Expression of PAR-1 and PAR-2 in Odontoblast-Like Cells MDPC-23

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INTRODUCTION. Protease-activated receptors (PARs) are G protein-coupled receptors, which are activated by proteolytical cleavage of the amino-terminus and thereby act as sensors for extracellular proteases. PARs activation plays important roles in the regulation of development, inflammation, immunity, and angiogenesis. PARs activation induces canonical G protein signaling and β-arrestin-dependent signalling. The aim of the current study was to investigate the expression and role of PARs in mouse odontoblast-like cells (MDPC-23). **MATERIAL AND METHODS.** Regulation of PARs expression in MDPC-23 cells was investigated by reverse transcriptase-polymerase chain reaction (RT-PCR) in the absence or in the presence of LPS (0,1 μg/ml). Antibodies against the PAR-1 and PAR-2 were used to investigate the cellular expression of these receptors using flow cytometry and confocal microscopy. Ca^{2+} signalling concentration–response curves were obtained using different PARs-specific agonists, thrombin for PAR-1 activation or trypsin for PAR-2. Cytoplasmic Ca^{2+} influx measurements were monitored through changes in the Fluo-4 fluorescence intensity in real time using the Flex Station 3 microplate reader system. After a baseline reading for 60 s, cells were exposed to graded concentrations of PARs agonists. **RESULTS AND DISCUSSION**. RT-PCR and immunocytochemical studies, demonstrated expression of PAR-1 and PAR-2 by odontoblast-like cells MDPC-23. In confocal microscopy immunohistochemical studies of human dental-pulp complex showed positive staining for the presence of PAR-1 and PAR-2. Treatment of MDPC-23 cells with trypsin, or with rat PAR-2-activating peptide (SLIGRL), caused a dose-dependent increase cytoplasmic Ca2+ influx. More, LPS-induced the mRNA expression of IL-6, TNF-α, PAR-1 and PAR-2 in MDPC-23 cells. **CONCLUSION**. The results presented here demonstrate for the first time that odontoblasts like cells express PAR-1 and PAR-2 receptors, suggesting that both receptors are involved in the inflammatory response in MDPC-23 cells.

Keywords: Protease-activated receptors; Odontoblast; MDPC-23 cells; inflammation.
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