

Guide to acne and related conditions

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Skin blemishes are not a sign of poor hygiene, but have many other causes. The treatments available in therapy and skin care are just as varied, especially when the blemishes are similar to acne.

The occurrence of skin blemishes is evenly distributed across the sexes. There is a statistical increase in adolescence, but even older people are not immune. Subjective perception often makes the problem seem bigger than it really is. But what can you do if you are affected by skin blemishes and acne? In addition to brief descriptions, our guide presents a range of sources where you can find detailed information.

Many factors

Synonyms for the term skin blemish that catch the eye on the internet include acne, pimples, pustules, papules and blackheads. Regardless of how you describe the symptoms in detail, whether in layman's terms or technical jargon, it all happens in or around the hair follicle. There is agreement that, as a rule, it is not just one factor alone that plays a role locally, but several together. The influences in detail:

- **Disposition:** This refers to an individual's predisposition to changes or keratinisation disorders in the hair follicles.
- **Hormones:** Sex hormone levels and their ratio to each other cause differences in the activity of the sebaceous glands during puberty, menstruation, pregnancy, the change of life and the menopause.
- **Psyche:** The psyche is an unconscious signal transmitter for physical control. This affects skin reactions and the gastrointestinal tract, among other things.
- **Microbiome:** Disturbances in the hair follicles cause shifts in the populations of aerobic and anaerobic bacteria. Facultative pathogenic bacteria can multiply. This results in inflammation, especially when sebum secretion is affected. This leads to a reciprocal influence.
- **Exposome:** The spectrum of external influences on our outer shell is broad and consists of substances of various origins, physical factors such as temperature, radiation and mechanical stress, and, last but not least, microor-

ganisms. Some of these are particularly noteworthy:

- In *cosmetics*: there is ongoing debate about comedogenic (blackhead-causing) ingredients. On closer inspection, however, the chemical structure is less relevant than the physical properties such as high melting point, low lipid solubility or high concentration of the substances in question, which interfere sebum. Examples include excipients such as cetyl alcohol (hexadecanol), stearyl alcohol (octadecanol) and stearic acid (stearates). However, when used in appropriate low concentrations, comedogenicity is usually low or non-existent. The situation is different when non-degradable paraffin oils, petroleum jelly and mineral waxes form surface films that promote the growth of anaerobic, pro-inflammatory bacteria such as *Propionibacterium acnes*. The same applies to lanolin in the case of oily skin. Unfavourable populations can also develop resistance to preservatives.
- Excessive *hygiene* with frequent use of deep-cleansing surfactants promotes the penetration of allergenic preservatives and, by washing away physiological protective substances, carries the risk of infection by external pathogenic germs.
- *Working substances*: Here, too, it is non-degradable oils and fats with comedogenic properties. Halogenated hydrocarbons are a special group. Chloracne caused by chlorinated hydrocarbons is clearly molecule-specific. Preservatives and disinfectants containing chlorine atoms can lead to similar reactions.
- *Clothing* (tight-fitting and impregnated) is also part of the exposome,

but is less relevant as skin blemishes are less noticeable.

- **Radiation:** Under UV exposure, many substances react with atmospheric oxygen to form aggressive, inflammation-triggering peroxides. Ethoxylated alcohols and polyethylene glycols (PEG) from cosmetics and topical medicines are typical examples of this and cause acne aestivalis, also known as "Mallorca acne". Essential oils and terpenoid fragrances and natural substances behave in a similar way. A well-known peroxide is ascaridol, which is produced from tea tree oil.
- **Medicines:** Side effects of topical and oral medicines, including hormone preparations and contraceptives, were reported at the time.¹
- **Nutrition:** The grandmotherly warning that "lard causes pimples" no longer applies today because it is rarely offered anymore. Even though reliable studies are scarce, dietary habits such as high carbohydrate consumption and nutritional imbalances between saturated and essential fatty acids may contribute to an existing predisposition to acne. Androgen and sebum production in overweight individuals is reduced by lower calorie intake.

