PURPOSE: The influence of X-ray and (12)C heavy ion irradiation on tumor cell migration and of beta(3) and beta(1) integrin expression was investigated. MATERIAL AND METHODS: Two different tumor cell lines (U87 glioma and HCT116 colon carcinoma cells) were irradiated with 1, 3, or 10 Gy X-rays or (12)C heavy ions. 24 h after irradiation a standardized Boyden Chamber assay for migration analysis was performed and cells were lysed for Western blotting. RESULTS: Radiation-induced influences were cell line- and radiation type-dependent. X-rays decreased HCT116 migration at higher doses and appeared to increase U87 migration after 3 Gy. Heavy ions decreased migration of both cell lines dose-dependently. A trend of increased beta(3) and beta(1) integrin expression in U87 cells after both radiation types was observed. beta(1) integrin expression in HCT116 cells was increased after X-rays but decreased after heavy ion irradiation. CONCLUSIONS: Results suggest that irradiation of tumor cells can modulate their migratory behavior. An increased migration, as shown with U87, leaves a higher probability of metastatic induction after irradiation of solid tumors in vivo, whereas an invariably reduced tumor cell migration, as shown after heavy ion treatment, could diminish the hazard of radiation-induced metastasis. As integrin expression and migration were only partially correlated, other migration-related surface molecules...
may be more relevant for radiation effects on tumor cell motility.