REVIEW ARTICLE

A REVIEW IN CURCUMINOIDS: CHEMISTRY, ANTICANCER ACTIVITY AND FUTURE PROSPECTS

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ABSTRACT

Curcumin is a biologically active phytochemical which manifests therapeutic activities in numerous health conditions, including cancer. Several curcuminoids obtained naturally and synthesized artificially also showcase anti-cancer and anti-tumorigenic effects. However, its water insolubility poses difficulties in its application to biological systems, lowering its availability in living tissues, which can be overcome by using various micro-encapsulation and nano-formulations of curcumin. When used in combination with other chemotherapeutic drugs, curcumin enhances the anti-carcinogen potential and reduces the side effects induced via chemotherapy. Structural modelling of basic pharmacophores of curcumin can enhance its biological and pharmacokinetic properties, as revealed by structure-activity relationship studies of curcumin. Various clinical trials of curcumin have proven its worth as an anti-neoplastic agent in humans, with minimal side effects. Its mechanism of action involves blockage of cell-signalling pathways and cellular enzymes, promotion of immunomodulatory effects and induction of programmed cell death in cancerous cells. Curcumin is an interesting molecule with diverse effects on various diseases, but its absolute potential has yet to be reached. Hence, more in-depth studies and clinical trials are needed. This review outlines curcumin's chemical properties and summarizes its anti-cancer and pharmacokinetic potential.