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5'AMP-activated protein kinase: an emerging target of phytochemicals to treat chronic inflammatory diseases

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Abstract

Inflammation is a defensive response of the organism to traumatic, infectious, toxic, ischemic, and autoimmune injury. Inflammatory mediators are released to effectively eliminate the inflammatory trigger and restore homeostasis. However, failure of these processes can lead to chronic inflammatory conditions and diseases such as inflammatory bowel diseases, rheumatoid arthritis, inflammatory lung diseases, atherosclerosis, and neurodegenerative diseases. The cure of chronic inflammatory diseases remains challenging as current therapies have various limitations, such as pronounced side effects, progressive loss of efficacy, and high cost especially for biologics. In this context, phytochemicals (such as alkaloids, flavonoids, lignans, phenolic acids, saponins, terpenoids, and other classes) are considered as an interesting alternative approach. Among the numerous targets of phytochemicals, AMP-activated protein kinase (AMPK) can be considered as an interesting target in the context of inflammation. AMPK regulates inflammatory response by inhibiting inflammatory pathways (NF-κB, JAK/STAT, and MAPK) and regulating several other processes of the inflammatory response (oxidative stress, autophagy, and apoptosis). In this review, we summarize and discuss the studies focusing on phytochemicals that showed beneficial effects by blocking different inflammatory pathways implicating AMPK activation in chronic inflammatory disease models. We also highlight elements to consider when investigating AMPK in the context of phytochemicals. © 2022 Taylor & Francis Group, LLC.

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acute lung injury; AICAR; ARDS; curcuminoids; Dorsomorphin; stilbenoids

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