Your dermatology internship starts tomorrow and you haven’t studied yet? No reason to panic! With these tips, you’ll easily survive the chief physician’s tests and you’ll learn how to make a skin finding - which is relevant not only for future dermatologists.

Structure of the Skin

Before you start appreciating the nuances of the study of efflorescences, it is recommended to refresh your knowledge of the fundamental structure of the skin.

The skin is the largest organ in the body. It is the outermost covering of the body and all parts of the body. It consists of three big layers (epidermis, dermis and subcutis), which are close to each other and have different functions.

Epidermis (upper skin)

The epidermis consist of a keratinized squamous epithelium, which is mainly formed by keratinocytes. Alongside the basal membrane, the melanocytes filter the ultraviolet radiation. Melanocytes synthesize the skin pigment as well as Langerhans cells (immune cells) and Merkel cells. The basal layer holds the stem cells of the skin.
skin is renewed regularly, starting from the basal layer.

The outermost covering of the skin known as stratum corneum protects the body from viruses, bacteria and other foreign bodies. Epidermis along with other layers of skin protects the internal organs, muscles, blood vessels and nerves against injury.

The epidermis contains neither lymphatic nor blood vessels.

Dermis (corium)

The dermis is a layer of the skin that consists of connective tissue. It is located between the epidermis and the subcutaneous fatty tissue. It is a thick layer formed by fibrous and elastic tissue. The dermo-epidermal junction is present next to the line separating the epidermis and dermis, in which the basal membrane of the epidermis connects with the dermis. Rete ridges and anchoring fibrils ensure that under the impact of the shear forces, the epidermis does not detach from the dermis. Disruption in this area can lead to typical blistering illnesses.

The dermis contains blood and lymphatic vessels, nerve fibres and sensory receptors (e.g. Meissner corpuscles), hair, sweat and sebaceous glands. Their distribution varies in different parts of the body. For example, multiple hair follicles exist on the head but not on the soles of feet. In addition to fibroblasts, which produce the extracellular connective tissue, tissue macrophages, lymphocytes, mast cells exist in the dermis.
Subcutis

The connective and fatty tissues underneath the dermis ensure mechanical protection and integrity of the skin. Fibrous and elastic tissues provide flexibility and elasticity to the skin.

Dermatological Examination

Dermatology is primarily a visual field. Dermatological evaluation is based on systematic and careful examination of the entire skin in daylight.

Disorders display wide variation depending on geography, seasonal changes in temperature, humidity and environmental factors.

In case of initial consultation no part of the skin should be skipped. The hands and soles, inframammary and the interdigital, inguinal, genital, axillary and perianal region should be examined as well as the ears, adjacent mucous membranes such as those covering the lips, oral cavity, anus, conjunctivas and the nose, the skin appendages (hairs and nails) as well as the scalp should be evaluated.

Note: Pay attention to pigment changes, which are suspicious of melanoma, skin tumors and in situ carcinoma during the examination.

In addition, the overall skin condition should be assessed: complexion, condition, drought, turgor and smell.
Description of skin findings

The skin texture, distribution and color provide insight into skin condition or ailments. The description of cutaneous abnormalities during examination is facilitated by the efflorescence gauge. The efflorescence (Latin: “ex” = out, “florescere” = flower), the so-called “flower of the skin”, provides a uniform morphological description of skin abnormalities and is the basis for communication between dermatologists. Therefore the efflorescence gauge is a kind of “code”, which can be used to describe nearly all of the pathological skin changes using a few terms and modifications.

The efflorescences are divided into primary efflorescences, which arise on healthy, unchanged skin and are a direct consequence of the illness as well as secondary efflorescences, which are the secondary changes accompanying primary efflorescences.

Primary efflorescences

<table>
<thead>
<tr>
<th>Efflorescence</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macula (spot)</td>
<td>Outlined color change, without increase of the substance. Different colors are possible. Non-palpable, not raised or depressed relative to the skin.</td>
<td>Red: increased circulation (erythema), bleeding in the skin (purpura) blue: hematoma white: lowered melanin, e.g. vitiligo brown: increased melanin</td>
</tr>
<tr>
<td>Urticate (wheal)</td>
<td>Volatile protrusion of the skin, due to serum exudates.</td>
<td>Urticaria, mosquito bite, drugs, stings, autoimmunity</td>
</tr>
<tr>
<td>Papule (nodules)</td>
<td>Increase of the substance higher than the skin level, with a diameter less than 0.5 cm. It can be palpated or felt.</td>
<td>Lichen ruber, insect bites, seborrheic keratoses, warts, and skin cancers</td>
</tr>
</tbody>
</table>
Nodes (knot)

Increase of the substance higher than the skin level, with a diameter larger than 0.5 cm

Skin tumor

Plaque

Flat sublime increase of substance in the skin; palpable, elevated or depressed lesions relative to skin

Eczema, psoriasis

Bulla (blister) vesicle (bubbles)

Cavity filled with liquid (e.g., serum, blood), possibly in every layer of the three layers of the skin

Pemphigus vulgaris, herpes simplex, burns, allergic contact dermatitis

Pustule (pustule)

Cavity filled with pus, possibly in every layer of the skin

Folliculitis, acne, psoriasis pustulosa

Secondary efflorescences

While the primary efflorescences occur on healthy skin, secondary efflorescences accompany pre-existing primary efflorescences.

