

## **Curcumin combination therapy: the implication and efficacy in cancer**

### **ABSTRACT**

Many chemotherapeutic drugs have been used for the treatment of cancer, for instance, doxorubicin, irinotecan, 5-fluorouracil, cisplatin, and paclitaxel. However, the effectiveness of chemotherapy is limited in cancer therapy due to drug resistance, therapeutic selectivity, and undesirable side effects. The combination of therapies with natural compounds is likely to increase the effectiveness of drug treatment as well as reduce the adverse outcomes. Curcumin, a polyphenolic isolated from *Curcuma longa*, belongs to the rhizome of Zingiberaceae plants. Studies from *in vitro* and *in vivo* revealed that curcumin exerts many pharmacological activities with less toxic effects. The biological mechanisms underlying the anticancer activity of co-treatment curcumin and chemotherapy are complex and worth to discuss further. Therefore, this review aimed to address the molecular mechanisms of combined curcumin and chemotherapy in the treatment of cancer. The anticancer activity of combined nanoformulation of curcumin and chemotherapy was also discussed in this study. Taken together, a better understanding of the implication and underlying mechanisms of action of combined curcumin and chemotherapy may provide a useful approach to combat cancer diseases.

**Keyword:** Cancer; Chemotherapy; Curcumin; Inflammation; Nanoparticle; 5-fluorouracil