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[6]-Gingerol inhibits metastasis of MDA-MB-231 human breast cancer cells.

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Abstract

Gingerol (Zingiber officinale Roscoe, Zingiberaceae) is one of the most frequently and heavily consumed dietary condiments throughout the world. The oleoresin from rhizomes of ginger contains [6]-gingerol (1-[4'-hydroxy-3'-methoxyphenyl]-5-hydroxy-3-decanone) and its homologs which are pungent ingredients that have been found to possess many interesting pharmacological and physiological activities, such as anti-inflammatory, antihepatotoxic and cardiogenic effects. However, the effects of [6]-gingerol on metastatic processes in breast cancer cells are not currently well known. Therefore, in this study, we examined the effects of [6]-gingerol on adhesion, invasion, motility, activity and the amount of MMP-2 or -9 in the MDA-MB-231 human breast cancer cell line. We cultured MDA-MB-231 cells in the presence of various concentrations of [6]-gingerol (0, 2.5, 5 and 10 microM). [6]-Gingerol had no effect on cell adhesion up to 5 microM, but resulted in a 16% reduction at 10 microM. Treatment of MDA-MB-231 cells with increasing concentrations of [6]-gingerol led to a concentration-dependent decrease in cell migration and motility. The activities of MMP-2 or MMP-9 in MDA-MB-231 cells were decreased by treatment with [6]-gingerol and occurred in a dose-dependent manner. The amount of MMP-2 protein was decreased in a dose-dependent manner, although there was no change in the MMP-9 protein levels following treatment with [6]-gingerol. MMP-2 and MMP-9 mRNA expression were decreased by [6]-gingerol treatment. In conclusion, we have shown that [6]-gingerol inhibits cell adhesion, invasion, motility and activities of MMP-2 and MMP-9 in MDA-MB-231 human breast cancer cell lines.

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