

Food and Nutrition Communication

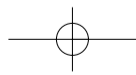
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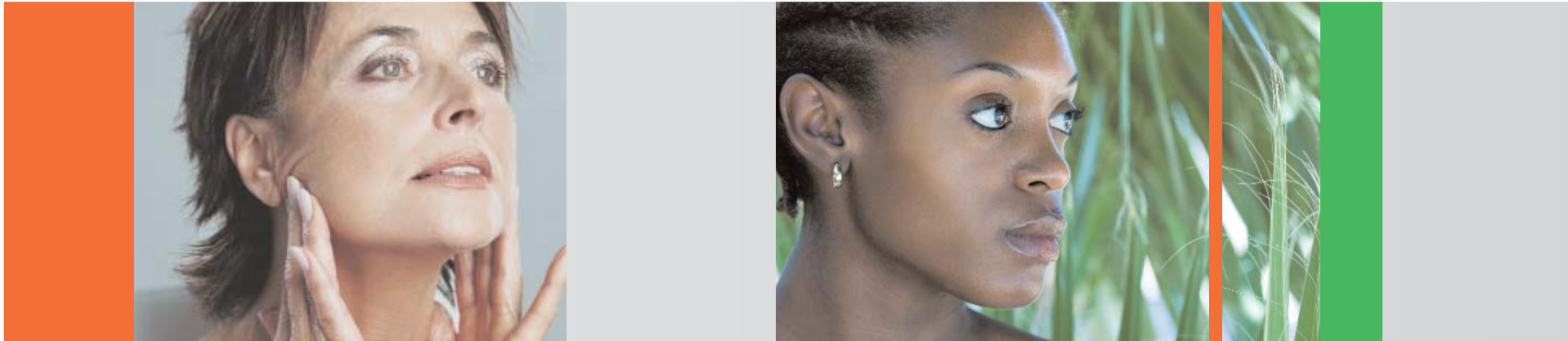


Healthy Skin

Good nutrition is important for good skin. The skin has medical importance, as many diseases are visible at skin level, and it has a very obvious psychological and social importance.

In this edition we explore ways to keep skin as healthy and attractive as possible for as long as possible, and list some skin conditions that require specialist treatment.





Why Nestlé is interested in skin

Nestlé is the world nutrition, health and wellness company, and a good, healthy skin is a visible sign of health and wellness.

Skin is the largest organ of the body, and like any other organ, it gets its nutrients through the blood circulation and thus from what we eat and drink.

Food and beverages have always been Nestlé's business, but we also have two joint ventures with L'Oréal specifically related to skin:

The first is **Galderma**, today's world leader in topical dermatology prescription products. Galderma was founded in 1981, to bring innovative treatment to patients with skin diseases. Particularly successful prescription products are *Differin*, the world leader in anti-acne treatment, *Loceryl*, an anti-fungal drug, *Tri-Luma* for the treatment of melasma, and the *Clobex* range for the treatment of psoriasis. Following on from the success of these and other products, Galderma is widening its field of action by going beyond drug-based treatments to focus on light procedures of aesthetic dermatology.

The second joint venture with L'Oréal is **laboratoires innéov**. Established in 2002 and based in France, this company specialises in non-prescription, over the counter nutritional supplements for skin and hair care, available in pharmacies in 15 European countries.

L'Oréal, the world's leading cosmetic company, and Nestlé both have complementary state-of-the-art research material. The joint venture *laboratoires innéov* was set up so that a growing consumer interest in skin and hair health could be satisfied, drawing on the best in both nutrition and cosmetics research. Nestlé and L'Oréal each own 50% of the joint venture.

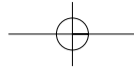
The polyvalent role of the skin [1]

The skin is the largest organ in the human body because it has the largest surface area of all the organs. What is not often realised, however, is that the skin is also the largest organ in terms of weight, and accounts for about 14% of body weight (about 10kg for a person weighing 70kg). This is about the equivalent of the weight of the skeleton. For the average adult human, the skin has a surface area of between 1.5–2.0 square meters, most of it between 2–3mm thick, although this is subject to considerable variation according to which part of the body it covers. The average square centimetre of skin contains approximately 100 sweat glands, 4 blood vessels, 10,000 melanocytes, and more than 155 nerve endings.

The skin can also be considered as "the external intestine" in the sense that the epithelia of the intestine and that of the skin are continuous.

