

NUTRITIONAL DEFICIENCIES AND THE SKIN

(From Beauty NZ Magazine)

Skin ageing is an unfortunate but continuous process. It is heavily determined by a combination of influences, including internal or intrinsic ageing, that cannot be altered. These include hormone status, environmental exposure (e.g., smoking, ultraviolet light exposure), diet and digestion.

Poor diet and digestion result in nutritional deficiencies which can then influence skin health. Sometimes, for instance, it's not a dietary deficiency, but a food sensitivity or allergy that can cause dermatitis.

In our fast-paced lives, we tend to rely on convenience or processed foods. This creates a situation of taking in calorie dense, but nutrient sparse foods – like a muffin, which has a lot of empty calories in the form of sugar and flour, but no significant useful constituents like B vitamins, or Vitamin C or protein.

You are not just what you eat – you are what you eat, absorb and are able to eliminate. It's not just about diet, it's about how your body goes about dealing with food and other things in your environment that affects your body's use of food.

In my experience, the diet of most females from childhood to their 40s tends to be low in iron and vitamin B12 – we know this because it is easy to measure. And, although we cannot easily measure them, I also suspect that most of us are deficient in nutrients like selenium, vitamins C, E, A and B vitamins.

In this article, we look at each nutrient individually, and then cover some skin conditions. It is one thing to know that certain vitamins used topically exert beneficial effects, but there has not been much research on the benefits of internal vitamins from food on skin health.

Coenzyme Q10 is produced in the body, as long as bowel flora are healthy, and there are adequate B vitamins to help in its production. It is important in cellular energy production – without energy, the skin cells can't do what they are supposed to do. It also acts as an antioxidant and as such is an anti-ageing agent. Rich dietary sources are fatty fish like sardines, and beans, nuts, whole grains, and meat.

Copper is an essential trace element and is found in organ meats like liver, seafood, mushrooms, beans, nuts, whole grains, and chocolate. Its relevance to the skin is that it helps control free radicals, by enabling superoxide dismutase – hence the copper peptide eye creams. Copper enables skin formation and repair by enabling the enzyme lysyl oxidase which cross-links lysine (an amino acid or protein building block) in collagen and elastin. Tyrosine is a copper activated enzyme which contributes to the synthesis of melanin.

Fish oils contain EPA and DHA which both act in many ways to help inflammation in the body and skin. They are found in oily fish like herring, sardines, mullet, and salmon.

Flavonoids refer to fruit and vegetable and other food constituents like quercetin, rutin and hesperidins, proanthocyanidins, anthocyanocides, epigallocatechin gallate, and genistein. Onions and apples are a rich source of quercetin. Citrus fruits contain rutin and hesperidins. Bilberry is rich in anthocyanosides. Soy products are rich in genistein. Green tea contains epigallocatechin gallate.

Other top foods include blueberries, grapes, cranberries and black tea, but green tea is a higher antioxidant. All flavinoids have been found to be strong free radical scavengers and act as anti-inflammatories and antioxidants. When also associated with vitamin C in foods, flavinoids exert an even stronger effect. Coffee is not something you can become deficient in, but contains many flavinoids and acts as a strong antioxidant.

Magnesium is found in green leafy vegetables, nuts, peas, beans, and whole grains. It is the busiest mineral, being required for 300 reactions in the body. Its relevance to skin is that it is important for cellular energy production – the skin cells need energy to function best. It is also important to help the body deal with other nutrients that influence the skin like zinc, copper and iron, and it helps in the production of gastric hydrochloric acid.

Without gastric acid, protein is not properly digested and so some vitamins like magnesium and zinc are not absorbed into the body. Those aged 40 or over may start to need help with protein digestion in the stomach.

A simple test to find out whether you need gastric (stomach) acid is to take a teaspoon of apple cider vinegar on an empty stomach. If there is no response – you need digestive acid. If you get heartburn, you have enough acid. A simple way of getting enough acid is to eat plenty of lemon juice and vinegar as well as bitter foods in your diet. This may be why Mediterranean people often have good skin.

Manganese is a component of superoxide dismutase, a powerful antioxidant in the body. Foods containing manganese include nuts, fruits and vegetables – especially hazelnuts, blackberries, pineapple, lentils, beans and whole grains. Manganese is lost in the milling of whole grains.

Selenium is an essential mineral found in seafood, liver, lean red meat, brewer's yeast, kelp, garlic, milk, eggs and grains grown in selenium-rich soil. In New Zealand, we have a deficiency of selenium in the soil so extra attention must be given to the diet. Brazil nuts are especially rich in selenium. Selenium is an important cog in the antioxidant wheel. It is an important component of glutathione, a strong antioxidant. It is also important for the detoxification of toxins.

Vitamin A is found in liver, fatty fish and dairy products. Its role is to regulate and control cellular growth and differentiation (a stable cell state that does not develop into cancer). We know that applying it topically in the form of retinoids improves wrinkles, skin and various conditions like acne, rosacea, etc.

Little Research

There has been very little research on vitamin A in the diet, but I did find a reference to a study of vitamins E, C and carotenoids (which come from vitamin A) that protect the skin from UV light. They studied middle aged women with wrinkles, dry and thin skin and found that a diet rich in vegetables, fruit and olive oil (containing polyunsaturated fatty acids) caused improvement.

Vitamin B2 or riboflavin is known to help the skin when included in skincare products. When deficient internally, it is one of the causes of cracks at the corners of the mouth called angular cheilosis. Vitamin B2 is found in dairy products, fish, meats (especially liver and kidney), green leafy vegetables and whole grains.

