

# Targeted inhibition of mammalian target of rapamycin (mTOR) signaling pathway inhibits proliferation and induces apoptosis of laryngeal carcinoma cells *in vitro*

Rongrui Li<sup>1,2</sup>, Riguang Wang<sup>2</sup>, Raosheng Zhai<sup>2</sup>, and Zhen Dong<sup>1</sup>

<sup>1</sup>Department of Otorhinolaryngology & Head and Neck Surgery, China-Japan Union Hospital of Jilin University, Changchun; <sup>2</sup>Department of Orthopedic Surgery, the First Affiliated Hospital of JiaMuSi University, Heilongjiang, China

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## ABSTRACT

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**Aim and objective.** Laryngeal carcinoma is one of the most aggressive cancers of the head and neck region. The survival rate of patients with laryngeal carcinoma is low due to its late metastases and resistance to chemotherapy and radiotherapy. It was reported that mTOR was involved in the growth and apoptosis of various cancer cells. The aim of this study was to detect the effects of mTOR inhibition by mTOR shRNA on the proliferation, apoptosis and invasive ability of Hep-2 human laryngeal carcinoma cells *in vitro*.

**Methods and study design.** mTOR shRNA was designed and transfected into Hep-2 human laryngeal carcinoma cells. Untreated cells and cells treated with control vector (non-targeted shRNA) were used as control. The proliferation and apoptosis of Hep-2 cells were detected by MTT and flow cytometry. A transwell assay was used to measure the invasive ability of Hep-2. The inhibition effects on the mTOR signaling pathway by mTOR shRNA were studied using RT-PCR and Western blot.

**Results.** Our results showed that the mRNA and protein expression of mTOR and Akt were high in laryngeal carcinoma cells and could be inhibited by mTOR shRNA. At the same time, low expression of PTEN mRNA and protein was observed in Hep-2 cells. The expression increased when the cells were transfected with mTOR shRNA. This showed that mTOR shRNA could inhibit the proliferation and invasive ability of Hep-2 cells. It also could induce the apoptosis of Hep-2 cells *in vitro*.

**Conclusions.** The mTOR signaling pathway plays an important role in the development of laryngeal carcinoma. The mTOR shRNA we designed in this experiment effectively inhibited the mTOR signaling pathway. It inhibited the proliferation and invasive ability of the studied laryngeal carcinoma cells and induced their apoptosis *in vitro*. mTOR might therefore be a useful target in the therapy of laryngeal carcinoma.

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**Key words:** mTOR, apoptosis, laryngeal carcinoma.

Correspondence to: Prof Zhen Dong, Department of Otorhinolaryngology & Head and Neck Surgery, China-Japan Union Hospital of Jilin University, Changchun 130033, P.R. China. e-mail dongzhen91@126.com

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