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<tr>
<td>Squama (scale)</td>
<td>Thickening of the horny layer (stratum corneum) of the epidermis, whitish sheds</td>
<td>Psoriasis, tinea</td>
</tr>
<tr>
<td>Erosio (erosion)</td>
<td>Superficial defect of the substance of the epidermis, healing without scars</td>
<td>Pemphigus vulgaris, inflammatory diseases</td>
</tr>
<tr>
<td><strong>Excoriation</strong> (artefact of scratching)</td>
<td>Defect of the substance, which manifests right through to the upper dermis; possible scars of healed defects</td>
<td>Abrasions, itching illness of the skin</td>
</tr>
<tr>
<td><strong>Crust</strong> (crust)</td>
<td>Bearing of dried up secrete</td>
<td>Serum, blood or pus out of smaller wound, infections, inflammatory diseases</td>
</tr>
<tr>
<td><strong>Ulcer</strong> (ulceration)</td>
<td>Defect of the substance, which involves at least the lower dermis, associated with poor healing, and obligatory scarring</td>
<td>Ulcer cruris</td>
</tr>
<tr>
<td><strong>Rhagade</strong></td>
<td>Crack-shaped tears of brittle skin appearing in natural skin folds such as the corner of the mouth and hands</td>
<td>Hyperkeratotic-rhagadiforme eczema of the hand, cracks at the corner of the mouth</td>
</tr>
<tr>
<td><strong>Cicatrix</strong> (scar)</td>
<td>Wound closure with collagenous connective tissue after a deep defect of the substance. Possibly hypo- or hyper pigmented, caved- in, sublime or skin level</td>
<td>Scar after ulcer or trauma</td>
</tr>
<tr>
<td><strong>Atrophy</strong> (skin thinning)</td>
<td>Tissue loss in the area of multiple skin layers. Thinning of the epidermis and dermis</td>
<td>Atrophy because of steroids or age, sun exposure, inflammatory diseases, neoplastic diseases</td>
</tr>
<tr>
<td><strong>Lichenification</strong></td>
<td>Thickening of the skin with oversimplifying lichenification</td>
<td>Atopic eczema</td>
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### Description of the findings

The dermatological findings should also always be used to assess the overall clinical picture. A step-by-step approach can be helpful.

First, start with the description of the **localization** (area of the body) as well as the number of **efflorescences** (solitary, several or numerous herds). Based on this description it can be determined whether or not it is a **localized** or a **generalized** phenomenon.

These terms can be used to provide closer description:

- **Disseminated** (sowed)
- **Diffuse** (fuzzy limited, extended)
- **Generalized** (disseminated over the whole body)
- **Grouped** (identical skin changes, lying directly next to each other)
- **Confluent** (passing into each other)
- **Solitary** (individually standing)
- **Multiple**
- Homogeneous
- Heterogeneous

Subsequently, the morphological description should include the size and form, limitation, color, consistency and quality of the efflorescence, and measured if necessary and specified in length or by comparison.

In general, an efflorescence that is located more deeply has a sharper limitation. The color of inflammatory efflorescences can reveal its localization: In the upper dermis, the efflorescences are mostly sharp, limited and bright red, whereas in the deeper layers the limitation is blurred and the color is purple. With a glass spatula, the reaction to pressure can be tested: Is the efflorescence movable? Does the color change under pressure?

**Note:** To assess efflorescences adequately, they need to be touched. It can be helpful if you close your eyes. The description of attendant symptoms such as signs of inflammation (erythema, overheating), pain, pruritus (itching), exudation and burning completes the skin findings.

### Anamnesis

**Anamnesis** is used to elucidate disease pathogenesis to provide a diagnosis, supported by previous findings and other relevant data. Anamnesis is the first important contact with the patients before they undress for examination. It is important to proceed gently and to turn from open, general questions to more “intimate” topics. Ask in a specific, unaggressive way. When in doubt, the relationship of trust between doctor and patient should not be compromised for the sake of a single question.

**Important questions for anamnesis**

- When exactly did the symptoms/skin changes start?
- Where exactly did the skin changes start to appear?
- Do the skin changes lead to subjective physical complaints? (pain, itching, hot/cold feeling)
- What did the skin changes look like at first, did they change? How did they spread?
- Do these complaints disturb their normal activities like sleep?
- What did you do so far to treat your skin changes?

