




Review

Animal Models of Inflammation for Screening of Anti-inflammatory Drugs: Implications for the Discovery and Development of Phytopharmaceuticals

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Received: 9 August 2019; Accepted: 29 August 2019; Published: 5 September 2019



Abstract: Inflammation is one of the common events in the majority of acute as well as chronic debilitating diseases and represent a chief cause of morbidity in today's era of modern lifestyle. If unchecked, inflammation leads to development of rheumatoid arthritis, diabetes, cancer, Alzheimer's disease, and atherosclerosis along with pulmonary, autoimmune and cardiovascular diseases. Inflammation involves a complex network of many mediators, a variety of cells, and execution of multiple pathways. Current therapy for inflammatory diseases is limited to the steroidal and non-steroidal anti-inflammatory agents. The chronic use of these drugs is reported to cause severe adverse effects like gastrointestinal, cardiovascular, and renal abnormalities. There is a massive need to explore new anti-inflammatory agents with selective action and lesser toxicity. Plants and isolated phytoconstituents are promising and interesting sources of new anti-inflammatories. However, drug development from natural sources has been linked with hurdles like the complex nature of extracts, difficulties in isolation of pure phytoconstituents, and the yield of isolated compounds in minute quantities that is insufficient for subsequent lead development. Although various in-vivo and in-vitro models for anti-inflammatory drug development are available, judicious selection of appropriate animal models is a vital step in the early phase of drug development. Systematic evaluation of phytoconstituents can facilitate the identification and development of potential anti-inflammatory leads from natural sources. The present review describes various techniques of anti-inflammatory drug screening with its advantages and limitations, elaboration on biological targets of phytoconstituents in inflammation and biomarkers for the prediction of adverse effects of anti-inflammatory drugs. The systematic approach proposed through present article for anti-inflammatory drug screening can rationalize the identification of novel phytoconstituents at the initial stage of drug screening programs.

Keywords: anti-inflammatory; phytoconstituents; biomarkers; drug discovery; animal models



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Publisher: **MDPI, ST ALBAN-ANLAGE 66, BASEL, SWITZERLAND, CH-4052**

ISSN / eISSN: **1661-6596 / 1422-0067**

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