The skin protects the body from the outside world and is also a sensory organ. In more physiological terms, the skin has many functions:

- Barrier protection against abrasion, chemicals, invading micro-organisms, water loss and light damage
- Maintenance of body temperature through perspiration and modulation of blood flow
- Sensory perception of temperature, pressure, pleasure and pain through specific receptors
- Immune function as a result of certain cells of the immune system that are exclusively located in the skin
- A "solar panel" for the synthesis of vitamin D in the body.



Skin as a communication tool

The skin also communicates emotions, such as shame and embarrassment through blushing, or fear and rage by going white or quivering or twitching. Variations in the physical appearance of human beings is believed by anthropologists to be an important factor in the development of personality and social relations, in particular physical attractiveness. In comparison with many mammals, there is a relatively low dimorphism between human males and females, but human beings are acutely sensitive to variations in physical appearance.

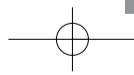
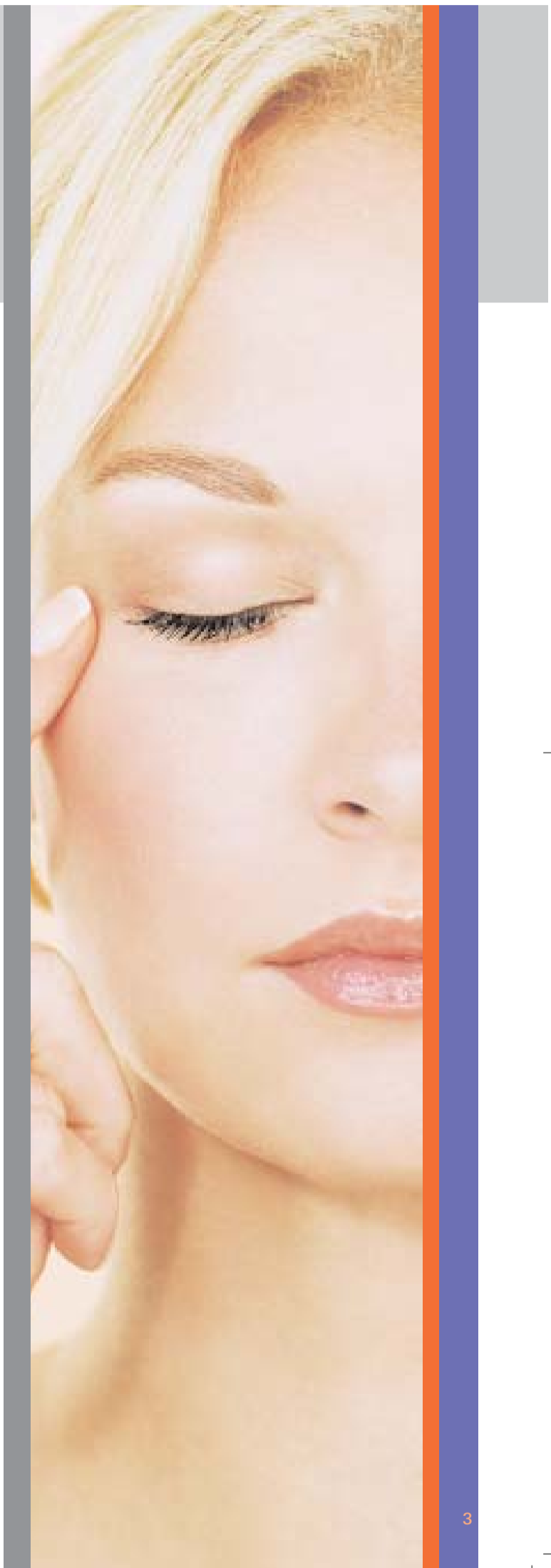
Skin and psyche

At a much more fundamental level, the French psychoanalyst Didier Anzieu's landmark book, *Le Moi-peau* (Ed. Dunod, 1985) and the collective works which followed it (*Les Enveloppes psychiques*, 1987, *Les Contenants de pensée*, 1993) described skin as the interface of self with non-self, and demonstrated how the functions of the ego develop with, and are supported by, the functions of the skin.

Skin colour

Human skin colour can range from almost black to nearly colourless, (appearing slightly pink or mauve, on account of the blood below the surface). The colour is determined by the amount and type of the two melanin pigments present in the skin pheomelanin (red to yellow) and eumelanin (dark brown to black). The amounts of these are determined by four to six different genes, one copy of each of which is inherited from the father and one from the mother. Each gene comes in several forms (alleles), resulting in a very great variety different skin colours.

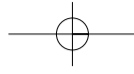
On average women have slightly lighter skin than men within their colour ranges. Albinos, who lack melanin in their skin because of a genetic mutation have white skin and hair.





