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Investigating the role of Quercetin in increasing the rate of cisplatin-induced apoptosis via the NF-κB pathway in MG -63 cancer cells

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Introduction: Treatment of patients with osteosarcoma (OS) remains a major clinical challenge, which accounts for the second leading factor of tumor-related mortality in the pediatric age. Numerous studies suggest that the co-treatment of chemotherapeutic agents with flavonoids such as Quercetin (Que) may enhance tumor cells' susceptibility to these agents. Overall, we sought to evaluate the underlying mechanisms governing the phenomenon; wherein Que affects the cisplatin-induced apoptosis in OS cells, focusing on the Nuclear factor-kappa B (NF-κB) pathway.
Methods: The Que, Cisplatin, and their combination's general cytotoxicity effects were evaluated using a 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay for 72 hrs. The protein expression levels of NF-κB were detected by an enzyme -linked immunosorbent assay (ELISA) Kit. Flow cytometry was used to evaluate cell apoptosis.
Results: Que considerably elevated the cytotoxicity of Cisplatin ($P< 0.05$). Que also dramatically down-regulated the expression levels of NF-κB in MG-63 cells compared to mono-treatment ($P< 0.05$). Besides, Que promotes cisplatin-induced apoptosis in MG-63 cells.
Conclusion: Our study's findings provide an exact point in the field of adjuvant therapy in osteosarcoma. In other words, this study could provide new insights into a better understanding of the role of Que in elevating cisplatin-induced apoptosis with NF-κB down-regulation.

Keywords: Osteosarcoma, Cisplatin, Quercetin, Apoptosis, NF-κB.