Overexpression of galectin-1 at the tumor invasion front is associated with poor prognosis in early-stage oral squamous cell carcinoma

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Abstract

Metastasis is a final and eventually fatal step in the progression of oral squamous cell carcinoma (OSCC) and typically accompanies a large primary tumor. Metastasis may also present from a small primary tumor and progress rapidly; therefore, early diagnosis is important for patients with small primary tumors. Galectin-1 is one significantly upregulated tumor-associated protein in many neoplasms. To determine the clinical significance of galectin-1, we analyzed its expression in clinical samples by immunohistochemistry and reverse transcription-quantitative polymerase chain reaction assay. Galectin-1 protein was significantly overexpressed in the tumor-associated stroma as well as the invasion front during early oral carcinogenesis ($P<0.05$). During the metastatic stage, the only significant immunoreactivity was at the tumor invasion front ($P<0.05$). Although galectin-1 mRNA was not significantly upregulated in the whole cancerous tissue, it was upregulated in stromal parts during early-stage OSCC and in epithelial parts at the metastatic stage. Survival analysis and a Cox's proportional hazards model showed that synchronous upregulation of galectin-1 protein and mRNA was correlated with worse disease-free survival in early-stage OSCC ($P=0.024$ and $P=0.047$, respectively). Our findings suggest that galectin-1 upregulation at the tumor invasion front might be a predictor of early metastasis in oral carcinogenesis.