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Amygdalin blocks the in vitro adhesion and invasion of renal cell carcinoma cells by an integrin-dependent mechanism

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Abstract

Information about the natural compound amygdalin, which is employed as an antitumor agent, is sparse and thus its efficacy remains controversial. In this study, to determine whether amygdalin exerts antitumor effects on renal cell carcinoma (RCC) cells, its impact on RCC metastatic activity was investigated. The RCC cell lines, Caki-1, KTC-26 and A498, were exposed to amygdalin from apricot kernels, and adhesion to human vascular endothelium, immobilized collagen or fibronectin was investigated. The influence of amygdalin on chemotactic and invasive activity was also determined, as was the influence of amygdalin on surface and total cellular α and β integrin expression, which are involved in metastasis. We noted that amygdalin caused significant reductions in chemotactic activity, invasion and adhesion to endothelium, collagen and fibronectin. Using FACScan analysis, we noted that amygdalin also induced reductions, particularly in integrins $\alpha 5$ and $\alpha 6$, in all three cell lines. Functional blocking of $\alpha 5$ resulted in significantly diminished adhesion of KTC-26 and A498 to collagen and also in decreased chemotactic behavior in all three cell lines. Blocking $\alpha 6$ integrin significantly reduced chemotactic activity in all three cell lines. Thus, we suggest that exposing RCC cells to amygdalin inhibits metastatic spread and is associated with downregulation of $\alpha 5$ and $\alpha 6$ integrins. Therefore, we posit that amygdalin exerts antitumor activity in vitro, and this may be linked to integrin regulation.

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