

# Decellularized Human Dermal Matrices for the Treatment of Burn Injury

Draye J.-P., T. Rose, G. Verbeken, J.-P. Pimay

Human Cell and Tissue Banks, Laboratory for Molecular and Cellular Technology, Burn Wound Centre, Queen Astrid Military Hospital, 1120 Brussels, Belgium

**Objective:** Recently, we have developed a novel Decellularized Human Dermal Matrix (DHDM), having both 3D-structure and composition well preserved. In order to decrease the need for autografting in patients with extensive deep burns, we plan to use this DHDM, together with autologous cells. The main objective of this preliminary work is the evaluation of the integration of the DHDM in burn wounds and its ability to receive skin autografts.

**Method:** Cryopreserved allogeneic skin (about 0.4mm thick) was obtained from post mortem human donors and was used to prepare DHDMs. A two-step decellularization method, involving a hypertonic treatment followed by a detergent treatment, was used to prepare the DHDMs. After detergent removal, the DHDMs were cryopreserved. Bacteriological/mycological testing, histological evaluation, MTT viability testing and High-Definition Optical Coherence Tomography imaging were used for quality control. The DHDMs were applied to burn wounds and were maintained in place by stitches. Wounds were dressed with transparent polyamide dressing and silver nanocrystalline dressings. Visual evaluation, with photographic records, and histological evaluation of the DHDM integration were performed.

**Results:** It was observed that burn wounds treated with DHDM were not infected. After about 3 weeks the DHDMs were integrated into the burn wounds and wounds were ready to receive skin autografts.

**Conclusion:** Conclusively, the DHDMs integration in burn wounds can be achieved. In the next step the use of autologous cells together with DHDM should improve revascularisation, shorten the integration time and reduce the need for autografting in patients with extensive deep burns.

