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Amygdalin influences bladder cancer cell adhesion and invasion in vitro

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Abstract

The cyanogenic diglucoside amygdalin, derived from Rosaceae kernels, is employed by many patients as an alternative anti-cancer treatment. However, whether amygdalin indeed acts as an anti-tumor agent is not clear. Metastasis blocking properties of amygdalin on bladder cancer cell lines was, therefore, investigated. Amygdalin (10 mg/ml) was applied to UMUC-3, TCCSUP or RT112 bladder cancer cells for 24 h or for 2 weeks. Tumor cell adhesion to vascular endothelium or to immobilized collagen as well as tumor cell migration was examined. Effects of drug treatment on integrin α and β subtypes, on integrin-linked kinase (ILK) and total and activated focal adhesion kinase (FAK) were also determined. Integrin knock-down was carried out to evaluate integrin influence on migration and adhesion. A 24 h or 2 week amygdalin application distinctly reduced tumor cell adhesion and migration of UMUC-3 and RT112 cells. TCCSUP adhesion was also reduced, but migration was elevated under amygdalin. Integrin subtype expression was significantly and specifically altered by amygdalin depending on the cell line. ILK was moderately, and activated FAK strongly, lost in all tumor cell lines in the presence of amygdalin. Knock down of β1 integrin caused a significant decrease in both adhesion and migration of UMUC-3 cells, but a significant increase in TCCSUP adhesion. Knock down of β4 integrin caused a significant decrease in migration of RT112 cells. Since the different actions of amygdalin on the different cell lines was mirrored by β1 or β4 knock down, it is postulated that amygdalin influences adhesion and migratory properties of bladder cancer cells by modulating β1 or β4 integrin expression. The amygdalin induced increase in TCCSUP migratory behavior indicates that any anti-tumor benefits from amygdalin (seen with the other two cell lines) may depend upon the cancer cell type.

Figures

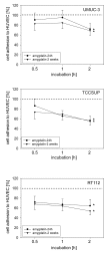

Figure 1. Adhesion of UMUC-3, TCCSUP and...

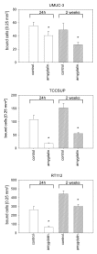

Figure 2. Adhesion of UMUC-3, TCCSUP and...

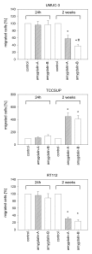

Figure 3. Effect of amygdalin on bladder...

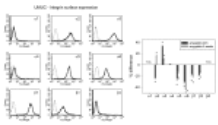

Figure 4. FACS analysis of integrin α...

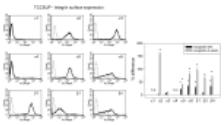

Figure 5. FACS analysis of integrin α...

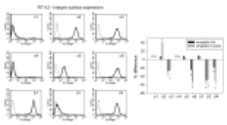

Figure 6. FACS analysis of integrin α...

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