Curcumin induces G0/G1 arrest and apoptosis in hormone independent prostate cancer DU-145 cells by down regulating Notch signaling.

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Abstract

OBJECTIVE: Curcumin as an effective anticancer bioactive extract has been proved to induce apoptosis in many cancer cells. Notch signaling regulates prostate cancer apoptosis, but it is still unknown whether curcumin induces apoptosis in DU-145 cells by regulating Notch pathway. The aim of this study was to investigate the effect of curcumin on regulating Notch signaling and provide basic data for using curcumin in prostate cancer therapy.

METHODS: Notch pathway signal related proteins Notch 1, Jagged-1 and NICD were detected using Western blotting and RT-PCR. The proliferation and apoptosis were determined by MTT method and Elisa kits after curcumin treatment, respectively. Dual-Luciferase Reporter Assay was carried out to confirm that curcumin could target Notching signaling. In order to study whether Notch 1 expression could be downregulated by curcumin, Notch 1 siRNA and Notch 1 plasmid were used in Notch 1 down-regulation and over-expression. The effects of curcumin on cell cycle distribution and apoptosis related proteins expression were analyzed by flow cytometry and western blotting, separately.

RESULTS: We found that Notch 1 signaling was down regulated in Notch 1 siRNA or Notch 1 plasmid transfected 145 cells after curcumin treatment. Curcumin induced G0/G1 arrest in DU-145 cells, and G0/G1 phase related regulatory factors Cyclin D1 and CDK2 expressions were inhibited. Meanwhile, p21 and p27 were up regulated. The apoptosis related protein p53 expression was increased, and apoptosis suppressor Bcl-2 was inhibited in DU-145 after curcumin treatment. Additionally, Caspase-3 and Caspase-9 were activated by curcumin.

CONCLUSION: Curcumin induced apoptosis and G0/G1 arrest in DU-145 cells by down regulating Notch signaling.

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KEYWORDS: Curcumin; DU-145; Notch signaling; Prostate cancer

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