

Conference Abstracts

In vitro β -catenin attenuation by a mefloquine-loaded core-shell nano emulsion strategy to suppress liver cancer cells

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Background

Liver cancer, with its robust metastatic propensity, imposes a substantial global health burden of around 800,000 new cases annually. Mutations in the Wnt/ β -catenin pathway genes are common in liver cancer, driving over 80% of cases. Targeting this pathway could potentially lead to better treatments.

Methods

The aim of the present study was to develop a novel strategy for targeting the Wnt/ β -catenin pathway while blocking the growth and division of liver cancer cells and downregulating gene expression. This was achieved by formulating a repurposed drug (mefloquine)-loaded garlic nano-emulsion (GNE) with gold nanoparticles (GNPs) as a core-shell nano-emulsion (MQ/GNE-GNP). The biocompatible core-shell nano-emulsion (MQ/GNE-GNP) exhibited a size distribution in the range of 50–100 nm, high stability, excellent hydrophilicity, good biosafety, and sustained release. Human liver cancer cells were exposed to MQ/GNE, GNPs, and MQ/GNE-GNP at varying concentrations, and the

effects were assessed through analysis of the cytotoxicity, reactive oxygen species, cell death, cell cycle analysis, and gene expression studies.

Results

It was found that MQ/GNE-GNP arrested HepG2 cells in the sub G0/G1 phase and induced apoptosis. The anticancer efficacy of the core-shell nano-emulsion (MQ/GNE-GNP) resulted in higher cell death in the AO/PI staining studies, demonstrating its greater anticancer efficacy. The administration of MQ/GNE-GNP downregulated the overall expression of nuclear β -catenin, thereby suppressing the Wnt/ β -catenin pathway. The protein expression level of Wnt 1 was upregulated, while β -catenin expression was significantly decreased. The core-shell nano-emulsion, incorporating a repurposed drug, could disrupt the β -catenin connections in the Wnt/ β -catenin pathway.

Conclusion

In conclusion, MQ/GNE-GNP could be a promising core-shell nanoemulsion for the effective treatment of liver cancer by targeting the Wnt/ β -catenin pathway.