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DADS 下调肌动蛋白解聚因子抑制人结肠癌SW480细胞迁移与侵袭

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Downregulation of Actin Depolymerizing Factor Expression Inhibits Migration and Invasion of Human Colon Cancer SW480 Cells

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摘要 研究二烯丙基二硫 (diallyl disulfide, DADS) 对人结肠癌SW480细胞肌动蛋白解聚因子 (actin depolymerizing factor, ADF) 表达及肿瘤细胞增殖、迁移与侵袭能力的影响。方法: MTT、划痕愈合和侵袭实验分别检测DADS对SW480细胞增殖、迁移与侵袭的影响; RT-PCR、Western blot检测DADS对SW480细胞destrin与cofilin1表达的作用。结果: MTT分析显示, 不同浓度DADS处理SW480细胞24、48、72、96 h后, 可呈时间-剂量依赖性抑制SW480细胞增殖 ($P < 0.05$)。划痕愈合实验显示, 20、30、40、50 mg/L DADS处理48h后, 细胞迁移率分别为55.51%、34.72%、23.23%、12.87%, 较对照组75.86%与DMSO组72.58%明显降低 ($P < 0.05$), 表明DADS呈浓度依赖性抑制SW480细胞迁移。Transwell侵袭显示, 20、30、40、50 mg/L DADS作用24 h后, 穿膜细胞数呈剂量依赖性分别减少34.67%、50.54%、57.12%、64.59% ($P < 0.05$)。45mg/L DADS处理SW480细胞24、48 h后, destrin mRNA下调24.7%、60.1%, 蛋白下调30.1%、58.9% ($P < 0.05$), 而处理前后cofilin1 mRNA与蛋白表达无显著性差异 ($P > 0.05$)。但SW480细胞处理1、15、30、60 min后, p-cofilin1表达呈时间依赖性分别下调18.9%、53.8%、62.1%、78.2% ($P < 0.05$)。结论: DADS抑制人结肠癌SW480细胞迁移与侵袭可能与下调destrin和p-cofilin1有关。

关键词: 二烯丙基二硫 结肠癌SW480细胞 肌动蛋白解聚因子 迁移 侵袭

Abstract: The study aims to investigate the effects of the expression and proliferation of the actin depolymerizing factor (ADF) on the migration and invasion of human colon cancer SW480 cells using diallyl disulfide (DADS). Methods: The proliferation, migration, and invasion potentials of ADF were examined using MTT, scratch healing, and transwell membrane assays. The expression levels of destrin and cofilin 1 were detected using the reverse transcription-polymerase chain reaction (RT-PCR) and Western blot analysis of SW480 cells, respectively. Results: The MTT assay results showed that the proliferation of SW480 cells treated with different concentrations of DADS for 24, 48, 72, and 96 h was significantly inhibited ($P < 0.05$). This result indicated that DADS could suppress the proliferation of SW480 cells in a time- and dose-dependent manner. The scratch healing assay obtained cell migration rates of 55.51%, 34.72%, 23.23%, and 12.87% for SW480 cells treated with 30, 40, 50, and 60 mg · L⁻¹ of DADS, respectively, for 48 h. These values are significantly lower than the migration rates of the untreated cells (75.86%) and the SW480 cells treated with 20 mg · L⁻¹ of DADS (72.58%) ($P < 0.05$). These results showed that DADS could inhibit the migration of SW480 cells in a dose-dependent manner. Moreover, the transwell invasion assay results showed that the number of cells permeating through the Matrigel significantly decreased to 34.67%, 50.54%, 57.12%, and 64.59% when the SW480 cells were treated with 20, 30, 40, 50, and 60 mg · L⁻¹ of DADS for 24 h ($P < 0.05$), respectively. These results demonstrated that DADS can repress the invasion of SW480 cells in a dose-dependent manner. The RT-PCR and Western blot analysis results showed that the expression of destrin mRNA and protein was downregulated to 24.7% and 60.1% and 30.1% and 58.9% ($P < 0.05$), respectively. The expression of cofilin 1 mRNA and protein was not statistically different from those in the SW480 cells treated with 45 mg · L⁻¹ of DADS ($P > 0.05$). However, the expression of p-cofilin 1 notably decreased to 18.9%, 53.8%, 62.1%, and 78.2% after 1, 15, 30, and 60 min, respectively ($P < 0.05$). Conclusion: DADS inhibited the proliferation, migration, and

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