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A study of hypolipidemic effect of Piceatannol on serum metabolomics of Hyper cholesterolemic rats by Gas chromatography/Mass spectroscopy and Ultra-performance liquid chromatography-Quadrupole time of flight/mass spectrometry

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Piceatannol, a natural antioxidant and metabolite of resveratrol found in red wine and traditional herbal medicines, has been reported to have the prevention of development and progression of global prevalent cardiovascular diseases (CVDs). We primarily tried to investigate its underlying molecular protective mechanisms in supplement to high cholesterol diets (HCD) (one of the causes of CVDs) by combination of GC/MS and UPLC-QTOF/MS. HCD induced rats were either supplemented with piceatannol or simvastatin for 4 weeks. Serum lipid levels of randomized samples were measured by Keygen's reagent. Serums were deproteinated for UPLC/MS analysis. Circulating free and esterified fatty acids were methylated and transesterified respectively prior to GC/MS analysis. The pooled quality control samples analyzed by UPLC/MS and standard fatty acid methyl esters by GC/MS were clustered together in the score plot of principle components, indicating high repeatability of the instrument. During the development of hypercholesterolemia, piceatannol supplementation significantly decreased the total cholesterol, LDL-C levels and the atherogenic index, similar to simvastatin ($p < 0.05$) but only piceatannol lowered triglyceride level. Combined with multivariate statistics, GC/MS results indicated that piceatannol recovered the circulating esterified fatty acid profiles better than simvastatin. Also, over 20 biomarkers screened from UPLC/MS in positive and negative ionization mode showed that piceatannol interrupted the glycerophospholipid metabolism, and especially bile acid metabolism. Piceatannol might facilitate the cholesterol removal via bile acid biosynthesis. Such recovery of the abnormal metabolic state prevented the progression of atherosclerosis and lowered the risk of CVDs. Our study demonstrated the combination of GC/MS and LC/MS helps support the therapeutic effect of piceatannol to hyperlipidemia at the metabolomics levels.

Biography

Tung-Ting Sham is pursuing PhD in Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University. Her research interest is to examine the effect of Traditional Chinese Medicines (TCM) in hyperlipidemias with modern scientific technology so as to unveil the mechanism and promote global application of TCM.

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