RSU1 Gene Promotes Lung Adenocarcinoma Metastasis via the EMT Mechanism

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Abstract

Background: Lung adenocarcinoma, a prevalent malignant tumor, is governed by intricate molecular mechanisms during its metastatic progression. The Ras Suppressor-1 (RSU1) gene, a pivotal regulator associated with cell adhesion and signaling pathways, possibly plays a crucial role in the pathogenesis of lung adenocarcinoma. *Objective*: This study aims to elucidate the impact of RSU1 gene knockdown on lung adenocarcinoma metastasis, specifically focusing on its modulation of the Epithelial-Mesenchymal Transition (EMT) mechanism. *Methods*: Utilizing RNA interference lentiviral vectors targeted against RSU1 (shRSU1) along with corresponding control vectors (shCtrl), A549 and H1299 cells were transduced. Assessment techniques included fluorescent microscopy for cell infection monitoring, PCR analysis for RSU1 gene expression and knockdown efficiency quantification, CCK-8 assay for cell proliferation evaluation, flow cytometry for apoptosis detection, and Transwell assays to evaluate cell invasion capacity. *Results*: Successful generation of shRSU1 lentiviral vectors and infection of A549 and H1299 cells was achieved. RSU1 knockdown resulted in a substantial reduction in RSU1 mRNA levels, with knockdown efficiencies of 84% and 65% ($P < 0.05$) in A549 and H1299 cells, respectively. RSU1 knockdown led to attenuated cell proliferation, enhanced apoptosis, and a notable decline in cell migratory and invasive capabilities. Correlation analysis demonstrated a significant relationship with a correlation coefficient of 0.50 ($P < 0.001$) between RSU1 and N-cadherin, and a negative correlation coefficient of -0.55 ($P < 0.001$) between RSU1 and E-cadherin. *Conclusion*: Depletion of RSU1 gene expression effectively inhibited the metastatic potential of lung adenocarcinoma cells, potentially exerting its effects through modulation of the EMT mechanism. These results provide valuable insights for further investigations into the involvement of RSU1 in lung adenocarcinoma metastasis.

Keywords

Ras Suppressor-1, Lung Adenocarcinoma, EMT, Gene Knockdown