

# A comparison – pharmaceutical and cosmetic active agents

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Medical drugs or cosmetics? Once the cosmetician realizes, that a skin condition demands more professional competency than she can provide in her institute, she recommends visiting a dermatologist. We compare pharmaceutical and cosmetic active agents.

The grey area between pharmaceutical and cosmetic preparations is increasing, in terms of promises of efficacy as well as the effects. This means more competencies on part of the cosmetician because she now can effectively treat various types of problem skins. Despite the enthusiasm though, it is quite important to respect the limitations in this case in order to avoid conflicts with the medical faculty but above all avoid conflicts with the law. Healing and curing activities are explicitly excluded in the Cosmetic Directive. Now, what exactly still falls under the category problem skin and where does the medical indication start? This is a rather complex question that often cannot be answered even by the experts who are in charge of the legislation.

Dry skin is a consequence of a barrier disorder. This type of skin, of course, is extremely sensitive based on the fact that if the skin hydration in the form of water vapor can pass through the skin barrier then the skin barrier, vice versa, is also open for the penetration of irritating working substances, allergens and microorganisms. The skin responds with erythema and itching. Now, the question arises whether we still deal with dry skin in this case or whether we already face the symptoms of atopic eczema? This is a rather difficult question, sometimes even for the physician.

What can be told for sure is that this skin also needs effective care. Dry, non-irritated skin can be treated with a lipid-rich cream which is equipped with a NMF (amino acids, urea) and hyaluronic acid. Atopic skin additionally requires substances that are anti-inflammatory, alleviate the itching and have a calming effect on erythemas. The ideal barrier cream is able to treat all the symptoms mentioned. However, in this context it is not allowed to promise a healing or curing effect.

## Counterproductive substances

Ingredients as well as INCI terms of the preparations used are an important topic, hence. The following issues should be considered:

- Emulsifiers may facilitate barrier disorders.
- Sensitizing preservatives are counterproductive.
- The same applies for scents that already easily pass through the skin barrier of healthy skin.
- Mineral oils form a coating film on the surface and reduce the natural recovery potential of the skin.

Clinical studies show that a professional selection of cream bases and active agents can already achieve excellent results. In other words: we have now changed into the field of corneotherapy. Opposed to it is the conventional pharmaceutical treatment with its specific indications.

## The comparison

The following table, which is not intended to be exhaustive, though, shows the indication in the first column, the second columns lists the typical pharmaceutical active agents and the last column names the alternative cosmetic agents for the adjuvant cosmetic skin care. As mentioned above, the appropriate cosmetic formulations can already achieve freedom of symptoms for the patient. This already seems like a gift to the individual concerned as he does not have to be afraid of the side effects which are characteristic for pharmaceutical preparations. If the medical treatment with pharmaceutical active agents is combined with an adapted skin care, we refer to adjuvant corneotherapy. Quite often even identical active agents are used, however, with differing functional properties. But what is to be said against the use of azelaic acid (up to 1 per cent) as a consistency substance in a cosmetic skin care product for the rosacea skin? By way of comparison pharmaceutical preparations contain a multiple dosage and show antimicrobial activity. It can be assumed that specifically in liposomal preparations this component will synergistically contribute to the recovery process. There is an

optimal interaction, if both pharmaceutical and cosmetic area apply the same base creams. In certain cases another alternative may be only

the use of sera respectively tinctures instead of cream bases.

