

Pills to supplement the diet – the impact of food supplements on the skin

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Food supplement sales are booming – not only in pharmacies. They are supposed to compensate organic deficits, de-acidify the body or relieve the skin from wrinkles. Which of the promises are realistic?

Vitamins, minerals and trace elements are the classic substances among food supplements. Food supplements are subject to the food law and serve health purposes however are not intended to fulfill therapeutic purposes. The word has spread that a balanced diet including fruit and vegetables almost never leads to deficits in essential substances or in other words, substances that the body cannot produce. Studies can prove this statement. There also are substances that can have counterproductive effects when consumed in high dosage. While no evidence is available for a higher life expectancy when ingesting various food supplements, it is known that a regular intake of carotenoids – carotene and vitamin A – tends to result in life shortening effects.

How come that food supplement sales are on the increase when their benefits are in doubt? Why are there more and more new substances on the market that supposedly are deficient in our body or become deficient with the process of aging? Do they actually improve our well-being and which of them have an effect on the skin?

Just as in other areas of life, the psyche has an important influence on our purchasing behaviour. Only the awareness that we actively support our health leads to the fact that we feel a lot better. In this respect it can be said that an improved quality of life can also be achieved with placebo effects. This implies that placebos can be useful.

Afraid of deficiency signs

Nevertheless, the term “placebo effect” is not very useful for effective marketing campaigns. That is why marketing departments emphasize the scientifically attested effects of deficiency situations. On top of that, food supplements receive a certain upgrade by registering them in the German Central Pharmaceutical Number System (Pharmazentralnummern – PZN). It is usually unknown to consumers, however, that this system only serves as identification code in the merchandise planning and control sys-

tem of pharmacies and is not related to any product features.

It is an ancient wisdom that nutrition has a significant influence on the condition of our skin. Even reduced water consumption multiplies the wrinkles on our skin – particularly with advancing age. An increased intake of liquids however is not sufficient to influence the wrinkles. Drinking plain water without any mineral matter in the daily recommended amount of at least two liters would even be counterproductive when the mineral balance is not compensated by other food since the kidneys constantly exude salts with the urine.

There are various theories purporting that certain foods such as sweets, milk, specific animal fats or an unfavourable ratio of essential omega-3 to omega-6 fatty acids have negative effects, as for instance a hyperacidity of the body, pustules, intensified acne, barrier disorders or a modified susceptibility to microorganisms. Quite apart from the fact whether such theories actually are true, it is possible to optimize the metabolism by selecting the adequate sources of food. Just to stick to our examples: adequate food sources would be sugar substitutes, yoghurt, vegan nutrition, linseed oil and low-acid foods. A fairly frequent attitude however is that people maintain their usual eating habits and take food supplements in the form of pills. This is as useless as trying to cure the skin of smokers by taking lots of vitamins. In this case only the minimalistic principle has a chance of success – in other words a consequent stop of smoking respectively reducing other things as for instance eating sweets.

Bothering metabolites

In addition to the decade-long belief that toxin deposits build up in the body and in the skin, a belief which still has been inspired by the discussions on diesel and nitrogen radicals, also the toxicity of industrial and environmental substances (pollution) and their impact on organism and skin is debated. They allegedly form deposits in skin and hair. There is a mul-

titude of remedies to protect against them and other substances and to get rid of such toxins, ranging from alkaline-based diet (acids), via fasting (lipid substances) and sauna visits (metabolic products) up to taking food supplements that eliminate heavy metals or, by anti-oxidant action, radicals. On closer examination it becomes obvious that the harmful substances frequently are not defined on the one hand and on the other hand, that there is no reliable evidence available for effective elimination. By the way, it should be mentioned that the body, without a lot of fuss, eliminates these substances via oxidative processes and subsequent glucuronidation via kidneys and urine. There are exceptions though, such as age marks that contain endogenous metabolites from oxidized proteins and lipids (lipofuscin) or proteins and sugars (advanced glycation end products, abbreviated AGE). They can only be removed by laser treatment, specific peelings or similar measures. Inert lipid-soluble substances such as polycyclic aromatic compounds (PCA) or chloroaromatic compounds that are stored in the fat tissue also degrade very slowly and are rather concentrated than eliminated during fasting. With respect to anti-oxidants that are supposed to have internal and external effects against radicals, it should be kept in mind that in certain cases and depending on certain conditions they can be counterproductive, as for instance when taken in excess either orally or topically, during chemotherapy, with intense athletic activities and in the prevention of diabetes. Taken as food supplements they have no visible influence on the skin.

At first glance it seems tempting to orally administer specific active agents that also are used in the skin care, since the absorption via gastro-intestinal tract is far more effective than via the hardly conquerable skin barrier – even if specific penetration enhancers are applied. The excellent absorption however is faced with the disadvantage of the active agent spreading over the whole body and thus related its dilution.

Too much of a good thing?

