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UPLC-Q-TOF/MS-based metabolomic studies on the preventive effects of aspirin eugenol ester in atherosclerosis hamsters

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Based on the pro-drug principle, aspirin and eugenol were combined to synthesize aspirin eugenol ester (AEE) by esterification reaction. As a potential drug candidate, AEE can not only reduce the side effects of its precursors but also enhance the therapeutic efficiency. In present study, the effects of AEE were investigated in hamsters with atherosclerosis. Atherosclerosis was established by feeding hamster with high fat diet (HFD) for 12 weeks. 30 male hamsters were randomly divided into control groups (normal diet), atherosclerosis group (HFD) and AEE group (HFD and 27 mg/kg body weight AEE). Blood biochemical parameters and histopathological injures in stomach, liver and aorta were evaluated. To assess the effects of AEE, the metabolic profiling of plasma were investigated using UPLC-Q-TOF/MS-based metabolomic approach coupled with multivariate data analysis. AEE decreased the atherosclerosis index, reduced body weight gain and alleviated hepatic steatosis and pathological changes of aorta. Unexpected, slight damages in stomach mucous of hamsters were found in AEE group. The disordered biochemical profile caused by the HFD was normalized by AEE treatment. Multivariate data analysis revealed that the metabolic profiles of AEE group were grouped away from atherosclerosis group and shifted toward the control group. In atherosclerosis hamsters, 13 potential biomarkers involved in glycerophospholipid metabolism, amino acid metabolism and biosynthesis of unsaturated fatty acids metabolism were regulated by AEE treatment. This study extends the understanding of endogenous alterations of atherosclerosis in hamster and offers insights into the pharmacodynamic activity of AEE in preventing atherosclerosis.

Biography

Xi-Wang Liu got his BSc degree in science (2007) from Northwest A & F University, and his MS degree in sciences (2010) from Northwest A & F University, too. Currently, the main work of his research is on research and development of novel animal drug, including lead compounds design, synthesis and screening, pharmacokinetics, veterinary drug residue determination and pharmacology.

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