

Evaluation of the effect of mechanostress by soft materials on cellular behaviors related to wound healing

Hideki Mori

Graduate School of Science, Osaka Prefecture University

We evaluated the migration ability of fibroblasts and vascular endothelial cells by scratch assay. To evaluate the cell migration ability, cell images were acquired over time as the cells were cultured after cell detachment by scratch treatment. Since both cells filled the detached area by proliferation and migration within 48 hours, the migration rate and direction of each cell was determined by image analysis and calculation based on the temporal images of the cells during 48 hours of culture. Compared to fibroblasts, vascular endothelial cells tended to migrate more perpendicular to the boundary with the detached area. In addition, the migration rate of vascular endothelial cells was slower than that of fibroblasts. By analyzing the migration characteristics of individual cells, we were able to find differences in the migration characteristics of different cell types, which cannot be determined by the conventional method of measuring the total area covered by cells. To investigate the effect of covering with a soft hydrogel as a wound dressing on cell migration, a scratch assay was performed on vascular endothelial cells covered with gelatin-alginate gel after cell detachment. The gel-covered vascular endothelial cells lost their polarity in the direction of migration, and their migration rate became slower. Covering with a soft gelatin-alginate gel seemed to have the effect of delaying the migration of cells to re-cover the wound.