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Current Evidence on Molecular Mechanisms of Andrographolide in Cancer

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Abstract

Cancer, a diverse group of diseases characterized by abnormal cell growth and the potential to spread throughout the body, accounts for approximately 10 million deaths globally each year. Current cancer therapies, including chemotherapy, radiation, and various pharmacological treatments, present several challenges and potential side effects. It is important to differentiate these conventional methods, which often involve synthetic drugs, from adjuvant therapies that might be used in conjunction. As a result, there is an increasing interest in alternative therapies, particularly in agents derived from natural sources for cancer treatment. Secondary metabolites have shown promise in promoting the development of new clinical drugs with various anti-cancer mechanisms. This review focuses on the anti-cancer potential of the novel metabolite Andrographolide, extracted mainly from Andrographis paniculata. The chemopreventive properties and the ability to inhibit various signaling pathways across different types of cancers without side effects posit Andrographolide as a promising natural antitumour agent. The review identified that Andrographolide inhibits multiple signaling pathways, contributing to its anti-proliferative, anti-metastatic, and apoptotic effects in various cancers. The compound's natural origin and lack of adverse side effects make it particularly attractive as a therapeutic agent. However, further detailed studies are needed to fully understand its specific mechanisms and potential clinical applications. Andrographolide presents a compelling option as a natural anticancer agent with the potential to overcome some limitations of traditional cancer treatments. Its broad spectrum of anti-cancer activities and absence of side effects highlight its therapeutic potential. The review highlights that continued research and clinical studies are important for confirming the effectiveness and safety of Andrographolide in human use, alongside optimizing dosage and delivery techniques.

Keywords: Andrographolide; anticancer; apoptosis; cellular signaling pathway.; migration; molecular mechanisms; proliferation.

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