The Effects of triethylene glycol dimethacrylate (TEGDMA) on the protein of human dental pulp cells

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Abstrak

Triethylene glycol dimethacrylate (TEGDMA) is a common component of the bonding agents and resin composites used in dentistry for restorative dentistry. However, TEGDMA could be released from composite resins following incomplete polymerization and degradation processes by salivary enzymes in the mouth. Subsequently, TEGDMA is available in saliva and diffuses toward and affects the dental pulp which contains various cells, and thus may cause severe cytotoxic effects.
Objectives: To determine the total protein concentration of human dental pulp cells following exposure to TEGDMA.
Materials & methods: Dental pulp cells were isolated from the pulp of the freshly extracted teeth and cultured in DMEM for 48 h (37°C, 5% CO2). Then, 2 mM, 4mM and 8 mM TEGDMA were added to these cells and incubated for 24 h. The total protein was measured by Bradford Protein Assay.
Results: The total protein concentration of dental pulp cell after expsured to 4 mM, 8mM, and 12 mM TEGDMA were statistically lower (22762.27 ug/ml ± 3385.87; 20268.44 ug/ml ± 1701.14; 23706.51 ug/ml ± 3214.52; respectively) than the control group (24253.77 ug/ml ± 3072.88). Furthermore, the total protein concentration of culture medium after exposured to 4 mM, 8mM, and 2 mM TEGDMA, were statustically higher (28635 ug/ml ± 2373.4; 35288.41 ug.ml ± 3469.48; 38199.79 ug/ml ± 2752.47; respectively) when compared with the controls (27073.85 ug/ml ± 2772.47).
Conclusion: 2 mM, 4 mM, and 8 mM TEGDMA caused cytotoxicity to human dental pulp cells showed by decreasing the total protein of cells and increasing total protein of the culture medium.