Cytotoxic Effect of Calcium Channel Blockers (mebudipine and dibudipine) on B16F10 Melanoma Cell Line

Samira Khani
Qom University of Medical Sciences, Qom, Iran

Abstract

Introduction: Dihydropyridine (DHP) calcium channel blockers have demonstrated potential anticancer properties. However, the cytotoxic effects of the novel 1,4-DHP inhibitors, mebudipine and dibudipine, on melanoma remain unexamined. This study evaluated the cytotoxic effects of mebudipine, dibudipine, and dacarbazine on B16F10 melanoma cells and their selectivity in the HEK293 healthy cell line.

Materials and Methods: This in vitro study evaluated the cytotoxic effects of mebudipine, dibudipine, and dacarbazine on B16F10 melanoma and HEK293 cells. Using the MTT assay, cell viability was assessed at 24 and 48 hours post-treatment to determine the most effective dose. The results were analyzed to compare the cytotoxic potential of these compounds with that of dacarbazine, providing insights into their therapeutic efficacy.

Results: The half-maximal inhibitory concentration (IC50) values for B16F10 cells at 24 hours were 13.51±0.97 µg/ml for mebudipine, 59.13±0.91 µg/ml for dibudipine, and 33.47±0.97 µg/ml for dacarbazine. At 48 hours, the IC50 values were 9.73±0.98 µg/ml, 30.96±0.94 µg/ml, and 9.74±0.97 µg/ml, respectively. In HEK293 cells, the IC50 values at 24 hours were 150.8±0.97 µg/ml for mebudipine, 240.4±0.96 µg/ml for dibudipine, and 135.7±0.97 µg/ml for dacarbazine, decreasing at 48 hours to 90.40±0.98 µg/ml, 206.5±0.97 µg/ml, and 74.66±0.98 µg/ml, respectively.

Conclusion: This study demonstrated that mebudipine and dibudipine exhibit cytotoxic effects on melanoma cells, with mebudipine showing the lowest IC50, indicating superior anti-melanoma activity. Dibudipine had the highest IC50 in healthy cells, suggesting lower toxicity. These findings highlight mebudipine's potential as an anti-melanoma agent, warranting further mechanistic studies to explore its therapeutic applications in cancer treatment.

Keywords

Mebudipine, Dibudipine, Calcium-channel blockers, Melanoma, cytotoxicity.