♦O2

Detection of laser doppler blood flow signal from human teeth

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Laser doppler flowmeter (LDF) has been applied to the measurement of pulpal blood flow (PBF) in human teeth. As far as we searched, the detection area of the pulp in the blood flow measurement has not been clarified, yet. Therefore, the purpose of this study was to obtain information of the detection area in PBF measurement using LDF. The experiments were performed on the artificial blood circulation in extracted human upper central incisors. The apical portions of examined teeth (n = 6) were severed and root canals were enlarged from the apical end to the 2 mm incisal to the level of enamel-cement junction. An individual resin cap of each tooth was prepared and a hole was drilled 2 mm incisal to enamel-cement junction of the labial side of the cap. The measurement probe of LDF (MBF3D, Moor Instrument, UK) was plugged into the hole of the cap. Heparinized human peripheral blood, which was in advance collected and diluted 3 times with physiological saline, was pumped through the apical foramen of the teeth via a silicone tube and a disposable needle (o.d. 0.7 mm) and blood flow signals were monitored. The flux signal significantly increased with the enlargement of the root canal to incisal direction ($p<0.01$, Friedman analysis). The result indicates that the performance of LDF in PBF with human teeth is limited.

♦O3

Isolation and characterization of bovine cementoblast progenitor cells

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Dental follicle is the mesenchymal tissue which surrounds developing tooth germ. During tooth root development, periodontal components such as cementum, periodontal ligament and alveolar bone are considered to be created by progenitors present in the dental follicle. However, little is known about these progenitors. Previously we observed that cultured bovine dental follicle cells (BDFC) contained putative cementoblast progenitors. To further analyze the biology of these cells, we have attempted to immortalize BDFC by expression of the polycomb group protein Bmi-1 and human telomerase reverse transcriptase (hTERT). The BDFC expressing Bmi-1 and hTERT showed extended life span by 90 population doublings more than normal BDFC, and still contained cells with potential to differentiate into cementoblasts upon implantation into immunodeficiency mice. Among them, we established a clonal cell line designated as BCPb8, which formed cemetum-like mineralized tissue reactive to anti-cementum specific monoclonal antibody, 3G9, and expressed mRNA for bone sialoprotein, osteocalcin, osteopontin and type I collagen upon implantation. Thus with the combination of hTERT and Bmi-1, we succeeded in immortalization of cementoblast progenitor in BDFC without affecting differentiation potential. The BCPb8 progenitor cell line could be a useful tool not only to study cementogenesis but also to develop regeneration therapy for periodontitis.