Genetics and Molecular Research

Hypoxia facilitates epithelial-mesenchymal transition-mediated rectal cancer progress

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Genet. Mol. Res. 15 (4): gmr15048936
Received July 1, 2016
Accepted September 1, 2016
Published December 2, 2016
DOI http://dx.doi.org/10.4238/gmr15048936

ABSTRACT. Rectal cancer is a commonly observed tumor in clinics, and epithelial-mesenchymal transition (EMT) is very important for tumor invasion and metastasis. We established a rectal cancer HCT-116 cell hypoxia model and detected cell proliferation, invasion, and EMT-related protein expression in this model, aiming to analyze the effect of hypoxia on rectal cancer cell EMT. Rectal cancer cell line HCT-116 was cultured in normoxic, hypoxic, or anaerobic environment, and hypoxia-inducible factor-1α (HIF-1α) mRNA expression was detected in the cells by real-time PCR. Cell proliferation was tested by MTT assay; cell invasion was determined by transwell assay, and HIF-1α, epithelial-cadherin, and Snail protein levels were evaluated by western blot analysis. HIF-1α mRNA level significantly increased in the anaerobic group compared to that in the normoxic and hypoxic groups ($P < 0.05$). HCT-116 cell proliferation in the anaerobic group was obviously higher than that in the other two groups, with the hypoxic group showing stronger proliferative ability than the normoxic group ($P < 0.05$). Compared to the normoxic group, the HCT-116 cells demonstrated

enhanced cell invasion and migration in hypoxic and anaerobic groups. HIF-1α and Snail expressions were upregulated, whereas epithelial-cadherin expression had declined in the hypoxic and anaerobic groups, compared to those in the normal control ($P < 0.05$). Therefore, hypoxia promoted rectal cancer cell progress by increasing HIF-1α to induce EMT.

Key words: Hypoxia; HCT-116; HIF-1α; E-cadherin; Snail