



## Nutritional deficiencies and the skin

Skin ageing is a continuous process that is heavily determined by influences including intrinsic ageing that cannot be altered, as well as some that can be. These factors include hormone status, environmental exposure (e.g. smoking or ultraviolet light exposure), diet and digestion.

At Skinfresh Clinic, we like to help inside health in order to enhance the outside skin. After all, the skin is the largest organ in the body.

Nutritional deficiencies can occur as a result of poor diet and digestion. This, in turn, can then influence skin health. Sometimes it's not a dietary deficiency, but a food sensitivity or allergy that causes dermatitis.

In our fast lives, we so often grab convenience foods as we rush along. This tends to create a situation where you take in calorie dense, but nutrient sparse foods. For instance, a muffin can have a lot of empty calories in the form of sugar and flour, but no significant useful constituents such as B vitamins, Vitamin C or protein.

## Diet and how your body deals with food

You're 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 the way your body uses food.

In my experience, most females from childhood to their 40's tend to be low in iron and Vitamin B12. We know this because these factors are easy to measure. Although we cannot easily measure them, I also suspect that people in general are deficient in nutrients such as selenium, Vitamin C, E, A and B vitamins.

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

## Nutrients vital to skin health

**Co-enzyme 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, it is an anti-ageing agent. Rich dietary sources are fatty fish such as sardines, beans, nuts, whole grains and meat.

**Copper** is an essential trace element found in organ meats such as liver, in 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 elastic. Tyrosine is a copper-activated enzyme which contributes to the production of melanin, which is what gives the skin its pigment.

**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 such as herring, sardines, teal, mullet and salmon.

**Flavonoids** refer to fruit and vegetable and other food constituents such as quercetin, rutin and hesperidins, proanthocyanidins, anthocyanocides, epigallocatechin galatin, 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 galatin.

Other top flavinoid containing foods include blueberries, grapes, cranberries and black tea, though 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 it 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 in the body, being required for 300 reactions. 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 such as zinc, copper and iron. It also helps in the production of gastric hydrochloric acid.

Without **gastric acid**, protein food that reaches the stomach is not properly digested. Likewise some vitamins, magnesium and zinc are not absorbed into the body to be used without sufficient gastric acid. People 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, brewers 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's role in the body as well as the skin is as an important cog in the antioxidant system. It spares Vitamin E and is an important component of glutathione, which is a strong antioxidant in the body. Glutathione is also important for detoxification in the body.

## Vitamins for healthy skin

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

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 orange/red vegetables and tomatoes) which protect the skin from UV light. The study looked at 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) brought about improvement.

**Vitamin B2 or riboflavin** is known to help the skin when it is included in skincare products. When deficient internally, it is one of the causes of cracks at the corners of the mouth – the condition 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, for anyone with dermatitis an enquiry about diet may be useful.

**Vitamin B5 or pantothenic acid** is found in foods and is also made by gut bacteria. 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 and often put 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 internally, helping the immune system and having anti-tumour activity. Vitamin C is rapidly depleted by stress.

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 that contain Vitamin C include all citrus fruits, blackcurrants, tomatoes, rosehips and vegetables such as peppers, broccoli and cabbage. However, much of the vitamin gets lost during cooking.

**Vitamin D** is not significantly obtained by diet unless you eat a large quantity of fatty fish such as 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. There may not be a coincidence that we've seen an increasing incidence of melanoma along with the increasing use of sunscreens.

**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, in wound healing (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.

## The role of amino acids in skin health

It's not just vitamins, co-enzyme Q10, fish oil, vegetable oils and some special foods such as tea and coffee that are important for the skin. There is also research on the role of amino acids (protein building blocks).

**Cysteine** is the amino acid precursor to glutathione, a 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 production, which is essential to wound healing. Proline helps skin texture by assisting production of collagen and reducing loss of collagen through the ageing process. Proline has been used in cosmetic skincare products where it is usually combined with Vitamin C to enhance its actions. Proline is found in high-protein foods such as meat, cottage cheese and wheat germ.

**Lysine**, along with zinc, is one of the commonest 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. People who most benefit from these creams are those with burns and trauma. Lysine is found in brewers yeast, dairy products, eggs, fish, legumes, meats, nuts, seafood, seeds, soy, whey, whole grains and gelatine, 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 affected by diet

Some skin conditions are affected by diet and possible dietary deficiencies.

**Acne** is often improved or even cured (especially if the sufferer is a teenager) when the dietary intake of excessive sugar and starches such as cakes, bread, pasta are reduced. Then there is room for more intake of fruits and vegetables which contain zinc, and Vitamins A, C and E. Correction of zinc deficiency also helps acne.

**Atopic dermatitis** or **eczema** is usually of allergic origin. It is helped by excluding foods that the person is sensitive to. Most often this is dairy, gluten (bread, pasta), but sometimes can include particular nuts, seafood, fish, or beef. A higher intake of foods containing Omega 6 helps the skin here too, in other words eat more vegetable oils or use a supplement 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 patient's zinc deficiency was addressed.

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

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 the skin. After all, as the skin is the largest organ in the body... what's good for the body is good for the skin!