Fatty acid chemistry of sebum

The unimpeded flow of sebum to the skin's surface is the most important goal in the prevention and treatment of skin blemishes, including acne. The composition of sebum² and its fatty

acid chemistry have only recently been reported in detail.³ Contrary to earlier assumptions, the secretion does not yet contain any free fatty acids when it leaves the glands.⁴ Free fatty acids such as sapienic acid (16:1 n-10) at around 25% and sebaleic acid (18:2 n-10) are apparently only produced in the hair follicles by lipases in the microbiome.

With regard to fatty acids, it has also been observed that externally applied linoleic acid apparently has a preventive effect on early acne.⁵ A multicentre study conducted with phosphatidylcholine (PC) came to a similar conclusion.⁶ Soy PC contains mainly linoleic acid in its fatty acid composition and serves as the basis for liposome production.⁷

Guidelines

The classification and indicative treatment of acne and thus also the associated "skin blemishes" are the subject of the guideline "Treatment of Acne"⁸, which was published by the German Dermatological Society (DDG) and was valid until 31 December 2014. Version 2.1 (05.03.2024)⁹, published in the AWMF guideline register¹⁰ on 05.03.2024 under registration number 013 – 017 but not yet accessible, is scheduled to be completed by 31.12.25.¹¹

Organisations operating in the border area with cosmetics have also addressed this issue. For example, the guideline "Dermocosmetics for cleansing and caring for acne-prone skin"¹² developed by the Society for Dermopharmacy (GD), which also covers care with cosmetics, dates from 21 March 2013.

¹ H. Lautenschläger, "Ich vertrage das Produkt nicht" – Einfluss von Arzneimitteln auf Haut und Hautpflege, *Kosmetische Praxis* 2009 (2), 11-14

² M. Picardo, M. Ottaviani, E. Camera and A. Mastrofrancesco, Sebaceous gland lipids, *Dermatoendocrinol.* 1 (2), 68–71 (2009)

³ H. Lautenschläger, Langweilig oder spannend? Eine Reise durch die Fettsäure-Chemie der Haut, *Chemie in unserer Zeit*, <https://onlinelibrary.wiley.com/doi/full/10.1002/ciuz.202400008> (8. November 2024)

⁴ C. L. Fischer and P. W. Wertz, *Skin Microbiome Handbook: From Basic Research to Product Development*, Chapter 11: Effects of endogenous lipids on the skin microbiome, Wiley Online Library (14 August 2020)

⁵ C. Letawe, M. Boone and GE Pierard, Digital image analysis of the effect of topically applied linoleic acid on acne microcomedones. *Clin Exp Dermatol.* 1998 (23) 56-8

⁶ M. Ghyczy, H-P. Nissen and H Biltz, The treatment of acne vulgaris by phosphatidylcholine from soybeans, with a high content of linoleic acid, *J Appl Cosmetol* 1996 (14), 137-145

⁷ H. Lautenschläger, Liposomes, *Handbook of Cosmetic Science and Technology* (A. O. Barel, M. Paye and H. I. Maibach), 155-163, CRC Press Taylor & Francis Group, Boca Raton 2006

⁸ https://www.dermaostschweiz.ch/wp-content/uploads/2016/10/Akne_S2k.pdf

⁹ <https://www.awmf.org/service/awmf-aktuell/therapie-der-akne>

¹⁰ <https://register.awmf.org/de/leitlinien>

¹¹ <https://register.awmf.org/de/leitlinien/detail/013-017>

¹² [https://www.gd-](https://www.gd-online.de/german/veranstalt/images2013/GD_LL_Akne_Pflege_Fassung_21.03.2013.pdf)

[online.de/german/veranstalt/images2013/GD_LL_Akne_Pflege_Fassung_21.03.2013.pdf](https://www.gd-online.de/german/veranstalt/images2013/GD_LL_Akne_Pflege_Fassung_21.03.2013.pdf)

More recent are guidelines from other countries, e.g. the USA: "Guidelines of care for the management of acne vulgaris" from May 2024.¹³ Wikipedia¹⁴ offers a fairly good overview of the different types of acne, but contains some broken links.

