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Network pharmacology-based discovery of natural and herbal anti-inflammatory agents co-targeting ischemic brain and heart diseases

Yan Zhu
Tianjin University, China

Although stroke and coronary artery disease (CAD) are different diseases, both preclinical and clinical evidence have suggested their intricate connections, some of which mediated by inflammation and immune response. Recent Canakinumab Anti-inflammatory Thrombosis Outcome Study (CANTOS) trial demonstrated the effects of IL-1β neutralizing antibody in atherosclerosis, providing the first convincing proof that modulating inflammation improves patients' cardiovascular health, and launches the era of immunotherapy in CAD. Herbal medicine has been a rich source for CAD drugs and also has great potential for the discovery of novel anti-inflammatory and immune-modulating agents. We present an integrated strategy using network pharmacology/transcriptome analyses followed by cell-based and in vivo experimental validation to decipher common and differential pharmacological mechanisms of herbal medicine formulae on stoke and CAD treatment. Examples of using this approach to systematically identify multiple active components from Radix Salviae miltiorrhizae, Flos Carthami tinctorii and Ginkgo biloba co-targeting the brain and heart diseases and revealing their unique anti-inflammatory mechanisms, will be discussed.

yanzhu.harvard@icloud.com

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