

Abstract

Aging is a complex biological process characterized by gradual decline in the physiological functions of cells and tissues, leading to the activation of a process known as cellular senescence. This results in the development of structural and functional changes in the organism accompanied by an increased risk of various diseases. Respiratory diseases are among the most common chronic conditions associated with the accumulation of senescent cells in the body. Current treatment for chronic respiratory diseases primarily focuses on symptom relief rather than addressing the primary cause of these conditions. Given that senescent cells play a significant role in the pathogenesis of respiratory diseases, the future of therapies lies in their elimination using senolytic agents. Despite promising results from some studies, current research is limited by the heterogeneity of senescent cells, which is reflected in their sensitivity to senolytic agents and the variability of therapeutic responses. Mitochondria play a central role in the development and maintenance of the senescent cell phenotype by regulating key processes such as energy metabolism and cellular signaling, regardless of the type of senescent cell. Thus, targeting mitochondria in senescent cells may represent a promising therapeutic strategy for modulating senescence and age-related diseases, such as chronic respiratory diseases.

Key words

cellular senescence, mitochondria, respiratory diseases, idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease, metabolic syndrom, senolytic drugs, therapy