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H_2O_2-induced premature senescence of human dental pulp cells was rescued by melatonin

Soo-Kyung Bae
Pusan National University, Republic of Korea

The anti-aging activities of melatonin, a hormone secreted by the pineal gland, have been reported in senescence-accelerated mouse models and several types of cells. However, the effects and mechanisms of melatonin on the senescence of Human Dental Pulp Cells (HDPCs) remain unknown. Here, we found that the melatonin markedly inhibited the senescent characteristics of HDPCs after exposed to hydrogen peroxide (H_2O_2), including the increase in senescence-associated β-galactosidase (SA-β-gal)-positive HDPCs and the up-regulation of p21 protein, an indicator for senescence. In addition, melatonin attenuated H_2O_2-stimulated phosphorylation of c-Jun N-terminal Kinase (JNK). Furthermore, H_2O_2-induced senescence of HDPCs was significantly suppressed by a specific inhibitor of JNK signaling, as measured by SA-beta-gal staining assay. Taken together, these results reveal that melatonin antagonizes premature senescence of HDPCs via JNK pathway. Thus, melatonin might have the therapeutic potential to prevent stress-induced premature senescence, possibly correlated with the development of dental pulp diseases and to maintain teeth health across the life span.

Biography

Soo-Kyung Bae has completed his PhD from Pusan National University, Republic of Korea and Postdoctoral studies from Kyoto University, Japan and NIH, USA. She is the Head of Department of Dental Phamacology of Pusan National University. She has published more than 20 papers in reputed journals and has been interested in the research of interaction between cells and microenvironment.

skbe@pusan.ac.kra

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