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Combination of Albendazole and 2-Methoxyestradiol significantly improves the survival of HCT-116 tumor-bearing nude mice

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Background: Albendazole (ABZ) is a microtubule-targeting anthelmintic with a remarkable activity against a variety of human cancer cells. In the present study, the potential benefit of combining ABZ with four microtubule-targeting drugs as the representative compounds that interact with the established binding sites on tubulin has been examined.

Methods: The interactions between ABZ and paclitaxel, vinblastine, colchicine, and 2-methoxyestradiol were characterized using median effect analysis method in HCT-116 colorectal cancer cells and DU145 prostate cancer cell line. The mechanisms underlying the synergistic interaction related to the polymerization of tubulin and apoptosis were then investigated. Finally, the effect of combination therapy on the survival of HCT-116 tumor-bearing nude mice was evaluated.

Results: Among the tested drugs, a synergistic anti-proliferative effect was observed with the combination of low concentrations of ABZ plus colchicine, and ABZ plus 2-methoxyestradiol (2ME). Exploring the mechanism of the interaction between ABZ and 2ME revealed that the combination therapy activated the extrinsic pathway of apoptosis. Consistent with the *in vitro* results, combination of low concentration of ABZ with 2ME prolonged the survival of mice-bearing HCT-116 tumors.

Conclusions: Combination of low doses of ABZ and 2ME has shown promising results in the current pre-clinical model. This study suggests that such drug combination, which would not normally be considered due to the similar mechanism of action and identical binding sites, may nevertheless provide therapeutic benefit in cancer therapy.

Biography

Anahid Ehteda obtained her Ph.D. degree from the University of New South Wales, Australia in 2012. She is currently appointed as a Research Officer at the Department of Surgery, the University of NSW. The key area of her research is the development of new therapeutic approaches for cancer treatment.

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