolic disorders.

The authors aptly highlight the limitations of current pharmacological treatments, such as bile acid-targeting drugs, that face challenges in clinical approval due to side effects like pruritus and gastrointestinal reactions. Their proposal to explore bioactive components in foods such as *Coptis chinensis* (source of berberine), turmeric (curcumin), and citrus fruits (hesperetin) offers a compelling alternative. These natural substances have demonstrated anti-inflammatory, antioxidant, and lipid-modulating effects in preclinical studies. We agree that future research should prioritize the purification of active ingredients, standardization of dosages, and rigorous safety assessments, particularly for vulnerable populations like children and pregnant individuals.

Our research team has conducted a series of studies on the mechanisms by which the "gut-liver axis" regulates MAFLD/NASH, systematically uncovering the core pathways through which TCM exerts multi-target synergistic effects to ameliorate disease progression. For example, citrus total flavonoids (PTFC) reshape gut microbiota structure (e.g., increasing *Bacteroidaceae* and *Christensenellaceae* abundance), regulate bile acid metabolism (reducing toxic bile acids TDCA/DCA/TCA and activating the FXR/TGR5 pathway), and improve hepatic inflammation and steatosis [2]. Citrus fruits, as classic representatives of the "homology of medicine and food," exemplify how their flavonoid components—ubiquitous in daily diets—naturally integrate "dietary nourishment" and "therapeutic intervention" through multi-target mechanisms, offering safe and sustainable strategies for MAFLD management.

Additionally, the Yiqi Bushen Tiaozhi formula (YBT) enhances gut microbiota diversity (e.g., *Christensenellaceae*), promotes α-linolenic acid metabolism, and alleviates metabolic disorders [3]. Ingredients such as wolfberry and yam in this formula embody the TCM principle of "nourishing with food and regulating with medicine," achieving holistic disease intervention by modulating the metabolic network of the gut-liver axis. Studies on Quzhou *Fructus aurantii* further demonstrate its ability to upregulate ileal reg3g expression, repair the intestinal barrier (enhancing ZO-1/occludin), reduce LPS translocation to the liver via the portal vein, inhibit Kupffer cell M1 polarization and hepatic stellate cell activation, and significantly ameliorate liver fibrosis [4]. As a dual-purpose medicinal and edible resource, *Fructus aurantii* underscores the scientific essence of "homology of medicine and food": functional components in natural foods act through multi-pathway synergies to balance efficacy and safety, making them particularly suitable for long-term management of metabolic diseases.

These findings systematically elucidate the core mechanisms by which TCM regulates the gut-liver axis through "microbiota–bile acid–barrier–immunity" multi–target interactions, offering comprehensive benefits in improving metabolic disorders, intestinal barrier integrity, and hepatic inflammation/fibrosis. They not only provide innovative theoretical foundations for TCM-based MAFLD and non-alcoholic steatohepatitis (NASH) therapies but also interpret the unique value of the "homology of medicine and food" concept in metabolic disease prevention and treatment from a modern scientific perspective.

Looking ahead, we propose exploring the integration of traditional natural medicines with precision medicine approaches, such as using metabolomics or single-cell sequencing to decipher molecular targets of active components. Attention must also be paid to the impact of industrialized agriculture on medicinal food quality (e.g., pesticide residues), advocating for standardized cultivation and ingredient testing systems. For special populations (e.g., children, pregnant individuals), multicenter clinical studies to validate safety and develop personalized interventions will be critical. We eagerly anticipate collaborating with the authors to advance the global recognition and scientific validation of the "homology of medicine and food" concept.

Declaration of interest

None.

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