Indication	Pharmaceutical active agents (partly also oral applications)	Cosmetic active agents
<b>acne (oily skin)</b> oily skin with efflorescences and comedones	benzoyl peroxide, retinoids, erythromycin and other antibiotics, azelaic acid, linoleic acid, salicylic acid, hormones, fruit acids, zinc oxide	phosphatidylcholine (liposomes) <sup>1)</sup> , linoleic acid, salicylic acid, azelaic acid, betulinic acid, vitamin A, yeast, ribwort, berberine
<b>acne (dry skin)</b> low fat skin with efflorescences and comedones; from the 3 <sup>rd</sup> decade of life	benzoyl peroxide, retinoids, erythromycin and other antibiotics, azelaic acid, linoleic acid, salicylic acid, hormones, fruit acids, zinc oxide.	vegetable triglycerides <sup>3)</sup> , phosphatidylcholine (nanodispersions) <sup>1)</sup> , linoleic acid, salicylic acid, azelaic acid, betulinic acid, amino acids (NMF), vitamin A, yeast, ribwort, berberine, phytohormones (red clover, soybean)
<b>actinic keratosis</b> pre-malignant chronic solar damage	diclofenac, 5-fluorouracil, 5-aminolevulinic acid, photodynamic therapy (PDT)	boswellia
<b>allergic contact eczema (contact dermatitis)</b> erythema, blisters, nodules, weeping blemishes after contact with allergens as e.g. nickel	corticoids, antihistamines, local anaesthetics	vegetable triglycerides <sup>3)</sup> and phytosterols to stabilize the skin barrier, avoiding dry skin
<b>couperosis</b> weak connective tissue with vascular dilation	retinoids, antibiotics (minocycline, doxycycline, metronidazole), azelaic acid	vegetable triglycerides <sup>3)</sup> , linseed oil, evening primrose oil, azelaic acid, betulinic acid, phosphatidylcholine (liposomes, nanodispersions) <sup>1)</sup> , echinacea, butcher's broom
<b>decubitus (bedsores)</b>	D-panthenol, antibiotics, anti-inflammatory and re-fattening cream bases (prevention)	non-aqueous base of vegetable triglycerides <sup>3)</sup> , phosphatidylcholine, hydrogenated phosphatidylcholine <sup>1)</sup> , and phytosterols (prevention)
<b>dry skin</b> skin barrier disorder: increased TEWL, low skin hydration	urea, linoleic acid, re-fattening cream bases	vegetable triglycerides <sup>3)</sup> , linoleic acid, ceramides, CM-glucan, amino acids (NMF), phosphatidylcholine (nanodispersions) <sup>1)</sup> , hydrogenated phosphatidylcholine (DMS base) <sup>2)</sup> , aloe vera, hyaluronic acid, CM-glucan
<b>gamma-radiation</b> erythema and dry skin due to radiotherapy	anti-inflammatory and re-fattening cream bases	phosphatidylcholine (nanodispersions) <sup>1)</sup> , evening primrose oil, linseed oil, amino acids (NMF), CM-glucan, urea, aloe vera, boswellia, echinacea
<b>hyper pigmentations</b> increased melanin formation	chemical peelings, hydroquinone	ascorbyl phosphate (vitamin C-phosphate); vitamin A, azelaic acid, phosphatidylcholine (liposomes, nanodispersions) <sup>1)</sup> , extracts: mallow, peppermint, cowslip, lady's mantle, veronica, lemon balm, ribwort
<b>ichthyosis (fish scale disease)</b> disorder of corneocyte desquamation	retinoids, urea (keratolytic)	vegetable triglycerides <sup>3)</sup> , phytosterols, vitamin A, phosphatidylcholine (nanodispersions) <sup>1)</sup> , hydrogenated phosphatidylcholine (DMS-base) <sup>2)</sup>