Vitamin B3 or niacin is found in eggs, whole grains, liver, meat and legumes. Deficiency of vitamin B3 causes a condition called pellagra which consists of diarrhoea, dermatitis, and dementia. Although pellagra is rare in New Zealand, in anyone with dermatitis, and inquiry about diet may be useful.

Vitamin B5 or pantothenic acid is found in foods and is also made by gut flora. Foods include liver, sunflower seeds and whole grains – but processing depletes it. Vitamin B5 is needed locally in the skin for wound healing – that means it's important for collagen production. It is also needed for energy production. This vitamin, along with many of the other B vitamins and vitamin C, magnesium and zinc, are depleted by stress.

Vitamin C is well known to act topically on the skin to boost collagen production, reduce oxidation and reduce brown pigmentation – it is the skin's super vitamin. Internally, it is well known to enhance wound healing. It is also a major antioxidant, helping the immune system and having anti-tumor activity. Vitamin C is rapidly depleted by stress, and it is my clinical impression that many people are deficient because they don't take enough foods containing it in their diets. The skin symptoms of vitamin C deficiency include bruising, dry skin, poor wound healing, bent or coiled hairs. There is also gum bleeding. Foods containing vitamin C include all citrus fruits, blackcurrants, tomatoes, rosehips, and vegetables – peppers, broccoli and cabbage. However, there is much loss of the vitamin in cooking.

Vitamin D is not significantly obtained by diet unless you eat fatty fish like herring, salmon, kipper and mackerel, or take cod liver oil. It is largely made in the skin and the kidneys after the sun contacts the skin. It is a powerful antioxidant. Research has looked into vitamin D's role in the prevention of malignant melanoma. Whether the increasing incidence of melanoma is connected with the increasing use of sunscreens has not yet been proven or dismissed.

Vitamin E works hand-in-hand alongside vitamin C in the skin. It is an important antioxidant. Food sources include wheat germ oil, vegetable oils or their seeds (sunflower, avocado) and nuts – especially hazelnuts and almonds.

Zinc, like magnesium, is also a very busy mineral, being required for 300 reactions in the body. It plays important roles in the immune system, wound healing (and therefore collagen production) and for the thyroid. A slow thyroid causes dry skin. Zinc also plays an important role in the production of stomach acid. Zinc is found in lean red meats, seafood (especially herring and oysters), yeast, pumpkin seeds, nuts, whole grains, green leafy vegetables and legumes.

It's not just vitamins, coenzyme Q10, fish oil, vegetable oils and some special foods like tea and coffee that are important for the skin. There is also research on amino acids (or protein building blocks).

Cysteine is the precursor to glutathione, the powerful antioxidant and detoxifier of the body. Although we generally know cysteine for its help in preventing cancer, heart disease and toxicity, it is also known for its ability to prevent hair loss and its help in wound healing. It is found in eggs, meat, dairy products, grains and beans.

Proline, lysine and arginine are all amino acids that stimulate wound healing. Proline is concentrated in collagen and is involved in collagen synthesis, which is essential to wound healing. Proline helps skin texture by assisting syntheses of collagen and reducing loss of collagen through the ageing process. Proline is used in cosmetic skin care products where it is usually combined with vitamin C to enhance its actions. Proline is found in high protein foods like meat, cottage cheese and wheat germ.

Lysine, along with zinc, is one of the most common nutrients in ointments and creams used for wound healing. Collagen is a protein rich in lysine, proline and arginine which are essential for wound healing. Patients who most benefit from these creams are those with burns and trauma. Glycerine is

found in brewer's yeast, dairy products, eggs, fish, legumes, meats, nuts, seafood, seeds, soy, whey, whole grains and gelatin, which is 33% lysine.

Arginine is found in fish, poultry, meat, oats, soy, walnuts, dairy products, carob, chocolate, brown rice, wheat and wheat germ, raisins, and sunflower seeds.

Skin Conditions

Now for some skin conditions which the diet as well as deficiencies could contribute to:

Acne is often improved or even cured (especially if the sufferer is a teenager) when the dietary intake of excessive sugar and starches (like cakes, bread and pasta) are reduced. Then there is room for more intake of fruits and vegetables which contain zinc, and vitamins A, C and E.

Atopic dermatitis/eczema is usually of allergic origin. It is helped by excluding foods from the diet that the person is sensitive to – most often dairy, gluten (bread and pasta), but sometimes can include some nuts, seafood, fish or beef. A higher intake of foods containing omega 6 helps the skin here, too – that's vegetable oils or a supplementation of evening primrose oil.

Dermatitis of unknown cause can commonly occur in older people. This can be due to multiple nutritional deficiencies from diet, poor gut function, or poor absorption from the stomach or large bowel. These situations occur as a person ages. I have seen a case of discoid eczema recover when the zinc deficiency was addressed.

Herpes infection or cold sores are due to the deficiency of lysine, which is an amino acid (protein building block). There seems to be a relative imbalance between the amino acids arginine (which enhances viral replication) and lysine (which inhibits viral replication). You can take lysine as a supplement or just get a better balance of lysine versus arginine foods. Arginine foods are listed above. Lysine foods include wheat germ, cottage cheese, chicken, wild game, pork, and avocados.

It appears obvious from this that a great diet full of a variety of fruits, vegetables, seeds, nuts and good quality protein don't just help your general health, but also your skin. After all, as the skin is the largest organ in the body, what's good for the body is good for the skin!