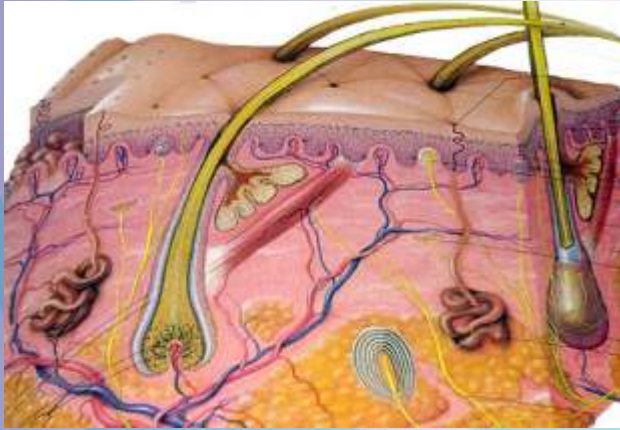


Skin



Understanding skin pathology, requires first and foremost an understanding of skin anatomy. Integral to this, is an understanding of the embryology of the skin. Skin forms the covering to the body, and its function is not only protective, but also its thermoregulation and is integrally involved in homeostasis (balance) of fluid levels in the body. The skin is divided into two sections; the outside layer is called the epidermis and the deep layer is called the dermis. The dermis in particular has two recognizable layers; the papillary dermis which abuts the epidermis, and the reticular dermis which abuts the underlying fat of the subcutaneous tissues. The epidermis contains only cells with no blood vessels, lymphatics or nerve endings. The dermis is rich in both blood vessels and nerve endings and also contains hair follicles, muscle which attaches to the skin and the hair, sweat glands, sebaceous glands and some other structures. The blood vessels in the superficial part of the dermis (papillary dermis) are tiny, and there are no lymphatics in this part of the dermis. In the deeper (reticular) dermis however, the blood vessels are much larger and there are abundant lymphatics.

When the skin is forming in the developing foetus/embryo, the outer layer, which becomes the epidermis, is derived from what is called the ectoderm, which covers the developing foetus. The cells of this layer are pluri-potential stem cells, and the very base of the epidermis. Basal cells which then differentiate into squamous cells, which then differentiate into prickly cells, then there is a clear cell layer, and finally there is a layer of keratinocytes. As the keratinocytes age, they stack up on one another and the outer layer of keratinocytes are dead cells, which are rather like a laminating layer on the outside of the skin. Once the body is fully formed, and the child comes into the world, the epidermis of the skin replenishes itself every month or two and this process continues on until death. The cells of the epidermis therefore are dynamic and are constantly changing. In contrast, the dermis cells are permanent. They are formed in the developing embryo/foetus from the mesoderm layer that is sandwiched between the ectoderm and the endoderm in the developing embryo. The mesoderm layer differentiates (changes) into a number of different structures including muscle, bone, blood vessels and glands and dermis. The dermis itself contains a number of structures. Nerve cells are different and they migrate throughout the body, and it is believed that growth of nerve through tissues results in differentiation of tissue parts and even tissue regions. The astute reader would have realized that my discussion of the cells in the epidermis did not mention melanocytes or pigment cells. That is because these cells actually come from the nerve cell line, and migrate from the neural crest to the developing embryo to park themselves at the junction of the epidermis and the dermis. They then nestle down into the basal cell layer, produce pigment (which is a characteristic of all nerve cells) and transport the pigment into the basal cells. This process continues on after birth and that is why freckles and various pigmented lesions develop throughout childhood and on into adolescence. These are the cells that produce malignant melanoma. The behaviour of the melanocytes varies for different races. African Negroes have the highest concentration of melanocytes (particularly the Sudanese and Ethiopian groups) and albinism is a rare congenital deformity where no pigment cells are formed whatsoever. This condition is life-threatening.

There is another nerve cell which also migrates into the epidermis from the neural crest and this is the Merkel cell line. This too can develop into an aggressive tumour, the Merkel cell tumor.

Skin has been subdivided into six different groups, based on the amount of pigment found, ranging from Type I which is the kind of skin which burns and never tans, through to Type 6 which is the negroid type skin, which never burns.

The skin plays an integral role in our temperature control as the blood vessels dilate and release heat in hot weather and constrict and keep the warm blood flowing in the core of the body in cold weather. Sweating also has a bearing on fluid balance in the body, and again is related to temperature. The skin is naturally moisturized by sebum which is released from sebaceous glands in the skin. This natural moisturizer also has some sun block activity, however this is not enough to be significant for the average Caucasian in a sunny climate such as Australia. This is reflected by the fact that the highest rate of skin cancer in the world is found in both Queensland and Western Australia, where there is a very large migrant population of British Caucasians, who have gone to live in a very harsh, sunny climate. Understanding of the skin anatomy is a springboard to understanding skin conditions. On this website, only cancerous skin conditions will be discussed, however there is a vast array of inflammatory skin conditions, which sometimes enter into the differential diagnosis of skin cancer. As such, it is imperative that dermatologists and plastic surgeons collaborate together in the management of this complex area of pathology.



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