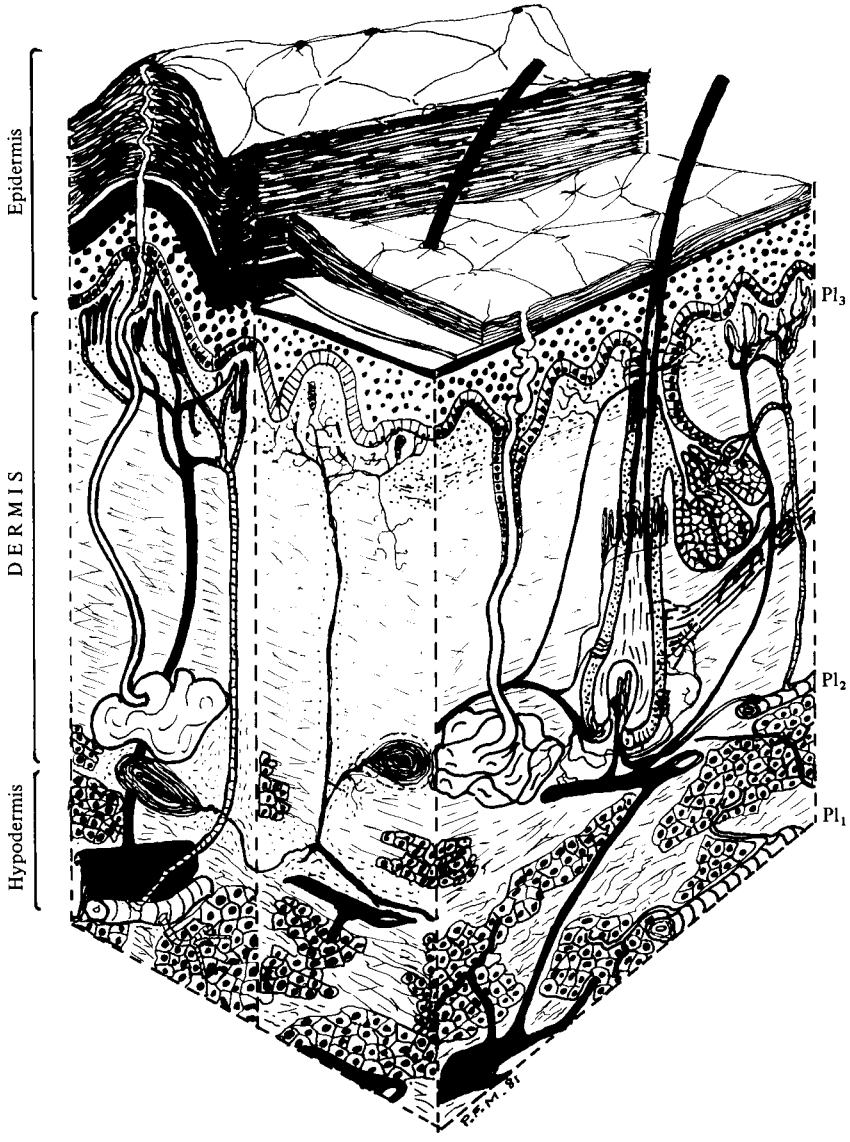
BIOLOGICAL STRUCTURE AND FUNCTION 9

SKIN



Diagrammatic representation of skin indicating both thick and thin skin (not to scale). Pl $_{1-3}$, levels of the three plexuses of blood vessels.

BIOLOGICAL STRUCTURE AND FUNCTION

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SKIN

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PREFACE

To choose the title *Skin* is in one sense presumptuous, in another challenging. The subject is so vast that only a brief overview is possible in a short book. Indeed, a computer search of the Medlars database revealed over 28000 publications on skin in the three years from 1978 to 1980. The majority of these occur in the fields of pathology, dermatology and, to a lesser extent, in cosmetics.

This book only deals with a limited range of topics and concentrates on those of particular interest to bioengineering, but even within these topics we have been circumspect in selecting descriptions of structure and behaviour to illustrate rather than provide a comprehensive account. Primarily, we describe normal human skin, but have sought illustrations from animal studies and pathological states where appropriate.

Inevitably, some of the mathematics used to describe the response of skin to mechanical forces may be unfamiliar to readers and a brief explanation is included in the text for those who have some mathematical background. The mathematical notation and symbols have been standardised, as far as possible, throughout the text, so many equations do not appear in the form presented in the original publications. To help the reader further, a list of symbols used will be found at the end of Chapter 4 and at the end of each section of Chapter 5, together with a summary of basic mathematical notation. Elsewhere, symbols are explained within the text.

We begin by considering the body surface – its appearance, structure and properties – but skin is a large organ which differs greatly in both structure and function from site to site. After considering skin in depth, a brief description of the site variation is given based essentially on structural parameters. The important physical and mechanical properties of skin are dealt with in separate chapters and the book is concluded by a brief survey of the response of skin to damage and ways in which healing may be assisted. It is perhaps appropriate that this final part also outlines the more recent attempts to provide substitutes for skin, for it is through this work that many of the functions of skin, which we take for granted, are highlighted.

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