**Note:** Patients often understand terms like ‘blister’, ‘wheals’, ‘eczema’ and similar terms differently than they are defined in dermatology. Therefore, it is important to ask the patient for their understanding of the different terms. Additional clues can be obtained via questions related to previous diseases of the skin/known illnesses, allergies, attendant symptoms such as fever, weight loss, and reduced general condition, previously consumed medicine, contact with noxious agents/chemical substances, and habits. Questions related to the family’s anamnesis as well as journeys abroad can provide important insights. Last but not least, the psychosocial condition of the patient as well as personal impairments caused by the skin changes should be examined.

### Clinical Testing

Simple clinical tests can be conducted during the examination, which provide important diagnostic information. A simple test such as palpation provides information about
consistency, mobility, painfulness, soreness, heat or cold of the skin, pulsation and other characteristics of the efflorescence.

Crusts can be removed to assess wound expansion. In case the secrete is abstracted, it can also be assessed.

Furthermore, there are specific clinical signs, which provide clues for specific dermatological conditions or other illnesses.

**Dermographism**

Here the skin is irritated with a blunt object (e.g., a spatula made of wood) and the reaction is evaluated. The resulting reddish wheals normally disappear quite quickly. A **red dermographism, in contrast**, occurs after 15 seconds and is a sign of local vasodilatation (capillary dilatation), which leads to a significant redness in the form of lines. A **reflective vasodilatation** (arterial dilatation) can produce a **reflex erythema** resulting in the formation of linear wheals due to fluid transudation. This is known as the triple response of Lewis.

A **dermographism with an urticarial origin** can occur a few minutes after the red dermographism and possibly last for minutes. The local release of histamine particularly via interaction of antigen with IgE leads to swelling of the stretched patterns and itching.

A white dermographism (**dermographism albus**), noticeable as a white stripe on the skin, is a sign of local **vasoconstriction** and suggests atopic tendency, i.e. a tendency towards hypersensitive reactions such as atopic dermatitis (**neurodermatitis, atopic eczema**).

![Image: "Dermographic urticaria resulting from pressure through clothing." by Openi. License: CC BY 3.0](image)

**Auspitz-phenomenon**
Also known as the phenomenon of the bloody rope, the Auspitz-phenomenon is diagnostic of *psoriasis*. It can be defined by the appearance of small isolated bleeding points on the surface of the skin after the removal of scales of psoriatic papules or plaques. If you scratch the scales of a *psoriasis plaque* with a spatula made of wood, the inflammatory dermis appears underneath. If you scratch the exact same spot again with a wooden spatula, the dermis is opened and punctual bleeding originating in the blood vessels of the *papillary top* occurs.

**Technical Tools**

To examine the skin, various dermatological tools are used. Besides the wooden spatula, which is used to trigger a dermographism, a *spatula made of glass, magnifying glass* and a *dermatoscope* are used. Additionally, *Wood light* (UVA), *sonography*, and histological procedures are used during the diagnostic evaluation.

**Spatula made of glass (diascopy)***

![Image: “Clinical appearance centrofacial telangiectasia (TAE) in patients treated with iloprost or bosentan after ten months. (b) diascopy of the cheek of a 57-year-old man treated with bosentan;” by Openi. License: CC BY 2.0](image)

The *glass spatula* (or transparent plastic) can be used to measure the efflorescences. Using a spatula, pressure is exerted on the efflorescence, to distinguish *bleeding* (erythema, which cannot be pushed away) from *vascular dilations* (which can be pushed away).

**Incident light microscope (dermatoscope)**
Dermatoscopy is a **non-invasive** procedure, which can be used to assess the superficial skin layers using a dermatoscope with a 10–100-fold magnification. An important area where the dermatoscope is used is the classification of **skin tumors** (pigmented and non-pigmented).

**Note:** The ABCDE rule for the evaluation of skin tumors: asymmetry, border (irregular), color, diameter (> 5 mm) and evolution.

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**Sonography**

**Medium frequency sonography** (7.5–10 MHz) can reveal deep **skin layers, veins, and lymphatic nodes**. It is important, for e.g., during a preliminary diagnosis of malignant tumors and examination of primary tumor and regional lymphatic nodes. Any suspicious lymphatic nodes are investigated during the planning and diagnostic phases as well as during follow-ups and therapeutic monitoring.

**High-frequency sonography** (20–50 MHz) is used for the examination of epidermis, dermis and subcutis, for e.g., preoperative measurement of the thickness of malignant melanoma.
Wood-light examination

**UVA radiation** (365 nm) emitted by the wood-light can produce colored fluorescence of hair and skin in case of specific skin alterations. A green fluorescence in case of **microspore**, red fluorescence in case of **erythrim**, white in case of onychomycosis and **vitiligo** is observed.

Histological procedure

In case of ambiguous diagnosis or to confirm a diagnosis, a **biopsy of the skin** can be performed. In this procedure, parts of the skin changes are excised as punching cylinders or small spindles of the skin. After fixation of the tissue sample, it can be histologically examined microscopically to detect and identify the skin disease.

In addition to the evaluation of epidermis, dermis and subcutis, it is possible to evaluate cancerous processes or autoimmunological illnesses using **immunohistochemical analyses** (antigen-antibody reactions) as well as **immunofluorescence**.

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