SKIN AND VENEREAL DISEASES

by L. Fandeyev

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Textbook for Secondary Medical Schools

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Translated from the Russian
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Supplements

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INTRODUCTION

Dermatology is the science of the skin and skin diseases; venereology is the study of venereal diseases.

Skin and venereal diseases began to be studied in antiquity. Descriptions of signs of various skin and venereal diseases and methods of their treatment can be found in manuscripts of ancient China, India, Egypt, Greece and other countries.

The development of dermatology and venereology as scientific disciplines dates from the second half of the 19th century. Russian dermatology and venereology came into existence at the same time.

Two trends in the study of skin diseases took shape in Western Europe in the middle of the 19th century; these trends were headed by the German and French dermatological schools. The adherents of the German dermatological school attached great importance to studying eruptions on the skin and their subsequent transformations, as well as to pathoanatomical changes occurring in skin diseases. They devoted considerable attention to the role played by various extraneous stimuli in the origin of skin diseases. The studies of these factors contributed to the development of the science of skin and venereal diseases. At the same time some representatives of the German dermatological school underestimated the significance of the general condition of the organism and the role of nervous and visceral dysfunction in the development of skin diseases; they often regarded skin diseases as purely local processes. This explains their attempts to treat patients suffering from skin diseases mainly with external agents and their underestimation of methods of general treatment.

The French dermatological school attached the greatest importance in the origin of skin diseases to changes within the organism, and this was its positive aspect. However, the ideas about these changes were often very vague. The French dermatologists considered many cases of skin diseases to be the result of "spoilage of juices". The scientists of the French school often gave too little thought to the external environment. The French dermatological school has made a valuable contribution to the study of fungus infections of the skin and to the elaboration of the methods of their treatment.

The development of the sciences of skin and venereal diseases was enormously influenced by progressive Russian medical scien-

tists, the fathers of Russian scientific medicine—M. Mudrov, S. Botkin, I. Sechenov and G. Zakhariyn.

The views of these scientists are characterised by their recognition of the leading role of the nervous system in the vital activities of the organism and their strivings to treat, "not the disease, but the patient".

The fathers of Russian dermatology and venereology were A. Polotebnov, A. Pospelov and V. Tarnovsky.

Russian dermatology and venereology are noted, on the one hand, for their view of skin diseases as diseases of the entire organism and, on the other hand, for their striving to improve medical aid to the patients suffering from skin and venereal diseases and to control their spread.

Soviet dermatology and venereology aim, not only at treating skin and venereal diseases, but also and mainly at preventing them. This *prophylactic* trend is the distinguishing characteristic of medical science of the Socialist state, amelioration of the health of the working people being one of its most important objectives.

Soviet dermatology and venereology derive their strength from their close contact with practice. The achievements of these sciences are systematically introduced into the practical work of hospitals and clinics for skin and venereal diseases. At the same time the practical experience of these hospitals and clinics is carefully generalised and studied in research institutions. Medical practitioners are widely enlisted for participation in scientific work.

ANATOMY AND PHYSIOLOGY OF THE SKIN

The skin is a natural covering and inseparable part of the human body. By separating the organism from the external environment it performs the important function of protecting the organism from unfavourable influences of the environment. It also participates in a number of very important processes, namely, thermoregulation, metabolism and excretion of waste products.

Structure of the Skin

The anatomical structure of the skin fits it for the performance of these important functions.

The total surface of the skin reaches 1.6 m^2. In adults the skin weighs about 18 per cent of their body weight. It has superficial furrows and deeper folds.

The superficial furrows cover the entire skin and by crossing form *skin fields* in the shape of triangles and rhombuses. On healthy skin the pattern of the skin fields is very delicate. It is more clearly marked on the dorsal surfaces of the hands and wrists. On the palms and soles, as well as on the palmar surfaces of the fingers and plantar surfaces of the toes the furrows are somewhat deeper and for the most part run in parallels.

The skin is composed of three layers: (1) epidermis or external layer, (2) true skin or derma, and (3) subcutaneous adipose layer or panniculus adiposus.

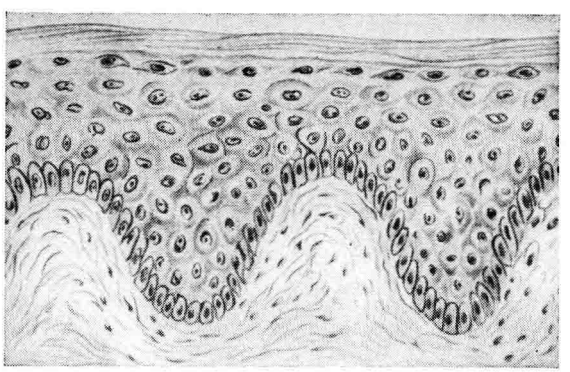

Fig. 1. Structure of the epidermis (from P. Grigoriev)

The **epidermis** consists of epithelial cells which possess great ability to multiply and replace the destroyed cells of this layer. Owing to this ability any wounds suffered by the skin, as a result of injury or skin disease, heal quickly and without leaving a trace.