Indication	Pharmaceutical active agents (partly also oral applications)	Cosmetic active agents
<b>inflammation (dermatitis)</b> (cf. eczema, dermatoses, neurodermatitis etc.)	antibiotics, antimycotics, antihistamines, immunosuppressive agents, corticoids, chamomile, calendula, D-panthenol	evening primrose oil, linseed oil, boswellia, D-panthenol, phosphatidylcholine (nanodispersions) <sup>1)</sup> , echinacea
<b>laser treatments</b> pre- and follow-up care to impede melanin formation	---	ascorbyl phosphate (vitamin C-phosphate), phosphatidylcholine (liposomes) <sup>1)</sup> , extracts: mallow, peppermint, cowslip, lady's mantle, veronica, lemon balm, ribwort
<b>neurodermatitis</b> inflammatory barrier disorder with pruritus, with varying degree of severity	antiseptics, corticoids, immunosuppressive agents, antihistamines, urea (skin hydration, pruritus), polidocanol (pruritus), evening primrose oil, D-panthenol	vegetable triglycerides <sup>3)</sup> , linseed oil, evening primrose oil, linoleic acid, phytosterols, ceramides, urea, allantoin and other amides, phosphatidylcholine (nanodispersions) <sup>1)</sup> , boswellia, hydrogenated phosphatidylcholine (DMS base) <sup>2)</sup>
<b>perioral dermatitis</b> small red or inflamed nodules/blisters around the mouth	erythromycin, minocycline, metronidazole, azelaic acid, tannins	boswellia, phosphatidylcholine (nanodispersions) <sup>1)</sup> , azelaic acid, green tea, hamamelis, echinacea, butcher's broom
<b>perianal barrier disorder</b> sore areas on the buttocks, frequently caused by excessive body hygiene	antiseptics, hamamelis, D-panthenol, anti-inflammatory and re-fatening cream bases	non-aqueous base of vegetable triglycerides <sup>3)</sup> , phosphatidylcholine <sup>1)</sup> , hydrogenated phosphatidylcholine <sup>2)</sup> , phytosterols
<b>psoriasis</b> exfoliative dermatitis with inflammatory skin condition due to increased and accelerated cornification (hyperkeratosis)	dithranol (cignolin), salicylic acid, urea, tar preparations, corticoids, calcipotriol, retinoids, cyclosporin A, psoralen, fumaric acid, fumaric acid ester	evening primrose oil, linseed oil, phosphatidylcholine (liposomes, nanodispersions) <sup>1)</sup> , fumaric acid, urea
<b>rosacea</b> erythema and connective tissue disorder	retinoids, antibiotics (minocycline, doxycycline, metronidazole), azelaic acid	vegetable triglycerides <sup>3)</sup> , linseed oil, azelaic acid, betulinic acid, phosphatidylcholine (nanodispersions) <sup>1)</sup> , vitamin A
<b>scars</b> indurations of the connective tissue with varying degree of severity	retinoids, heparin, chemical peeling	vitamins A, C, E, coenzyme Q10, D-panthenol, phosphatidylcholine (nanodispersions) <sup>1)</sup> , hydrogenated phosphatidylcholine (DMS-base) <sup>2)</sup>
<b>striae</b> scarred tissue caused by hyperextension	vitamin A acid, trichloroacetic acid (chemical peeling)	prevention: rose hip seed oil, linseed oil, vitamin E, coenzyme Q10, phosphatidylcholine (nanodispersions) <sup>1)</sup>
<b>sun burns and burns</b> (erythema)	antiseptics, NSAID, D-panthenol	linseed oil, linoleic acid, D-panthenol, phosphatidylcholine (nanodispersions) <sup>1)</sup> , echinacea, boswellia
<b>toxic degenerative eczema</b> chronic cumulative toxic contact eczema	corticoids, allantoin, hamamelis, antiseptics, D-panthenol, anti-inflammatory and re-fatening cream bases	vegetable triglycerides <sup>3)</sup> , evening primrose oil, linseed oil, phytosterols, hydrogenated phosphatidylcholine (DMS cream base) <sup>2)</sup> , ceramides, urea, allantoin, D-panthenol, hamamelis

Annotations to table:

1) Phosphatidylcholine itself is a very effective active agent due to its linoleic acid content. On the other hand, it serves as an intensifying agent for the penetration of polar aqueous agents (in liposomes) and lipophilic agents (in biologically degradable nanodispersions). In particular fat oils as e.g. linseed oil, evening primrose oil as well as fat-soluble vitamins

become better available for the metabolism and more acceptable for the customers in terms of sensorial properties.

2) Besides triglycerides, phytosterols, squalan and ceramides, hydrogenated phosphatidylcholine is a texturing component of emulsifier and preservative free DMS base creams with skin-related membrane structure.

- 3) Vegetable triglycerides can be neutral oils (medium-chain triglycerides), avocado oil, wheat germ oil, almond oil, or the like. Specific triglycerides like evening primrose oil (main active agent: gamma-linolenic acid), linseed oil (main active agent: alpha-linolenic acid), rose hip seed oil (linoleic acid & alpha-linolenic acid) are listed separately.
- 4) The active agents listed in the table above are used separately or in adequate combinations depending on the specific skin condition.

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