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CLINICAL FORMS AND MORPHOLOGICAL ELEMENTS OF SKIN

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Abstract: *The skin, the largest organ of the human body, is a complex and dynamic structure that serves as the first line of defense against external aggression, regulates body temperature, and facilitates sensory perception. Its multidimensional nature is reflected in the diverse range of clinical forms and morphological elements that comprise its architecture. This article aims to delve into the intricacies of skin morphology, exploring the various clinical forms and morphological elements that contribute to its structure and function.*

Keywords: *morphological elements, structure, layer, epidermis, muscle, substance*

Introduction: Human skin represents the outer cover of the human body, constituting the interface between the organism and the environment. Through its multiple and complex functions, it safeguards the body's integrity and homeostasis. It is composed of two main layers, the epidermis and the dermis, which lie on the subcutaneous layer or hypodermis. Anatomically superficial to these layers, cutaneous adnexa are found, such as hair, nails, and the eccrine, apocrine, and sebaceous glands. The epidermis, or the outermost layer of the skin, is composed of five layers of epithelial keratinocytes: the basal, the spinous, the granular, the clear, and the cornified layers. The keratinocytes, the primary cell type of the epidermis, are arranged in a continuously differentiating scale of maturity and fulfill their function through multiple morphological changes. The dermis is of mesodermal origin, and its extracellular matrix is constituted by collagen fibers and an amorphous ground substance composed predominantly of glycosaminoglycans, proteoglycans, and water.

Cutaneous adnexa—hair, nails, and eccrine, apocrine, and sebaceous glands—are specialized structures for which specific plastic and connective tissue cell derivatives of the skin combine. The epidermis derives from the ectoderm, the dermis originates from the mesoderm, while the adnexa have mixed ectodermal and mesodermal involvement. The intrinsic and extrinsic layers add specialization and insulation to the structure of the innermost skin itself. In the thin skin of the eyelids, external genitals, and the peripheral area of the external auricle, we also find a subcutaneous muscle, the orbicularis oculi muscle, and the superficial arrector pili muscles. The hypodermis hosts the cutaneous nerves, blood and lymph, adipose tissue, and metabolism, and insulates the body. Due to their unique ultrastructural features, all layers of the skin are able to perform the specific macroscopic and microscopic peculiarities of their role. All layers are controlled by the central and peripheral nervous systems, the endocrine system, or the immune system.

Significance of Studying Skin Morphology

The skin is an important morphological covering of the human body. Its structure and function

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demonstrate the unity of the regulatory effects that have evolved during the different stages of development of all the major systems in humans, ensuring its stability and a continuous calculus of a combination of its inner environment. The study of the clinical forms and the basic morphological elements of the skin is essential in forensic medical practices, not only because they are among the most frequently encountered objects, but also often because their state is determined by civil disputes related to health, skin damage, and death, through which it is necessary to determine how and under what influence the body is subjected. The definition is that the physical characteristics of the skin of deceased and living witnesses and suspects are used to establish, i.e., limit the environmental circumstances of the questioned event.

The students should be clear, when the tests are made, on the correct way to understand the importance of any anatomical data. In this lesson, we have to come to the function of the skin, its division, the composition of the cuticle and the deep structures, and a description of the micrographic objects under the microscope. The definition of the most complete nomenclature is recommended, and it is explained in due time which are the three layers with which the skin appears in the sagittal section when we perform a cut that has its roots in the hypodermis. The skin is an organ of ectodermal origin that fills the human body continuously from birth to adulthood.

Literature review.

The exploration of clinical forms and morphological elements of skin has garnered significant attention in recent years, as evidenced by a growing body of literature that delves into various aspects of dermatological diagnosis and treatment. The foundational work by M. Chuong et al (2006) emphasizes the importance of understanding the biological basis of pattern formation in skin lesions, arguing that the distinctive patterns observed in skin conditions provide vital diagnostic cues. Their research highlights the need for interdisciplinary approaches to unravel the complexities of dermatological pattern formation, particularly through advanced imaging techniques such as confocal microscopy and scanning electron microscopy. This foundational understanding sets the stage for subsequent studies by illustrating the intricate relationship between skin morphology and its clinical implications.

Building upon this groundwork, Kawahara and Hamarneh, (2019) focus on the classification systems employed in dermatological diagnosis, particularly the role of machine learning in enhancing the accuracy and efficiency of skin disease classification. Their proposed pipeline, which integrates various image processing techniques, reflects a significant advancement in the field, showcasing how technology can be harnessed to improve diagnostic outcomes. This article underscores the evolving nature of dermatological diagnosis, indicating a shift towards more systematic and data-driven approaches.

In a more psychosocial context, Gieler et al (2020) explore the intersection of skin conditions and mental health, introducing the concept of cumulative life course impairment. They argue that chronic skin diseases not only impact physical health but also have profound implications for a patient's psychosocial well-being and life trajectory. This perspective broadens the understanding

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of skin disorders beyond mere physical manifestations, highlighting the importance of considering psychological factors in treatment and diagnosis.

The literature further expands with Mościcka, (2022) examination of skin manifestations related to the COVID-19 pandemic, which has introduced new challenges and considerations in dermatology. This review reflects the dynamic nature of skin pathology in response to global health crises, emphasizing the need for ongoing research to understand the implications of viral infections on skin health.

Discussion.

