Tissue Engineering: A Rapidly Growing Field of Skin Research

Tissue engineering is a rapidly growing area of biological and medical cooperation for modeling of formation and functions of organs. Researchers with a molecular biology background, biologists, chemists, physicians, engineers and other specialists are looking for new approaches to substitute damaged or nonfunctional tissue, or at a final stage, organs.

Skin as the largest organ of the human body is readily accessible for direct tissue modulation, for example gene therapy. Recently, retroviral transduction of murine fibroblasts transformed them into a pluripotent embryonic stem cell-like state [Meissner et al.: *Nat Biotechnol* 2007;25:1177–1181]. More recently, nerve cells were made from elderly patients' skin cells [Baker, M.: *Nature* 2008; 454:675]. Comparable transfections of human cells and consecutively a therapeutic patient-specific stem cell therapy in skin diseases are at the horizon.

In this special issue of *Skin Pharmacology and Physiology*, tissue engineering of the skin is covered by 7 contributions from a broad range of researchers.

Tissue engineering with special emphasize on stem cells is covered by Charruyer and Ghadially. This is a remarkable contribution that should be noticed on the background of the above-mentioned publications. Apple-

gate and her group reviewed bioprocessing of human fetal cells for tissue engineering of skin. Wiegand and Hipler evaluate the biocompatibility and cytotoxicity using keratinocyte and fibroblast cultures. The importance of tissue engineering is covered by 2 chapters by Macri and Clark as well as by Auger et al. Immunological aspects and tissue engineering in the context of in vitro irritation models and immune reactions are addressed by S. Gibbs. Santiago-Walker et al. describe the morphological aspects and the biological basis for the application of organotypic three-dimensional model systems in the study of melanocytes.

We hope that this special issue of *Skin Pharmacology and Physiology* will give you a good overview of some, but not all, aspects of tissue engineering. We are curious how this aspect will be addressed in 5 years; certainly in a different way and to the benefit of patients with so far untreatable skin diseases.

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