Microscopic examination of the epidermis shows that it is composed of five layers: (1) stratum germinativum or basale, (2) prickle-cell layer, (3) stratum granulosum, (4) stratum lucidum, and (5) stratum corneum (Fig. 1).

The *stratum germinativum* or basale adheres to the true skin or derma. It consists of one layer of cylindrical cells with large and easily stained nuclei. The cells of the stratum germinativum do not adhere to each other, but are divided by narrow fissures. These fissures called intercellular canaliculi extend into similar canaliculi of the overlying prickle-cell layer of the epidermis. Lymph from the lymphatic fissures of the derma penetrates into the canaliculi of the epidermis and circulates through them. The cells of the stratum basale are interconnected by protoplasmic bridges. The epidermis has no blood vessels, and the lymph entering the intercellular canaliculi brings nutrient substances into the epidermis and removes the metabolites.

The protoplasm of the cells of the stratum germinativum has grains of melanin (pigment) which are coloured from light brown to dark brown.

In dark-complexioned people the cells of the stratum germinativum contain more pigment than do those of light-complexioned people. The stratum germinativum in the skin of people of tropical countries contains still more grains of pigment. Sun-tan is due to an increase in the amount of pigment in the stratum germinativum. The increased deposition of pigment in response to insolation is a defense reaction of the organism; by covering the nucleus lumps of pigment protect from the harmful effects of ultraviolet rays not only the nucleus, but also the deeper cells. Among the cells of the stratum basale there are also special pigment cells—melanoblasts and melanocytes.

The cells of the epidermis multiply in the stratum germinativum. The young cells formed as the result of division replace the older cells and crowd them into the prickle-cell layer. No multiplication of cells is normally observed in the prickle-cell and other overlying layers of the epidermis.

The *prickle-cell layer* is made up of an average of 4-6 rows of cells. The interpapillary prominences of the epidermis have more rows of cells (Fig. 2). The prickle cells are large, polyhedral and have large, light nuclei. These cells also have numerous intercellular protoplasmic bridges and are separated from each other by intercellular canaliculi.

The *stratum granulosum* is composed of 1-3 rows of elongated cells arranged parallel to the surface of the skin. These cells have

pale nuclei. The protoplasm contains numerous grains of *keratohyalin*, an albuminous substance which is an early phase of the formation of keratin—the horny substance of the skin.

The three lower layers of the epidermis—stratum germinativum, prickle-cell layer and stratum granulosum—are often designated together as the malpighian layer.

Over the stratum granulosum is the *stratum lucidum*. Under the microscope this layer appears as a shiny thin band; it is composed of 1-2 rows of flat, shiny cells without nuclei. The protoplasm of these cells contains *eleidin* (an albuminous substance). Eleidin is a product of further transformation of keratohyalin into a horny substance.

The *stratum corneum* is the outermost layer of the epidermis. It is formed of several intimately united rows of flat, thin, horny plates overlying each other.

The horny plates are composed of completely keratinised cells of the epidermis without nuclei. Their protoplasm has completely changed to keratin, the end product of the process of keratinisation. The stratum corneum is the thickest on the palms and the soles of the feet. On the surface of the stratum corneum the horny plates are less adherent and are gradually cast off; this is known as desquamation which is a normal physiologic process.

True skin or derma. The second layer of the skin—the true skin or derma—is located under the epidermis (see Fig. 2). The derma abounds in connective tissue fibres which form interweaving bundles. The connective tissue of the derma contains but few cells.

Two basic types of connective tissue fibres—collagenous and elastic—are distinguished. The interspaces between the bundles of fibres are filled with the basic amorphous substance which plays a very important part in the processes of metabolism and in the protective functions of the skin.

There is also a third type of connective tissue fibres—reticular fibres—which are arranged in a thin layer between the epidermis and the derma, and around sebaceous and sweat glands, hair follicles and muscles of the skin.

At the junction with the epidermis the derma forms an undulate surface, its papillae projecting into the epidermis. The junction between the epidermis and the derma is very clearly defined.

The derma is composed of two layers: papillary and reticular. The papillary layer is next under the epidermis. The bundles of connective tissue fibres in the papillary layer are quite delicate and interweave in various directions. Many bundles run perpendicularly to the surface of the skin and project into the papillae.

The reticular layer consists of thicker bundles of fibres which by interweaving form a dense network. A large part of these bundles is arranged parallel to the surface of the skin. This structure