Cytotoxicity of curcumin against $CD44^{\pm}$ prostate cancer cells: Roles of miR-383 and miR-708

Abstract

Background: Cancer stem cells (CSCs) remaining in the tumor tissues after applying treatments may cause recurrence or metastasis of prostate cancer (PC). Curcumin has the promising potential to target CSCs.

Aim: Here, we aim to evaluate the cytotoxic effects of curcumin on the expression of miR-383-5p and miR-708-5p and their target genes in $CD44^{+}$ CSCs and $CD44^{-}$ non-CSCs isolated from the PC3 prostate cancer cell line.

Materials and Methods: We used MTT assay to determine the optimal cytotoxic dose of curcumin on $CD44^{\pm}$ PC cells. Then, we assessed nuclear morphological changes using DAPi staining. qRT-PCR was also used to detect miRNA and gene expression levels after curcumin treatment.

Results: Curcumin significantly enhanced the apoptosis in both $CD44^{-}$ and $CD44^{+}$ PC cells in a dose-dependent manner (*P*-value < 0.05). The cytotoxicity of curcumin against $CD44^{-}$ cells (IC_{50} = 40.30 ± 2.32 μM) was found to be more effective than $CD44^{+}$ cells (IC_{50} = 83.31 ± 2.91 μM). Also, curcumin promoted miR-383-5p and miR-708-5p overexpression while downregulating their target genes LDHA, PRDX3, and RAP1B, LSD1, respectively.

Conclusion: Our findings indicate that curcumin, by promoting the expression of tumor suppressors, miR-383-5p and miR-708-5p, and inhibiting their target genes, induced its cytotoxicity against $CD44^{\pm}$ PC cells. We trust that curcumin could be established as a promising adjuvant therapy to current PC treatment options with more research in the clinical field.

Key words: Prostate Neoplasms; MicroRNAs; hsa-miR-708-5p; hsa-miR-383-5p; Natural Products; Curcumin;