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Radiation enhancer effect of Curcumin derivatives

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Curcumin, a natural spice, was found to possess chemopreventive and anti-carcinogenic effect. It directly interferes the binding between transcription factor and target site and inhibits the expression of many closely related genes of cellular proliferation, differentiation, and tumorigenesis. To elucidate the anticancer effect of curcumin, we synthesized curcumin analogs and performed cytotoxicity assay and colony forming assay. Curcumin has two side groups on each of the two aromatic rings, and they are hydroxyl group and methoxy group. The synthetic analogs that did not have hydroxyl group in our previous study did not show strong cytotoxic effect on cancer cell lines. This indicated that the cytotoxic effect of curcumin is strongly dependent on the presence of the hydroxyl group of curcumin. For the colony forming assay, the cells were treated with the analogs and γ-irradiation. Among those analogs, we have observed that γ-irradiation cytotoxicity was enhanced by some analogs only when they have the hydroxyl group. The methoxy group of curcumin was shown to be not essential for the cytotoxicity. Without both hydroxy and methoxy group, the analog were inactive. The dimethoxy substitution analog of hydroxyl group has no inhibition ability. Exchange of the position of hydroxyl and methoxy group produced higher activity molecule.