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INVESTIGATION OF THE WORKING MECHANISM AFTER TRANSDERMAL ADMINISTRATION OF A TCM COMPOUND PRESCRIPTION XZT BY A METABOLOMICS-BASED SYSTEMATIC STRATEGY

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Traditional Chinese medicine (TCM) has a long history and rich experiences in treating cirrhotic ascites and nowadays is widely applied in clinical practice as a complementary and alternative approach. XZT, a traditional Chinese herbal cataplasm, has been shown to be effective in treating cirrhosis-associated ascites in clinical practice. XZT composed of Dahuang (*Rheum palmatum L*), Laifuzi (*Raphanus sativus L*), Gansui (*Euphorbia kansui TN Liou ex TP Wang*), Chenxiang (*Aquilaria sinensis (Lour) Gilg*), Dingxiang (*Eugenia caryophyllata Thunb.*), Bingpian (*Borneolum syntheticum*) and Shexiang (*artificial Moschus*). In trying to uncover the working mechanism of such combined system, we used a metabolomics-based systematic strategy to trace the molecular basis as well as the pharmacokinetic behavior of XZT. Our results revealed that the peak plasma concentrations and bio availabilities of the active ingredients were significantly increased in rats with cirrhotic ascites, thus proving the rationality of external XZT therapy. Metabolomics study demonstrated that XZT mediated synergistically abnormalities of amino acid metabolic pathways in cirrhotic rats. Biomarkers identified in the metabolic profiling were validated through targeted quantitative analysis and by the results from serum and urine. We found that regulation of L-arginine/nitric oxide (NO) pathway was the most important mechanism of XZT to improve the gastrointestinal motility of cirrhotic rats. This effect of XZT has been confirmed by the inhibition of inducible NO synthase and neuronal NO synthase activities in the small intestine. This work gave a valuable insight into the mechanism of XZT and provided an effective way to elucidate the mechanisms of combined therapeutic systems.

BIOGRAPHY

Nianping Feng is currently full Professor and the Director of the Department of Pharmaceutical Sciences at Shanghai University of Traditional Chinese Medicine. He received his PhD degree from China Pharmaceutical University in June 1997 and was an Assistant Research Professor at the same university prior to joining the Shanghai University of Traditional Chinese Medicine in Oct. 1998. He worked as a Senior Scientist at Purdue University from Sept. 2012 to Sept. 2013. His research interests include novel drug delivery systems, pharmaceutical nanotechnologies and TCM-based new drug development. He has published more than 100 peer-reviewed articles and book chapters and holds 11 patents.

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