Curcumin analogue diarylpentanoid, 1,5-bis(4-hydroxy-3-methoxyphenyl)-1,4-pentadiene- 3-one (MS13) inhibited proliferation and induced apoptosis on human primary gastric cancer ags cells

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Track: Research
Theme: Treatment

ABSTRACT

Globally, gastric cancer is the fifth most common cancer with the fourth highest mortality rate, underlining the urgent need for novel therapeutic treatments. Curcumin, a bioactive compound extracted from the plant turmeric (Curcuma longa), is known for its wide range of pharmacological effects, including anti-cancer properties. Curcumin has been shown to suppress the growth of gastric cancer both in vitro and in vivo. However, its poor absorption, low bioavailability and rapid metabolism hinder its ability to exert anti-cancer effects in the clinical setting. Our group has synthesized a series of curcumin diarylpentanoid analogues, including 1,5-bis(4-hydroxy- 3-methoxyphenyl)-1,4-pentadiene-3-one or MS13. In this study, we investigated the cytotoxic and apoptotic effects of MS13 on human primary gastric cancer AGS cells using the MTT assay and Annexin V/propidium iodide apoptosis assay, respectively. Our result showed that MS13 exhibited greater potency in 24-h cytotoxicity effect, with a half-maximal inhibitory concentration (IC50) of 7 µM, compared to curcumin (16 µM). Apoptotic analysis showed that both curcumin- and MS13-treated cells, at their respective IC50 values, primarily induced apoptosis as the main mode of cell death. The percentage of apoptotic cells following MS13 treatment was significantly higher compared to curcumin, suggesting MS13 is more potent than curcumin. Additionally, MS13 induced significant morphological alterations, with greater apoptotic changes observed after 24 hours of treatment. In conclusion, MS13 inhibits AGS cell viability mainly via apoptosis induction and is more potent than curcumin. Further studies are required to explore the underlying molecular mechanisms of MS13-induced cytotoxicity and apoptosis.

Keywords: Curcumin, curcumin analogue, gastric cancer