Our human ancestors

Many theories exist as to the most probable progression of skin colour of our human ancestors over the last 5 million years. It is thought that at this early stage, our earliest ancestors had light skin under thick dark hair covering most of the body. From about 1.2 million years ago, early man in Africa came under increasing evolutionary pressures on account of climate change, and began to lose his hair covering, and to develop the propensity to alter skin protein to create a skin darkening defence mechanism against sunlight. Those who were not able to evolve this way, i.e. they retained their light skin, could not therefore survive the increasing aggression of the sunlight. Successive waves of migration northwards over numerous generations may have lessened the need for this genetic adaptation to conditions of extreme heat, and the darker skin to lose its genetic importance for survival, thus explaining the co-existence of different skin colour types imposed by genetic adaptation to climate.



Skin care today

The skin and ageing

Ageing of the skin is a continuous and visible process. It accelerates noticeably in people over 50, and manifests itself in the form of wrinkles and flaccidity or droopiness. Fortunately, certain components in our food can help to slow down this ageing process to some extent. One of these is lycopene, a powerful antioxidant that gives the natural red colour of tomatoes. Processed tomatoes are an excellent source of lycopene, but it would be difficult to consume enough tomato purée every day to obtain the desired effect on the skin. In light of this, the Nestlé Research Centre developed a food ingredient, Lacto-lycopene™. The lycopene in this ingredient is dispersed in whey proteins which makes it much more bioavailable (lycopene is not usually well absorbed). The process allows more ingested lycopene to reach the blood stream from dietary sources and therefore be more available to the skin. Lacto-Lycopene™, currently exclusive to *laboratoires innéov*, but also available for future Nestlé products, served as the base, together with vitamin C and a soya extract, to make a dietary supplement in tablet form to improve skin firmness. All three skin-active components in the supplement are antioxidants, but they also influence collagen levels and skin elasticity. Together with soya isoflavones, natural phyto-hormones structurally similar to oestrogens, the combination leads to a significant increase in hyaluronic acid and collagen synthesis.

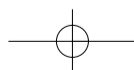
Another of *laboratoires innéov*'s nutritional supplements responds to the specific problem of dry, scaly skin. In the skin, Polyunsaturated Fatty Acids (PUFAs) provided by the daily diet, play an important role for cell structure, barrier function, lipid synthesis, inflammation and immunity. The supplement contains PUFAs with anti-inflammatory potential, combining fish oils and blackcurrant seed oils for their particular chemical profiles and their bioavailability. Dry skin is the result of numerous biological and environmental factors.

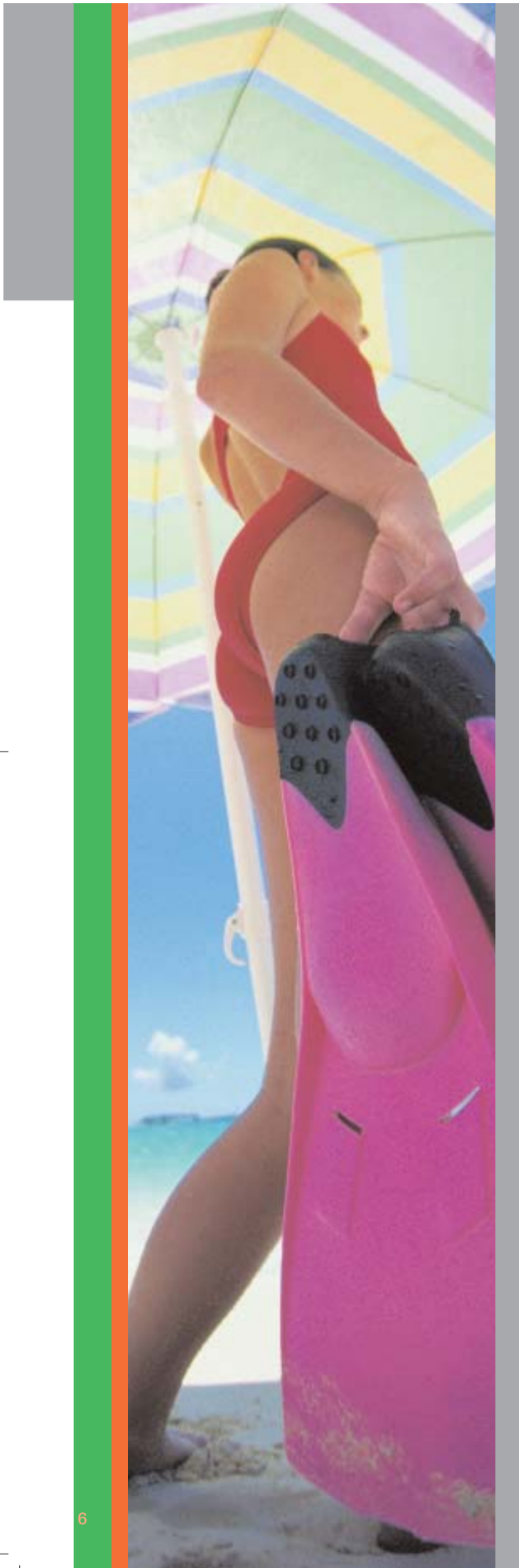
Epidermal lipids are important components of the skin. Among these lipids, ceramides play an essential role in controlling permeability. Deficiency in ceramides contributes to dry skin. A new profile of the human corneal layer ceramides, including two new types, was recently discovered by L'Oréal research. Ascorbic acid (Vitamin C) was shown to improve the specifically deficient ceramides in trials using reconstructed human skin models *in vitro* to assess the biological interest of nutritional ingredients on skin surface lipogenesis.

