HISTOPATHOLOGY OF THE SKIN

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SECOND EDITION

281 Illustrations
With 8 in Color

LONDON

PITMAN MEDICAL PUBLISHING CO., LTD.

First Published in the United States of America in 1954 *by*
J. B. LIPPINCOTT COMPANY

Published in Great Britain by
PITMAN MEDICAL PUBLISHING CO., LIMITED
45 New Oxford Street, London, W.C.1

ASSOCIATED COMPANIES

SIR ISAAC PITMAN & SONS, Ltd.
PITMAN HOUSE, PARKER STREET, KINGSWAY, LONDON, W.C.2
THE PITMAN PRESS, BATH
PITMAN HOUSE, LITTLE COLLINS STREET, MELBOURNE
27 BECKETTS BUILDING, PRESIDENT STREET, JOHANNESBURG

PITMAN PUBLISHING CORPORATION
2 WEST 45TH STREET, NEW YORK

SIR ISAAC PITMAN & SONS (CANADA), Ltd.
(INCORPORATING THE COMMERCIAL TEXT BOOK COMPANY)
PITMAN HOUSE, 381-383 CHURCH STREET, TORONTO

PRINTED IN THE UNITED STATES OF AMERICA
A (L.11)

Preface to the Second Edition

Descriptive histopathology is regarded by some as a static science in which nowadays but few concepts change. But this is not so. Many advances have been made in the field of dermatopathology in only the five years that have passed since the appearance of the First Edition of this book. Consequently, many changes were necessary for this Second Edition.

Important advances have been made in recent years in the histologic diagnosis of the vesicular and the bullous diseases, especially of pemphigus. Therefore, the descriptions of these diseases have been entirely rewritten and brought together into a new, separate chapter. Because of changes in the concept of the histogenesis of the nevus cell, the chapter on nevi and melanomas also has been rewritten. The use of the periodic acid-Schiff reaction for the demonstration of fungi in tissue is an important advance which is taken due notice of in the chapter on fungus diseases. Extensive changes also have been made, for instance, in the descriptions of kraurosis vulvae, the purpuras and verruca. Furthermore, discussion of the following diseases has been incorporated because recent work has increased the interest of dermatologists in them: beryllium granuloma, papular myxedema, porphyria, ochronosis, hibernoma and hemangiopericytoma. Many changes have been made in the Bibliographies that follow each chapter in order to keep them up to date. Fifty-six new photomicrographs have been added, and 14 of the old photomicrographs have been replaced by better ones.

It is with great regret that I record the death of Dr. Tracy B. Mallory, former chief of the Pathology Laboratory at the Massachusetts General Hospital. To him I owe a great debt of gratitude. Dr. Benjamin Castleman, the present chief of the laboratory, has advised and helped me in many ways, and I thank him. I also wish to express my thanks to Mr. Richard W. St. Clair for producing with great skill the new photomicrographs and to Mr. Walter Kahoe, Director of the Medical Department of J. B. Lippincott Company, for his many courtesies and his unfailing co-operation.

WALTER F. LEVER

Preface to the First Edition

This book is based on the courses of dermatopathology which I have been giving in recent years to graduate students of dermatology enrolled at Harvard Medical School and Massachusetts General Hospital. The book is written primarily for dermatologists; I hope, however, that it may be useful also to pathologists, since dermatopathology is given little consideration in most textbooks of pathology.

I have attempted to keep this book short. Emphasis has been placed on the essential histologic features. Minor details and rare aberrations from the typical histologic picture have been omitted. I have allotted more space to the cutaneous diseases in which histologic examination is of diagnostic value than to those in which the histologic picture is not characteristic. In spite of my striving for brevity I have discussed the histogenesis of several dermatoses, because knowledge of the histogenesis often is of great value for the understanding of the pathologic process.

Primarily for the benefit of pathologists who usually are not too familiar with dermatologic diseases, I have preceded the histologic discussion of each disease with a short description of the clinical features.

A fairly extensive bibliography has been supplied for readers who are interested in obtaining additional information. In the selection of articles for the bibliography preference has been given, whenever possible, to those written in English.

