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Snail-induced epithelial-mesenchymal transition in gastric carcinoma cells and generation of cancer stem cell characteristics

Y.J. Yang, Z.B. Li, G.R. Zhang, L.J. Wu, J.Y. Yu, L.J. Hu, Y.L. Zhou, H.D. Wang and D. Liang

Hainan Province Nongken Sanya Hospital, Sanya, China

Corresponding author: D. Liang
E-mail: liangdongnsh@126.com / liangdong-1224@163.com

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ABSTRACT. Biological changes in Snail-overexpressed SGC7901 cells were studied by establishing a pEGFP-C1-Snail carrier. The significance of Snail in epithelial-mesenchymal transition (EMT) as well as the invasion and metastatic capacity of gastric cancer cells was also discussed; moreover, we attempted to verify the probable cancer stem cell characteristics of Snail-overexpressed cells. A pEGFP-C1-Snail eukaryotic expression plasmid was constructed and pEGFP-C1(-) and pEGFP-C1-Snail plasmids were extracted and transfected into SGC7901 cells using Lipofectamine 2000. Stably expressed SGC7901-N [control group containing pEGFP-C1(-)] and SGC7901-S (test group containing pEGFP-C1-Snail) cells were screened using a G418 resistance medium. Snail, E-cadherin, β-catenin, vimentin, and fibronectin gene and protein expressions were detected by real-time quantitative PCR, western blot, and immunofluorescence. Cell invasion and metastasis were tested by scratch test, invasion assay, and an

adhesion experiment. The positive rate of aldehyde dehydrogenase-1 (ALDH-1) expression was analyzed by flow cytometry. The results indicated the occurrence of EMT, accompanied by morphological changes in the cells and a weakening of the cell adhesion capacity. We also observed a decrease in the expression of epithelial markers E-cadherin and β-catenin and an increase in mesenchymal (Snail and vimentin) marker expression. Moreover, the cells showed increased invasiveness and metastatic capacity, and decreased proliferative ability. Moreover, the Snail-treated SGC7901 cells moved towards the scratch and produced fewer clones compared to the control cells. Owing to its capacity for self-renewal, SGC7901-S cells produced new clones and expressed ALDH-1. Therefore, we concluded that *Snail* overexpression induced EMT and endowed cells with tumor stem cell characteristics.

Key words: Epithelial-mesenchymal transition; Gastric carcinoma; Cancer stem cell; Snail