

The effects of human dermal papilla cells on the induction of hair follicle after xenotransplantation of the composite graft into immunodeficient mice.

Yasuo Kubota

St. Marianna University, School of Medicine. Department of Dermatology

Living human skin equivalents, in which human keratinocytes are cultured on collagen matrix containing human dermal fibroblasts, have been successfully transplanted and maintained for a long time on deep connective tissue of immunodeficient mice. Here, we cultured human dermal papilla cells in the type I collagen gels and overlaid by primary culture of human epidermal cells concomitant with a few melanocytes as a composite graft.

We examined effects of human dermal papilla cells derived from human hair follicle on the induction of hair follicle after xenotransplantation of the composite grafts into immunodeficient mice. At three weeks after transplantation, the epidermal cells generated human epidermis-like tissue. Histological examinations revealed that no epidermal elongation or newly formed follicular-like structure were observed. Interestingly, a significant number of DOPA positive melanocytes, which were initially concomitant in a primary epidermal cell culture, was found not only in the epidermal basal layer but also in the entire mid-dermis, while the transplantation of a composite grafts in immunodeficient mice by using human fibroblasts instead of dermal papilla cells showed the presence of a small number of melanocytes in the basal layer only.

These results indicates that human dermal papilla cells facilitate the maintenance or migration of the melanocytes in the xenotransplantation of composite grafts, a living human skin equivalents.

The present system by using the xenotransplantation of composite grafts in immunodeficient mice also seems to be the good models for studying the cell-cell (epithelial-mesenchymal) interaction.