Role of telomerase expression in interstitial lung diseases

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Abstract

Background: Telomeres are hexameric nucleotide sequences. The biological role of telomeres is to prevent shortening of DNA to preserve integrity of the genome. Length of telomeres is determined by age, sex, and environmental exposures. Telomeres are vulnerable to injury by oxidative stress. Telomere length is sustained by telomerase, a ribonucleoprotein telomerase reverse transcriptase (TERT). Telomerase may help cell growth and secure against cell death. 'Telomeropathy' is associated with genetic mutations. The most common phenotype related to telomerase mutation is pulmonary fibrosis. **Objective:** To investigate the associations of both TERT and telomerase RNA component C with disease progression in patients with interstitial lung diseases (ILDs), which include idiopathic pulmonary fibrosis (IPF), and to compare results between patients with ILD and control. **Patients and methods**: A total of 46 patients with different types of ILDs were enrolled as well as 15 healthy persons as control. Whole blood sample was obtained from both patients and healthy control for detection of expression of telomerase gene by quantitative real-time PCR. **Results:** There was a significant negative correlation between telomerase reverse transcriptase (h-TERT) and partial pressure of oxygen (r=−23, P=0.03). Both h-TERT and telomerase reverse transcriptase RNA component (h-TERC) were relatively more expressed in patients with IPF with pulmonary hypertension, whereas there was a significant elevation of h-TERT relative expression in patients with IPF with honeycombing high-resolution computed tomography pattern in comparison with those with reticulonodular pattern، with median of 0.85 versus 0.29, respectively. **Conclusion** Hypoxia may affect DNA damage in the telomere region. Expression of telomerase may take part in pulmonary fibrosis. Exposure to hypoxia or growth factors can stimulate the expression of telomerase on cells of vascular smooth muscle.