I wish to express my deep gratitude to Dr. Tracy B. Mallory and Dr. Benjamin Castleman of the Pathology Laboratory at the Massachusetts General Hospital for the training in pathology they have given me. It has been invaluable to me. Their teaching is reflected in this book. Furthermore, I wish to thank Mr. Richard W. St. Clair, who with great skill and patience produced all the photomicrographs in this book.

WALTER F. LEVER

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Introduction

TECHNIC FOR BIOPSY

It is important to select a proper site for biopsy. In most instances, histologic examination of a fully developed lesion will give more information than examination of an early or an involuting lesion. An exception to this rule represents vesicular, bullous and pustular lesions. For their histologic examination, a very early lesion is required; otherwise, secondary changes (such as regeneration, degeneration or secondary infection) may obscure essential features and make recognition of their mode of formation impossible. Generally, it is inadvisable to include normal tissue in the biopsy specimen, unless a large specimen is taken or the physician personally supervises the processing of the specimen, because improper sectioning by the technician may result in only normal skin being seen in the section. The specimen should include subcutaneous fat, because, in many dermatoses, characteristic histologic features are found in the lower dermis or in the subcutaneous fat. If several types of lesions are present and the diagnosis hinges on the histologic findings, much time may be saved by taking specimens for biopsy from more than one lesion.

In the author's experience, a specimen obtained with a 6-mm. biopsy punch nearly always has proved adequate for histologic study. Two sutures are sufficient to close the wound.

Before placing the specimen in the routine fixative, which in many hospitals is Zenker's or Helly's solution, one should consider which stains are desirable. Some of the special stains can be performed only if the specimen has been fixed in the appropriate fixative. A tabulation of staining methods with the required fixatives is found in Table 1, on page 29.

LIMITATIONS OF HISTOLOGIC DIAGNOSIS

Although histologic study is one of the most valuable means of diagnosis in dermatology, it has its limitations. Often, no definitive diagnosis can be made. The reason for this is that few dermatoses, aside from the tumors, are associated regularly with a diagnostic his-

tologic picture. Instead, the histologic features may be merely suggestive of a diagnosis or may be entirely nonspecific. Even in the case of tumors, difficulties in diagnosis may arise. For instance, distinction of squamous-cell carcinoma from pseudo-epitheliomatous hyperplasia is not always possible. In cases of infectious granulomas, such as syphilis, tuberculosis and the deep mycoses, a specific diagnosis often cannot be made unless the causative organism can be demonstrated. Great difficulties may also be encountered in the histologic study of the large group of noninfectious inflammatory dermatoses. In the diseases of this group, such as psoriasis, lichen planus and lupus erythematosus, in which the histologic picture is diagnostic as a rule, sometimes it may be merely suggestive. In other diseases of this group, such as the various types of dermatitis or eczema, the histologic picture is, at best, only suggestive. In still others, such as pityriasis rosea and parapsoriasis, it is always nonspecific.

Nevertheless, frequently, when the histologic picture is not diagnostic, a correlation of the histologic with the clinical findings will make a diagnosis possible.

In many instances, the chief value of histopathologic study lies in corroborating the clinical diagnosis or in ruling out possible diseases which are being considered on the basis of clinical appearance. It is obvious that the histopathologist can give the clinician a maximum amount of information only if every specimen submitted for histologic diagnosis is accompanied by detailed clinical information, including a differential diagnosis.

