

Biofactors in skin diseases: Avoiding zinc deficiency in acne

Zinc plays an important role in the prevention and treatment of acne vulgaris. The essential biofactor has an anti-inflammatory effect, regulates sebum production and supports the skin barrier.

Acne vulgaris is one of the most common skin diseases and mainly affects adolescents during puberty, but can also occur in adulthood. The causes are multifactorial and include hormonal, genetic and environmental factors. Studies show that acne patients are more likely to suffer from a zinc deficiency. Significantly lower zinc levels have been measured, particularly in inflammatory forms of acne.^{1,2}

How does zinc work for acne?³

1. anti-inflammatory effect

Acne is associated with a chronic inflammatory reaction. The body produces more pro-inflammatory cytokines such as interleukin-6, interleukin-8 and tumor necrosis factor. Zinc inhibits NF-κB signaling, which plays a central role in the regulation of these inflammatory mediators. Zinc also reduces lipoxygenase and cyclooxygenase activity, which means that fewer pro-inflammatory leukotrienes and prostaglandins are formed. In addition, zinc activates superoxide dismutase, an enzyme that neutralizes free radicals and thus protects the skin cells.

2. bacteriostatic effect:

The bacterium *Cutibacterium acnes* colonizes the sebaceous glands and intensifies inflammatory processes. Zinc influences the cell membrane of the bacterium, which makes its survival more difficult. In addition, the biofactor zinc inhibits bacterial lipase activity, which means that fewer pro-inflammatory fatty acids are formed from the sebum.

3. antiandrogenic effect:

Zinc inhibits the enzyme 5-alpha-reductase, which converts testosterone into dihydrotestosterone (DHT). DHT promotes sebum production and contributes to the development of acne. An adequate supply of zinc results in less DHT being produced, which reduces sebum production and can alleviate acne symptoms. Zinc also supports cell proliferation and the regeneration of the skin barrier.

Zinc and acne: the scientific evidence^{4,5,6,7}

Scientific studies show that acne patients often have low zinc levels in their blood. There is evidence of a significant zinc deficiency, particularly in inflammatory acne. Targeted oral zinc supplementation can help to compensate for this deficiency and improve the appearance of the skin. A

randomized, controlled study showed that a daily intake of 30 mg zinc can reduce inflammatory acne pustules by up to 50 %. The effectiveness was comparable to the daily intake of 100 mg of the antibiotic minocycline.⁸

Targeted compensation of zinc deficiency⁹

The Federal Institute for Risk Assessment recommends a maximum daily dose of 6.5 mg zinc in food supplements. In therapeutic use, especially for zinc deficiency and skin diseases such as acne, the recommended dosages according to the data are higher - usually between 10 and 50 mg of zinc per day. These quantities should be covered by appropriately approved medicines with good bioavailability. Organically bound zinc salts such as zinc orotate or zinc gluconate can be easily absorbed and utilized by the body.

Further information on zinc can be found here.

Literature:

¹ Classen HG et al. Zink-Mangel. Symptome, Ursachen, Diagnose und Therapie. MMP 2011; 3: 87-95

² Classen HG et al.: Wie wirkt der Biofaktor Zink auf das Immunsystem? Zeitschrift für Komplementärmedizin 2023; 15(03): 34-38

³ Bae YS et al. Innovative uses for zinc in dermatology. Dermatol Clin 2010; 28: 587-597

⁴ Cervantes J et al. The role of Zinc in the treatment of acne: A review of the literature. Dermatologic Therapy 2018; 31(1): doi: 10.1111

⁵ Dreno B et al. Multicenter randomized comparative double-blind controlled clinical trial of the safety and efficacy of zinc gluconate versus minocycline hydrochloride in the treatment of inflammatory acne vulgaris. Dermatology 2001; 203(2): 135-140

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⁷ Brand S: The clinical effects of zinc as a topical or oral agent on the clinical response and pathophysiologic mechanisms of acne: a systematic review of the literature. J Drugs Dermatol 2013; 12(5): 542-545

⁸ Wang H et al.: Maternal zinc deficiency during pregnancy elevates the risks of fetal growth restriction: a population-based birth cohort study. Sci Rep 2015 Jun 8; 5: 11262

⁹ <https://www.bfr.bund.de/cm/343/hoechstmengenvorschlaege-fuer-zink-in-lebensmitteln-inklusive-nahrungsergaenzungsmitteln.pdf>