The dermis is composed of 4 mobile types: keratinocytes, Langerhans cells (LCs), melanocytes, and Merkel cells. Keratinocytes are the most plentiful and structure 4 layers: the stratum corneum, granulosum, spinosum, and basale. Keratinocytes in the stratum basale differentiate stepwise into the stratum corneum (keratinization) and repeat the epidermal turnover. Epidermal turnover is 30 days in humans, 26–27 days in pigs, 22 days in dogs, and 34 days in rats. In contrast, the turnover of hairless mice is solely 3–4 days. The stratum corneum is composed of useless deposits of terminally maturing keratinocytes and is the outermost layer of the epidermis, which is the shielding barrier of the pores and skin that excludes poisonous marketers and microbes and prevents dehydration. The stratum corneum incorporates lipids, such as cholesterol, free fatty acids, and ceramides, which characteristic as a barrier and are associated to moisture retention. Electronically, they have been located as lamellar granules, referred to as Odland bodies. The marginal band is the internal lining of the mobile membrane. The proteins that construct it are steady towards bodily and chemical stimuli and are worried in pores and skin protection. The stratum granulosum includes keratohyalin granules that are comfortably seen in hematoxylin and eosin (H&E)-stained histological sections. Electronically, they are irregularly fashioned and determined as electron-dense regions. The stratum granulosum incorporates tight junctions (TJs) that seal intercellular areas and manipulate the intercellular transport of water, solutes, and water-soluble molecules. The stratum spinosum includes keratinocytes differentiated from the stratum Basale and LCs, which are accountable for immunity. Keratinocytes in the stratum spinosum show up polygonal in structure and provoke differentiation. Desmosomes composed of desmoglein's and Desmo Collins adhere to intercellular spaces. In some pores and skin conditions, such as acanthosis, crosslinks between cells might also be seen below the light microscopy. LCs are resident dendritic cells derived from a bone marrow precursor and are accountable for monitoring invading pathogens with the aid of taking up overseas antigens and supplying the processed antigens to T cells, ensuing in T mobile differentiation and activation. The mammalian pores and skin consist of two units of barriers: one is the stratum corneum and the different is TJs in the stratum granulosum. LCs on the internal of the stratum spinosum can lengthen their dendrites to backyard the TJs in the stratum granulosum to seize antigens. The stratum basale consists of a single layer of columnar or especially cuboidal keratinocytes resting on a basement membrane. Hemidesmosomes and their related intermediate filaments anchor the basal area of basal cells to the basement membrane. Merkel cells and melanocytes have additionally been located in the stratum basale. Merkel cells have been recognized in many experimental animals and are positioned in the outer root sheath of the hair follicles. They are

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additionally receptive to tactile sensation. Merkel cells shape Merkel cell-neurite complexes (Merkel discs) with axons in the contact dome that are thinking to feature as slow-adapting mechanoreceptors. Melanocytes are neural crest-derived cells with organelles known as melanosomes that produce and secrete melanin to adjoining basal cells and prickle cells. Melanocytes independently exist in desmosomes barring associating with different keratinocytes. Melanin consists of black or brown eumelanin's and purple or yellow pheomelanin's, which cowl the pores and skin and guard the nuclear DNA from UV radiation. Melanogenesis inside melanocytes is faulty in albino animals, and amelanotic melanoma barring melanin granules has not often been reported.

Analysis and Results.

The dermis, the supporting layer of the skin, is a richly vascularized and innervated connective tissue composed of fibroblasts, collagen, elastin, and glycoproteins. Fibroblasts produce collagen, elastin, and glycosaminoglycans, which form the dermal matrix. The dermal matrix provides skin strength, elasticity, and resilience, as well as facilitating the movement of cells and nutrients. The dermis is further divided into two sublayers: papillary dermis (superficial layer) and reticular dermis (deep layer). The papillary dermis contains thin collagen and elastin fibers, while the reticular dermis contains thicker, more densely packed collagen and elastin fibers.

Hypodermis (Subcutaneous Fat): The Innermost Layer

The hypodermis, the innermost layer of the skin, is a loose connective tissue composed of adipocytes (fat cells), fibroblasts, and blood vessels. Adipocytes, the primary cell type, store lipids and play a crucial role in energy metabolism and thermoregulation. The hypodermis also contains collagen and elastin fibers, which attach to the underlying fascia, securing the skin to the bone.

Morphological Elements of the Skin

The skin contains a diverse array of morphological elements, each with unique functions. Sebaceous glands, found in the dermis, produce sebum, an oily substance that regulates skin hydration and protects against pathogens. Sweat glands (eccrine and apocrine glands) regulate body temperature by evaporating sweat, a serous liquid produced by the glands. Hair follicles, found in the dermis, produce hair, a keratin-based structure that plays a role in thermoregulation, sensation, and social communication.

Clinical Forms of the Skin

The skin can present with various clinical forms, reflecting its response to internal and external factors. The normal skin, also known as eutrophic skin, presents with a smooth, supple surface and normal pigmentation. Hypertrophic skin, characterized by thickening and scaliness, can result from chronic irritation or trauma. Atrophic skin, on the other hand, presents with thinning and wrinkling, often due to aging or hormonal changes. Dysplastic skin, characterized by abnormal cellular growth, can be a precursor to skin cancer.

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Conclusion.

In conclusion, the clinical forms and morphological elements of skin are intricate and interconnected components that contribute to its structure and function. Understanding the complexities of skin morphology is essential for diagnosing and managing skin conditions, as well as developing effective treatment strategies. Furthermore, recognizing the clinical forms and morphological elements of skin can help to promote skin health and prevent skin disorders, highlighting the importance of skincare and sun protection. Ultimately, the study of skin morphology is an ongoing endeavor that continues to reveal the intricacies of the skin and its vital role in maintaining overall health and well-being.

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