Book Reviews

The Keratinocyte Handbook; Edited by Irene M. Leigh, E. Birgitte Lane and Fiona M. Watt; Cambridge University Press, 1994; xvii + 566 pp. £ 130.00. ISBN 0-521-458781

and

Keratinocyte Methods; Edited by Irene M. Leigh and Fiona M. Watt; Cambridge University Press, 1994; xv + 207 pp. ISBN 0-521-458781

'The Keratinocyte Handbook' and 'Keratinocyne Methods' is a set of books which cover both basic aspects of keratinocyte biology and a compilation of experimental protocols commonly involved in the study of cultured keratinocytes as well as specialized procedures to analyze skin specimens.

The 'Handbook' focuses on basic aspects of keratinocyte biology, and is organised in 6 sections representing the different aspects of keratinocyte physiology and pathology. 59 authors have contributed to this book providing a broad review in each individual topic. It is evident from the list of contents that keratinocyte biology involves many aspects of structural biology, cell kinetics, organ morphogenesis, cellular development/differentiation steps and neoplastic transformation. So far, there was no comprehensive review integrating the different aspects of keratinocytes making it particularly difficult to get familiar with epidermal cells.

In the first part, Karen Holbrook gives an introduction on the ultrastructural architecture of the epidermis, presenting chosen electron microscopy pictures to illustrate the various ultrastructural characteristics of epidermal cells, differentiation and the epidermal-dermal junction. The high quality of the illustration primes the reader with a fundamental knowledge of structural features encountered in skin at different stages of keratinozytion. In addition to keratinocytes, reference is given to melanocytes and Langerhans cells.

The second part highlights keratinocyte culture systems in 6 chapters with an introductory chapter by Irene M. Leigh and Fiona M. Watt, followed by more specialised chapters, such as Rebecca J. Morris' and Susan M. Fischer's, summarising properties and applications of defined culture systems for epidermal keratinocytes from adult mice, using a chemically defined tissue culture medium, SPRD-111, a modification of the MCDB-151 medium. Taking into account the growing number of genetically targeted mice with an epidermal phenotype and the difficulties associated to study normal mouse keratinocytes in tissue culture, this chapter is certainly invaluable when working with transgeneic mice. The next two chapters by Norbert E. Fusenig and Michele De Luca describe cellular interactions in the skin. Norbert Fusenig describes epithelial–mesenchymal interactions in two-dimensional as well as three-dimensional tissue culture systems illustrating the complexity of epithelial–mesenchymal cell interactions in skin, whereas De Luca and coworkers focus on interactions between keratinocytes and melanocytes in reconstituted normal human epidermis maintained in tissue culture. Terence Kealey and Michael Philpott focus on the human pilosebaceous unit, giving an extensive review and tissue culture models. In the last chapter, Chris Fisher writes about epithelial phenotypes in keratinocyte lineages in embryonic development with special reference to morphogenesis of cutaneous appendages and differentiation pathways of embryonic and fetal keratinocytes in vivo and vitro.

The third section is devoted to the problems of keratinocyte adhesion and is opened with a chapter by Fiona M. Watt and Mark D. Hertle about keratinocyte integrins and their distribution in various settings, such as epidermal stratification, cell migration, epidermal morphogenesis and wound healing. This chapter is followed by Pamela Cowin, giving an overview of adhesive cell junctions of keratinocytes and the so far identified molecules providing this structural basis of hemidesmosomes and desmosomes. Finally, Jo-David Fine gives an overview of basement membrane proteins, their synthesis and distribution in the basement membrane cells and briefly reviews alterations of specific basement membrane proteins in inherited epidermolysis bullosa skin.

Section four covers aspects of keratinocyte proliferation and differentiation. Robin Dover summarises cell kinetics of keratinocytes, followed by an appendix about stem cell biology with special regard to the epidermal proliferative unit. Jeffrey Teumer, Kathleen Zezulak and Howard Green focus on mRNA content in keratinocytes of different growth and differentiation potential, followed by Ian Mackenzie, elaborating on epithelial–mesenchymal interactions in epithelial tissues during development and steady state maintenance. Robert Rice and coworkers illustrate the different transglutaminases in keratinocytes as markers of keratinocyte differentiation. Marcia Simon reviews the epidermal cornified envelope and its precursors, followed by Susan M. Morley and E. Birgitte Lane on the keratinocyte cytoskeleton. Beverly Dale and coworkers then describe keratohyalin granule proteins, followed by Maria Ponce on Lipid biosynthesis. Keratinocytes and their production of immunological cytokines are covered by the contribution of Tom J. Stoof, Dick M. Boorsma and Brian J. Nickoloff and finally B.C. Powell and G.E. Rogers describe differentiation in hard keratin tissues.

Having dealt so far with physiological processes, section five reviews in four chapters aspects of transformation and neoplasia in epithelia, first discussing the role of human papillomavirus mediated cell transformation by Alan Storey, Connie Sexton and Lawrence Banks, then followed specifically by Ximena Montano about the role of oncogenes in skin cancer, leading to the contribution of David A. Greenhalgh, Joseph A. Rothnagel, Andrea M. Dominey, Xiao-Jing Wang and Dennis R. Roop, who focus on the transgenic mouse models for inherited and acquired skin disorders to study molecular mechanisms and potential therapeutic approaches in this rapidly developing field. The chapter is closed by Petra Boukamp and coworkers, who critically review in vitro transformation and tumor progression.

The last section is organised into four chapters, the first one illustrating clinical applications of keratinocyte transplantation with regard to wound healing, described by Irene M. Leigh, followed by Carolyn Compton's contribution on keratinocyte grafting, in which animal models are summarized to study basic aspects of the biology of skin regeneration. Robin A.J. Eady and coworkers review the potential of keratinocytes in the diagnosis and pathogenesis of genetic skin disorders and Lorne B. Taichman closes this chapter by reviewing the potential of epithelial gene therapy approaches, commenting on the expression levels of transduced genes, the influence on keratinocyte functions and the potential of genetically altered keratinocytes as metabolic factories. Also possible deleterious side-effects of epithelial gene therapy are discussed in this section. The index of this book is helpful and quickly leads the reader to appropriate chapters. The illustrations of the book are superb and well presented.

The companion 'Keratinocyte Methods' is organised in five parts.

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