A topical application offers the advantage of administering high doses onto specific areas. With the exception of local overdosage that should be avoided, the risk of systemic effects can be neglected with topical application. With the oral administration of physiologically relevant heavy metals such as zinc and copper, by contrast, it is necessary to observe an adequate ratio balance among the substances. Disorders in the ratio balance of the two metals can be found in the context of rheumatic dis-

eases. It should also be mentioned that high doses of iron can impede the zinc metabolism. Isoflavones (phytohormones) are an interesting substance group for body and skin around the menopause and in the case of hormonal fluctuations. Isoflavones often are a daily component of the nutrition in Asian countries and obviously soothe menopause symptoms. They are ingested via soya products. Isoflavones stimulate the collagen synthesis and slow down collagen degradation, among other properties. Vitamin D is a substantial oral supplement in cases where the natural synthesis in the skin is impeded through UV filters and sun abstinence. The vitamin is essential for an undisturbed metabolism but has no direct influence on the complexion.

With essential fatty acids it should be taken into account that orally taken essential fatty acids are differently metabolized from topically applied ones. Topically applied linoleic acid is integrated into the barrier-active ceramide I. At the same time, anti-inflammatory reaction products form through 15-lipoxygenase action. When orally taken, arachidonic acid (omega-6) forms during the liver passage and partly also eicosapentaenoic acid (omega-3), of which the various precursors and metabolites are integrated in regulatory circuits and transformed among others into local hormones as for instance prostaglandins. Eicosapentaenoic acid is a component of fish oil capsules. Alpha-linolenic acid, also omega-3, occurs in linseed and kiwifruit oil. Oral administration then is advantageous when complex compounds of natural origin are involved, such as yeast of which the B-vitamins content also is beneficial for the skin. Frequently substances that are more or less useless when taken individually then have synergistic effects. Also the intestinal microbiome copes better with natural compounds than with the pure, partly overdosed chemicals that can lead to imbalances. This also explains why probiotic food works out successful and after its breakdown in a well-functioning digestive system finally also is beneficial for the skin. By the same token, it is well-known that a disordered digestion is counterproductive for the skin. Beyond that, the intestinal flora also produces essential substances such as vitamin K.

Supportive of the skin

One reason for taking food supplements is that they prevent a potential deficiency. However, since the body stores most of the vital substances for some time, symptoms of deficiency do not appear even if fruit and vegetables are not consumed for days. On the other side, the continued consumption of carrots influences the complexion. It gets darker and even de-

velops a light sun protection effect. As a matter of fact, this also applies to carotene pills. Resveratrol which abundantly occurs in red wine and is an antioxidative polyphenol with trans-stilbene structure has no measurable influence on the skin, though. Similar to the oligomeric proanthocyanidins (OPC) contained in red wine, it is also promoted as an antioxidant in skin care preparations. Coenzyme Q₁₀ is better suited for the external treatment. Irrespective of its molar mass, the polymeric hyaluronic acid is broken down into its individual components before absorption, with N-acetyl-glucosamine respectively glucosamine being the most relevant of the individual components. With oral administration it is supposed that the turgor-influencing hyaluronic acid only has a negligible effect on the new synthesis, while positive evidence for this effect is available for topical penetration. In this context it cannot be excluded that the microbiome of the skin breaks down the low molecular hyaluronic acid into N-acetyl-glucosamine. Similar mechanisms can be assumed with collagen preparations. In the case of a balanced diet with an appropriate amount of meats, it is supposed that collagen drinks as supplier of amino acids only have negligible effects. The studies cited as evidence unfortunately do not provide information on how many of the test persons have been avoiding meats, reducing meats and above all, avoiding all the different kinds of sausage. Their quota meanwhile has been increasing to a higher double-digit percentage and hence has a significant influence on the study results.

Bromelain is another substance with peptide structure. In the cosmetic field, this enzyme found in pineapples is used for enzyme peelings. Integrated into gastro-resistant pills, fragments of this enzyme get to the nasal area where they reduce swellings. A similar approach is the long-term intake of pollen where a gradual desensitization against hay fever and allergic asthma can be observed. It would be interesting to figure out whether also the skin then becomes less sensible to allergies.

Role of amino acids

In the context of amino acids, creatine and L-carnitine should still be mentioned. They play a role in the muscular metabolism and fat reduction. An effect on the skin could not be proven, though. Also phosphatidylcholine which is a component of lecithin and a multifunctional substance in the dermatological skin care has almost no influence on the skin when ingested in the form of a food supplement. An exception is the protection of the gastric mucosa, for instance when administered in combination

with the intake of non-steroidal anti-inflammatory drugs (NSAID).

There are more and more new studies published with experimental test values suggesting a deficiency in any of the natural substances of the body that can be compensated with adequate food supplements. In this context often the in-vitro results are extrapolated to in-vivo conditions and the fact is neglected that experimental laboratory data should not be "normalized" without knowing whether they are significant for the well-being of a person. That is why studies always should be scrutinized.

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