Response of Human Gingival Epithelial Cells (HGE-15 cells) to Bioactive Glass RKKP (surfaces as machined)

H. Oguchi*, Y. Karube, F. Ohsu, K. Matsumoto, M. Morito
Tsurumi University School of Dental Medicine, Japan

Purpose

Many biomaterials are currently used for dental implants. One important problem critical to the outcome of implant therapy is adhesion between implant materials and the gingiva.

The purpose of this study was to investigate the interface between bioactive glass (RKKP) and HGE-15 cells.

Materials and Methods

Commercial titanium alloy (CT), RKKP, and plastic culture dish [Falcon (F)] as control were used in this experiment. 1.0× 105 of HGE-15 cells were plated on the materials and cultured for 30 minutes, 1 hour, 2 hours and 24 hours for examine with a scanning electron microscope (SEM). For examination by transmission electron microscopy (TEM), HGE-15 cells were cultured for 24 hours. The cells were fixed for 2 hours dehydrated conventionally, and subjected to critical point drying. The cells were coated with gold and examined by SEM. For TEM, cells were fixed, dehydrated, and embedded in Epon. The specimens were sliced at a thickness of 78 nm, double-stained, and examined.

Results

SEM Findings: On F and CT, 30 minutes after incubation, cells adhere to the materials indicating lamelliapodia and filopodia. After 2 hours, cells changed its form from oval shape to flat shape. After 24 hours, cells formed a sheet of polygonal-shaped cells. On RKKP, though increase and spreading of cells were delayed compared with F and CT, however, samples were mostly covered with polygonal-shaped cells 24 hours after the incubation.

TEM findings: After 24 hours of incubation, no hemidesmosome was seen between F, CT, and RKKP and cells. On F and CT, a double-layered structure was seen between materials and cells. On the other hand, HGE-15 cells were bonded directly to the RKKP.

Conclusion

We have concluded that the RKKP indicated the good biocompatibility to the HGE-15 cells in vitro. We will investigate various possibilities for the RKKP in the dental field and others.