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Opinion Article

Exploring the Mechanism of Chinese Medicines for the Treatment of Gout in Network Pharmacology

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DESCRIPTION

Monosodium Urate (MSU) Sedimentation, which directly affects the disturbance of purine excretory and/or hyperuricemia, causes gout, a crystalline-concerned arthropathy. Globally, affluent nations have a higher prevalence of gout than underdeveloped nations. The disease gradually strikes younger people. Gout is typically treated with colchicine, non-steroidal anti-inflammatory medications, glucocorticoids, uric acid, and allopurinol. However, many of the medications used to treat gout currently have unwanted side effects, such as gastrointestinal reaction, transaminase rise, and anaphylactic reaction. Due to its efficacy and lack of side effects, Traditional Chinese Medicine (TCM) has recently received great attention. Drug pairs are an everyday combination of two Chinese medicines that are frequently seen in TCM clinics and are the foundation of TCM prescriptions. The two most frequently utilized TCM combinations for treating gout are *Dioscoreae hypoglaucae* rhizoma (DH) and *Smilacis glabrae* rhixoma (SG) However, further research is still needed on the molecular processes of DS (DH and SG) in the treatment of gout. By methodically examining the involvement and influence of drugs on biological networks, the study of network pharmacology can shed light on the riddle of how drugs function on the human body. TCM has the advantages of being multi-component and multi-target, which is in line with network pharmacology's study methodology.

A form of hyperuricemia known as gout is brought on by an abnormality in purine metabolism, which results in increased synthesis or decreased excretion of uric acid. When uric acid levels in the blood are excessively high, sodium salts of uric acid are accumulated in joints, soft tissues, cartilages, and kidneys, triggering an inflammatory response in the affected tissues. Traditional Chinese medicine and natural remedies have received increasing attention in recent years for their potential efficacy, safety, and lack of side effects in the treatment of gout. The primary causes and pathogenesis of gout are thought to be damp-heat, phlegm turbidity, blood stasis, and insufficiency of the liver, spleen, and kidney. The fundamental syndromes of gout are damp-heat accumulation, stasis-heat accumulation, phlegm-turbidity block, and liver-kidney Yin deficit. Chinese medicine pairs DH and SG are frequently used to treat gout. In animal kidneys, it has been discovered that a 70% ethanol extract of DH can increase the expression of the genes and proteins for the organic anion transporters OAT1 and OAT2, while decreasing the expression of the genes and proteins for the urate transporter 1. Total saponins of DH can raise uric acid concentration and secretion, creatinine secretion, uric acid excretion fraction, and glomerular filtration uric acid secretion. They can also decrease serum uric acid level in a dose-dependent manner.

In rats with hyperuricemia, the water extract of DH can reduce the gene expression of Monocyte Chemoattractant Protein-1 (MCP-1) and Tumour Necrosis Factor-Alpha (TNF- α), Intercellular Adhesion Molecule-1 (ICAM-1), and Vascular Cell Adhesion Molecule-1 (VCAM-1), as well as enhance the body's ability to fight inflammation. Inhibiting Xanthione Oxidase (XOD) with SG can lower uric acid levels, lessen the oxidative stress brought on by hyperuricemia, minimize inflammation, and safeguard kidney function. Integrated component prediction and DS target pathway analysis technique employing network pharmacology have been used to more accurately determine the pharmacological efficacy of DS. From the viewpoint of the interaction network, the technique mines and extracts the possible synergistic impact of DH and SG. Recent studies discovered similar targets between gout and DS, including NLRP3, STS, EPHB2, PRKAA1, ROS1, SLC22A12, ATP8A2, IRF6, and P2RX7, which may be crucial for DS to treat gout. But further verification is needed for clinical and experimental investigations.

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