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## Cytotoxic effects of current dental adhesive systems on immortalized odontoblast cell line MDPC-23.

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## **Abstract**

OBJECTIVES: Evaluate the cytotoxic effect of the three dental adhesive systems.

**METHODS:** The immortalized mouse odontoblast cell line (MDPC-23) was plated (30,000 cell/cm2) in 24 well dishes, allowed to grow for 72 h, and counted under inverted light microscopy. Uncured fresh adhesives were added to culture medium to simulate effects of unset adhesive. Three adhesives systems were applied for 120 min to cells in six wells for each group: Group 1) Single Bond (3M), Group 2) Prime & Bond 2.1 (Dentsply), and Group 3) Syntac Sprint (Vivadent). In the control group, PBS was added to fresh medium. The cell number was counted again and the cell morphology was assessed under SEM. In addition, the adhesive systems were applied to circles of filter paper, light-cured for 20 s, and placed in the bottom of 24 wells (six wells for each experimental materials and control group). MDPC-23 cells were plated (30,000 cell/cm2) in the wells and allowed to incubate for 72 h. The zone of inhibition around the filter papers was measured under inverted light microscopy; cell morphology was evaluated under SEM; and the MTT assay was performed for mitochondrial respiration.

**RESULTS:** The fresh adhesives exhibited more toxic (cytopathic effects) to MDPC-23 cells than polymerized adhesives on filter papers, and as compared to the control group. The cytopathic effect of the adhesive systems occurred in the inhibition zone around the filter papers, which was confirmed by the MTT assay and statistical analysis (ANOVA) combined with Fisher's PLSD test. In the control group, MDPC-23 cells were dense on the plastic substrate and were in contact with the filter paper. In the experimental groups, when acid in the adhesive systems was removed by changing the culture medium, or when the adhesives were light-cured, some cells grew in the wells in spite of the persistent cytotoxic effect.

**SIGNIFICANCE:** All dentin adhesive systems were cytotoxic odontoblast-like cells. Both acidity and non-acidic components of these systems were responsible for the high cytopathic effect of those dental materials.

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