2

Embryology of the Skin

THE EPIDERMIS

In the earliest period of fetal life, the epidermis consists of a single layer of cells. Between the fifth and the seventh weeks of fetal life, this becomes a double layer, consisting of an inner layer, the stratum

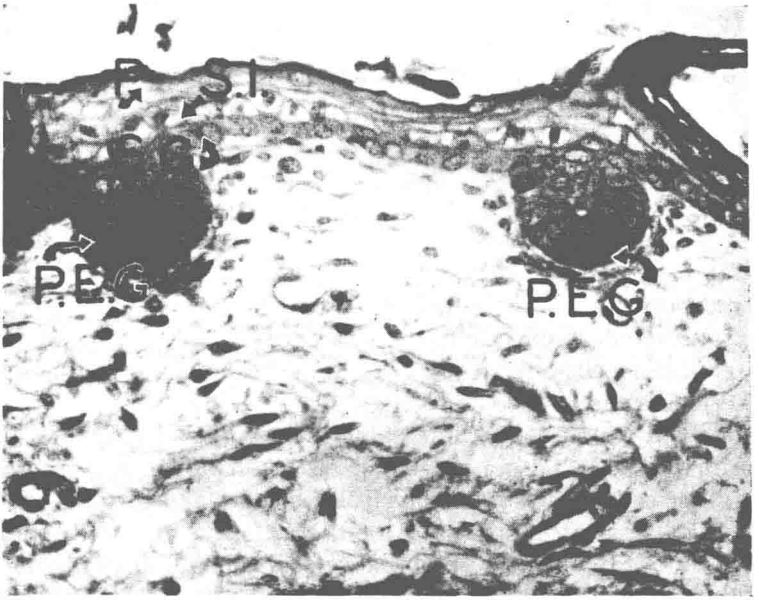


FIG. 1. **The skin of an embryo 4 months old.** The epidermis consists of three layers: the stratum germinativum (S.G.), the stratum intermedium (S.I.) and the periderm (P.). Two primary epithelial germs (P.E.G.) are shown. The fetal dermis shows many more fibroblasts than the adult dermis. (×400)

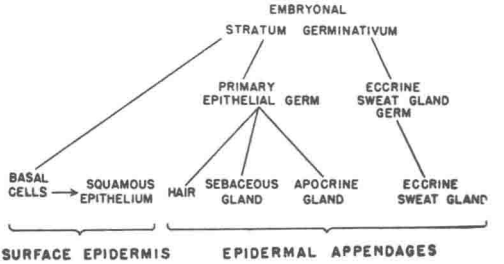
germinativum or palisade layer, and an outside layer, the periderm or epitrichial layer. The stratum germinativum is composed of large cuboidal cells, while the periderm consists of flat cells. In the third month, single cells appear between the two layers and later form a complete line, the stratum intermedium (Fig. 1). The cells of the

stratum intermedium are large and, because of their clear cytoplasm, have a ballooned appearance.

At about the fourth month, the periderm separates to aid in the formation of the vernix caseosa. At the same time, the stratum intermedium becomes multilayered and develops into the squamous-cell layer, or stratum malpighii. Intercellular bridges become recognizable only after the epidermis has become stratified with several layers.

The embryonal stratum germinativum differentiates into the following types of cells: (1) the basal cells, (2) the eccrine sweat-gland germ cells and (3) the primary epithelial germ cells (Chart 1).

CHART 1.—Embryology of the Epidermis



Basal Cells. While the cells of the embryonal stratum germinativum possess no intercellular bridges, the mature basal cells do. By progressive differentiation, the basal cells develop into squamous cells, granular cells and horny cells, thus forming the multilayered surface epidermis.

Epidermal Appendages. The epidermal appendages develop from the primary epithelial germ cells and the eccrine sweat-gland germ cells. These cells possess no intercellular bridges and form cells without intercellular bridges. Primary epithelial germs first appear in the third month of fetal life as epithelial buds projecting into the dermis (Fig. 1). Eccrine sweat-gland germs are first observed in the fifth or the sixth month.

The eccrine sweat-gland germs give rise to the eccrine sweat glands, whereas the primary epithelial germ cells give rise to the hair matrix, the sebaceous glands and the apocrine glands. Only the hair and its two inner sheaths (the Huxley and the Henle layers) develop from the hair matrix. The outer sheath of the hair and the ducts of the sebaceous glands, which are composed of prickle cells, originate from cells with the potentiality of forming prickle cells, namely, from basal cells (Lever). The apocrine glands, which begin to form with the hair and the sebaceous gland, involute before they reach full development,