

The submitted dissertation addresses the issue of acellular pig dermis in healing burn wound. The acellular xenodermis Xe-Derma® (XD) has been developed in the Prague Burn Centre in cooperation with the Czech Academy of Sciences and has been produced by a Czech company.

Several culture techniques for cultivation of human primary keratinocytes were tested. The bioactivity of XD was studied by a cell culture assay in an organotypic culture system at the air-liquid interface. We compared keratinocyte proliferation and formation of epidermis in vitro with formation of neo-epidermis in the deep dermal wounds treated with XD (in vivo). Morphological and immunohistochemical analysis of keratinocytes confirmed the similarity of organization and differentiation of the cultured epidermal cells to the normal epidermis. Ability to stimulate growth and differentiation of keratinocytes connote bioactivity of XD. The natural structure and firmness of XD (composed of collagen and elastic fibres with the surface responding to the basement membrane) enables adhesion, proliferation, migration and differentiation of epidermal cells.

In the clinical use XD appertains to temporary covers in burn treatment, particularly on scalds in children. In the frame of grant project IGA there has been investigated healing of widely meshed autografts in extensive burns with limited donor areas. Freshly isolated autologous epidermal cells applied into the “windows” of the autograft were covered with XD and thus protected. This combination has been used recently in the treatment of a 8-years-old boy with 90% of the T.B.S.A. Rapid and solid healing of the donor sites covered with XD allowed manifold crops from the same area. The surgical task to close the necrectomized burn was successfully accomplished by support of XD covering widely meshed autografts and protecting new epithelia in all donor sites.