Investigation on Cytotoxicity of Root Canal Filling Materials

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Abstract: The purpose of this study was to investigate the toxicity of two root canal materials to immune cells of mice: Canals® (CaN) which is widely used clinically as a sealer, and Vitapex® (VP), which is used for paste root filling materials. Tritium-thymidine uptake into lymphocytes for DNA synthesis derived from male C3H/HeN strain mice was examined on incubation with two root canal filling materials or original exudates into culture medium, and 10- and 100-diluted exudates. After staining with propidium iodide for cell death or annexin V for apoptosis, lymphocytes were analyzed by flow cytometry. The exuded lymphocytes from mice by intraperitoneal injection of exudates of root canal filling materials were analyzed by flow cytometry using FITC-anti Thy1.2 antibody for T-lymphocytes and FITC-anti μ antibody for B-lymphocytes. Statistical analyses were done using Student’s t-test, and less than 0.01 was considered to be significant. Tritium-thymidine uptake into lymphocytes decreased significantly by root canal filling materials or exudates. Tritium-thymidine uptake into activated lymphocytes by concanavalin A also decreased by the original exudate or 10-diluted exudate of CaN, and the original exudate of VP only. Propidium iodide-stained lymphocytes incubated with CaN-exudate increased soon and lasted for 48 hours. On the other hand, annexin V-stained lymphocytes incubated with CaN-exudate increased after just 12 hours, and returned to the control level after 24 hours. From the analysis of intraperitoneally exuded lymphocytes by exudate of root canal filling materials, T-lymphocytes tended to increase and B-lymphocytes tended to decrease, compared to the lymphocytes induced by medium only. The results suggested that the root canal filling materials used in this study were toxic to immune cells of mice.

Key words: Cytotoxicity, Endodontic materials, Immune cells