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# Effects of lycopene on proliferation and death of canine osteosarcoma cells.

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## Abstract

OBJECTIVE: To determine the effects of lycopene with and without concurrent chemotherapeutic treatment on growth and apoptosis of canine osteosarcoma cells.

SAMPLE POPULATION: Cell cultures of 3 established canine osteosarcoma cell lines (D17, OS 2.4, and HMPOS).

PROCEDURES: Growth curve kinetics and cell cytotoxicosis for various treatment combinations were assessed by use of 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assays. Additionally, cell cycle kinetics and colony-forming soft agar assays were performed to determine the influences of lycopene on the cell cycle and anchorage-independent growth. Western immunoblotting of HMPOS cells was performed to examine signaling and apoptotic pathways implicated in lycopene-induced apoptosis.

RESULTS: Lycopene alone caused mild to pronounced attenuation of cell proliferation of all 3 cell lines as well as apoptosis in HMPOS cells but did not interfere with cell death in response to doxorubicin. Soft agar anchorage-independent growth assays revealed complete inhibition of cell proliferation in 2 of 3 osteosarcoma cell lines. Further investigation into the apoptotic response revealed activation of mitochondrial-induced apoptosis primarily through expression of truncated Bid and a decrease in protein kinase B (ie, AKT) phosphorylation.

CONCLUSIONS AND CLINICAL RELEVANCE: Results suggested that lycopene may be beneficial during treatment of osteosarcomas. Lycopene did not negatively or positively affect survival of osteosarcoma cells during doxorubicin treatment and independently induced apoptosis in the HMPOS cell line. These findings warrant further in vitro and in vivo studies into the use of this natural compound as an adjuvant antiproliferative, proapoptotic treatment in dogs with osteosarcoma.

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