Immune responses of human dental pulp stem cells in lipopolysaccharide-induced microenvironment.

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Abstract
This study aimed to investigate the effect of inflammatory stimuli on dental pulp stem cells (DPSCs) by assessing their proliferation and expression of genes as well as proteins in lipopolysaccharide (LPS)-induced microenvironment (iDPSCs). DPSCs were first characterized for their mesenchymal properties prior to challenging them with a series of LPS concentrations from 12 to 72 h. Following to this, their proliferation and inflammatory based genes as well as protein expression were assessed. iDPSCs had demonstrated significant expression of mesenchymal markers. Upon exposure to LPS, the viability dropped distinctly with increasing concentration, as compared to control (P < 0.05). The expression of pro-inflammatory genes such as interleukin 6, interleukin 8 were augmented with exposure to LPS (P < 0.05).

Similarly, cytokines like tumour necrosis factor (TNF) α and interleukin 1α had increased in dose dependant manner upon LPS exposure (P < 0.05). Our results suggest that LPS concentration between 1 and 2 μg/mL demonstrated inflammation induction in DPSCs that may simulate inflamed microenvironment of dental pulp in clinical scenario. Thus, optimizing iDPSCs secretome profile could be a promising approach to test various regenerative protocols in inflamed microenvironment.

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KEYWORDS: cytokines; interleukins; mesenchymal stem cells; permanent tooth