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[Research on the knockout of LMNA gene by CRISPR/Cas9 system in human cell lines].

[Article in Chinese]

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Abstract

The LMNA gene encodes the nuclear Lamin A and Lamin C proteins, and is related to nuclear membrane organization, genome stability and cell differentiation. Abnormal expression of LMNA is ubiquitous in human tumors, and its mutation leads to various forms of laminopathies, including Emery-Dreifuss muscular dystrophy (EDMD), dilated cardiomyopathy (DCM), and Hutchinson-Gliford progeria syndrome (HGPS). To further determine the functions of the LMNA gene in cellular physiology, the present study used the CRISPR/Cas9 technique to edit the LMNA gene of 293T and HepG2 cells in vitro, which resulted in two stable LMNA gene knockout (LMNA KO) cell lines. Compared to the respective wild type cells, the LMNA KO cell lines showed decrease in proliferation ability, increase in apoptosis, alteration in cellular morphology and uneven structures in the nucleus membrane. In this study, we report for the first time the results on the construction of LMNA KO immortalized cell lines and characterization of their morphological changes, thereby laying the foundation for the further studies of the LMNA gene functions and pathogenic mutations.

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