Therapy

The treatment of acne is reserved for dermatology, although some cosmetic ingredients have a similar effect – sometimes not as quickly, but just as effective in the long term. It is therefore essential not to advertise terms such as "cure" in relation to preparations or treatments, even if some medicinal substances such as salicylic acid and azelaic acid may be found in cosmetics and are safe in certain concentrations according to the safety report required by the Cosmetics Regulation (KVO). Medicinal substances that are frequently used:

- Keratolysis: salicylic acid
- Anti-inflammatory: Azelaic acid, benzoyl peroxide, antibiotics, zinc salts, alcohols
- Regeneration ("comedolytic"): Retinoids such as tretinoin, isotretinoin, adapalene
- Antiandrogens
- Acid peels

Details are included in the guidelines. Some of the drugs have several effects at the same time. Anti-inflammatory action is usually the result of antimicrobial activity. Sometimes there is additional sebum-suppressing activity (e.g. with retinoids). This is also suspected with the topical application of linoleic acid.

The issue of excipients (preservatives, emulsifiers, paraffin oils, etc.) must also be considered when choosing topical pharmaceuticals. Where possible, the same base cream is used in medical therapy and cosmetic prevention in the sense of adjuvant corneotherapy. This enables a seamless transition from therapy to cosmetic prevention and vice versa. The cosmetic treatment of side effects such as dry skin (benzoyl peroxide) is facilitated by amino acids, for example.

Prevention

The prevention of blemishes and acne is the task of skin care. As far as possible in this area, the above-mentioned influencing factors are minimised by appropriate compositions. Similar to rosacea and perioral dermatitis, active ingredients are often used in the form of serums and lipid-containing cream bases are avoided.

Ideally, the serums contain carriers in the form of liposomal or nanodisperse linoleic acid-containing phosphatidylcholine. If creams are necessary in the second step or for dry late-onset acne, lamellar bases based on hydrogenated phosphatidylcholine and natural skin barrier components are recommended. They require a minimum of excipients. The active ingredients in detail:¹⁵

- **Keratolysis:** Salicylic acid (also antimicrobial), high-dose urea, α -hydroxy acids (AHA fruit acids). Free ascorbic acid (vitamin C) has a similar effect. Proteases from enzyme peels.
- **Anti-inflammatory:** Boswellic acids in frankincense inhibit microbial proteases. Essential fatty acids such as linoleic acid, α - and γ -linolenic acid fluidise the skin barrier and sebum and form anti-inflammatory metabolites. They are released from their triglycerides (linseed, kiwi, evening primrose and rosehip oil) by lipases. Other active ingredients include acetoside (ribwort plantain), berberine (barberry), components from chamomile, phosphatidylserine¹⁶ and astringents such as witch hazel, green and black tea, epigallocatechin gallate (EGCG) and liposomal zinc salts.
- Azelaic acid, high-percentage alcohol or isopropanol (disinfection, cleansing) and betulinic acid have **antimicrobial** effects.
- **Regeneration:** Vitamin A and its esters (KVO: face & hands), niacinamide (vitamin B₃), vitamin E and its esters, vitamin C esters such as sodium ascorbyl phosphate (INCI), isoflavonoids from red clover and soy, echinacea and D-panthenol.

¹³R. V. Reynolds et al., Journal of the American Academy of Dermatology 90 (5), 1006, E1-E30; [https://www.jaad.org/article/S0190-9622\(23\)03389-3/fulltext](https://www.jaad.org/article/S0190-9622(23)03389-3/fulltext)

¹⁴ <https://de.wikipedia.org/wiki/Akne>; accessed on 2 July 2025

¹⁵ H. Lautenschläger, Akne – Möglichkeiten der kosmetischen Prävention, Beauty Forum 2015 (2), 88-91

¹⁶ H. Lautenschläger, Trend zu physiologischen Inhaltsstoffen – Phosphatidylserin in der Hautpflege, Chemie in unserer Zeit 2024, 58 (5), 93-97

- **Skin cleansing:** Low-foaming cleansing gels without refatting agents, liposome-based lotions, enzyme peels.

Dr Hans Lautenschläger