Specialized proresolving mediators in infection and lung injury

Shayna Sandhaus and Andrew G. Swick

Specialized proresolving mediators (SPMs) are endogenous lipid metabolites of long-chain polyunsaturated fatty acids that are involved in promoting the resolution of inflammation. Many disease conditions characterized by excessive inflammation have impaired or altered SPM biosynthesis, which may lead to chronic, unresolved inflammation. Exogenous administration of SPMs in infectious conditions has been shown to be effective at improving infection clearance and survival in preclinical models. SPMs have also shown tremendous promise in the context of inflammatory lung conditions, such as acute respiratory distress syndrome and chronic obstructive pulmonary disease, mostly in preclinical settings. To date, SPMs have not been studied in the context of the novel Coronavirus, severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2), however their preclinical efficacy in combatting infections and improving acute respiratory distress suggest they may be a valuable resource in the fight against Coronavirus disease-19 (COVID-19). Overall, while the research on SPMs is still evolving, they may offer a novel therapeutic option for inflammatory conditions.

The role of phytochemicals in sepsis: A mechanistic and therapeutic perspective

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Sepsis and septic shock are still a leading cause of mortality and morbidity in intensive care units worldwide. Sepsis is an uncontrolled and excessive response of the innate immune system toward the invading infectious microbes, characterized by the hyper-production of pro-inflammatory mediators such as interleukin (IL)-1β, IL-6, tumor-necrosis factor (TNF)-α, and high-mobility group box 1 (HMGB1). In severe sepsis, the overwhelming production of pro-inflammatory cytokines and reactive oxygen species may compromise organ function and lead to the induction of abnormal apoptosis in different organs, resulting in multiple organ dysfunction syndrome and death. Hence, compounds that are able to attenuate inflammatory responses may have therapeutic potential for sepsis treatment. Understanding the pathophysiology and underlying molecular mechanisms of sepsis may provide useful insights in the discovery and development of new effective therapeutics. Therefore, numerous studies have invested much effort into elucidating the mechanisms involved with the onset and development of sepsis. The present review mainly focuses on the molecules and signaling pathways involved in the pathogenicity of sepsis. Additionally, several well-known natural bioactive herbal compounds and phytochemicals, which have shown protective and therapeutic effects with regard to sepsis, as well as their mechanisms of action, are presented. This review suggests that these phytochemicals are able to attenuate the overwhelming inflammatory responses developed during sepsis by modulating different signaling pathways. Moreover, the anti-inflammatory and cytoprotective activities of phytochemicals make them potent compounds to be included as complementary therapeutic agents in the diets of patients suffering from sepsis in an effort to alleviate sepsis and its life-threatening complications, such as multi-organ failure.

Mangiferin and organ fibrosis: A mini review

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Fibrosis is the end stage of many chronic diseases, which results in organ function failure and high mortality. Mangiferin is a major constituent in mango and other 16 plants, and has been shown a variety of pharmacological effects, such as antioxidant, antibacterial, anti-tumor, anti-inflammation. The emerging evidence has shown that mangiferin can improve renal interstitial fibrosis, pulmonary fibrosis, myocardial fibrosis and hepatic fibrosis through the inhibition of inflammation, oxidative stress and fibrogenesis effects, indicating that mangiferin is promising therapeutic choice for organ fibrosis. The aim of this review is to summarize the therapeutic effects of mangiferin on fibrosis of various organs and the underlying mechanisms.

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