

## Cytotoxicity of GuttaFlow Bioseal, GuttaFlow2, MTA Fillapex, and AH Plus on Human Periodontal Ligament Stem Cells



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### STUDY AIM

Evaluation of the in vitro cytotoxicity of the resin- MTA-based **MTA Fillapex<sup>1</sup>** and of the silicon-based sealers **GuttaFlow bioseal<sup>2</sup>** (with bioactive glass ceramic) and **GuttaFlow 2<sup>2</sup>** on human periodontal ligament stem cells (hPDLSCs). Testing of cell viability and attachment compared to the commonly used reference epoxy resin-based sealer **AH Plus<sup>3</sup>**.

### EXPERIMENTAL SETUP

**Sealer extract preparation:** Each sealer was mixed according to product instructions. Incubation in a clinical situation simulating environment. After extraction with culture medium, dilution of the sealers (ratio: 1:1; 1:2 and 1:4 ).

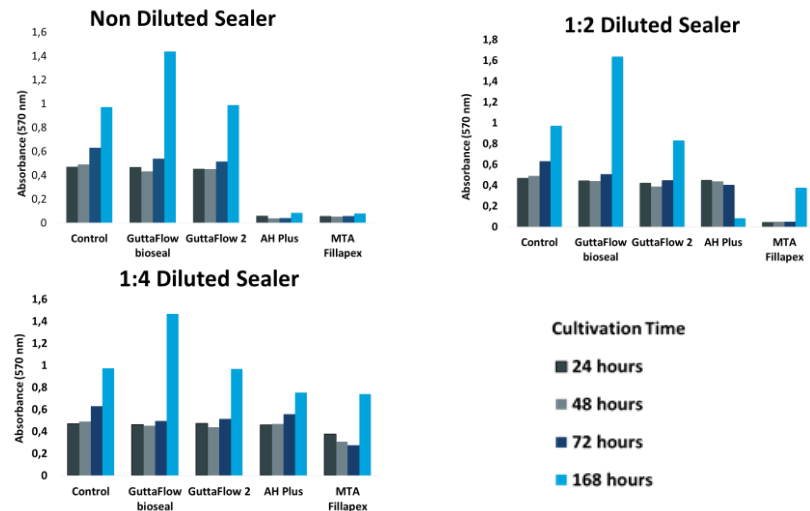
**Cultivation of hPDLSCs:** Cells were scraped from the root surface of impacted wisdom teeth (n = 12) from 10 healthy donors. After extraction and purification, adherent cells were grown to 80% confluence (defined as passage zero). Cells were subcultured once a week and the study was carried out with characterized cells from passage 4 on.

**Determination of the cell viability:** hPDLSCs were cultured in presence of the different sealer dilutions for 24, 48, 72 and 168 hours (control: hPDLSCs in complete medium). After expiration of defined terms, addition of MTA and measurement of absorbance at 570 nm to determine the cell proliferation.

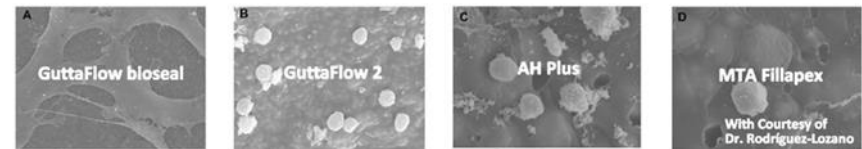
**Evaluation of cell attachment:** hPDLSCs were directly seeded in disks with different sealer samples and cultured for 168 hours and analyzed by scanning electronic microscopy (SEM).

### RESULT

#### MTA Assay – Cell Viability



#### SEM of Cell Attachment on Sealers



### CONCLUSION

Due to the better cytocompatibility of GuttaFlow bioseal, hPDLSCs cultured in the presence of this sealer showed a significant higher viability than the cell cultures with Guttaflow 2, AH Plus, MTA Fillapex and the control culture without sealer. Cells seeded on the surface of AH Plus, MTA Fillapex and GuttaFlow 2 showed a low resp. moderate attachment. Whereas cells cultivated with GuttaFlow bioseal exhibited better cellular attachment and spreading.

<sup>1</sup> **Manufacturer:** Angulus, Londrina, Parana, Brazil

<sup>2</sup> **Manufacturer:** Coltène/Whaledent AG, Altstätten, Switzerland

<sup>3</sup> **Manufacturer:** Dentsply DeTrey Konstanz, Germany