Protecting skin from sun damage

In a 2004 study on nutritional protection against skin damage from sunlight, Helmut Sies and Wilhelm Stahl of the Institute for Biochemistry and Molecular Biology at the University of Dusseldorf, noted that the concept of systemic light protection by dietary means is gaining acceptance. Skin is continuously exposed to ultraviolet radiation, the major cause of sunburn and non-melanoma skin cancer. Most of the damage is caused when people are *not* on vacation, that is, at a time when topical sunscreen is not generally applied. During this period, therefore, the skin depends on its own defence mechanisms alone. Micronutrients can act as UV absorbers, as antioxidants, or can modulate signalling pathways elicited upon UV exposure. Sies and Stahl's study suggested that dietary protection is provided by carotenoids, tocopherols, ascorbate, flavonoids, and n-3 fatty acids, all contributing to maintenance resistance as part of life-long protection [2].

Laboratoires innéov have a nutritional supplement that prepares the skin for tanning while helping to build up its cellular defence mechanisms. The result is a more intense tan, better skin resistance and fewer residual marks on the skin. It does *not*, however, replace topical sun protection in the form of a sun protection cream, or protective clothing.





First generation pre-tanning preparations of the '70s contained carotenoids to colour the skin. At high doses, however, carotenoids can have a pro-oxidative effects. As a consequence, in second-generation pre-tan pills, antioxidants were added to scavenge free radicals. Now in 2006 *laboratoires innéov* have launched a further innovation, the first cell-defence pre-tanning supplement with a skin probiotic.

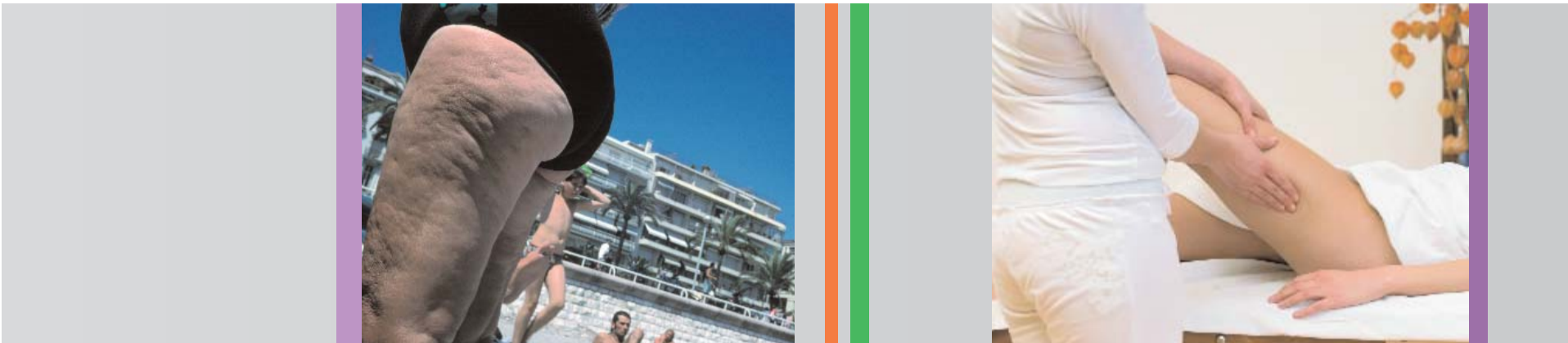
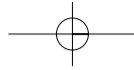
Probiotics and skin

Most of the bacteria in the gastrointestinal tract are beneficial to the host through the protection they give against colonization (infection) by harmful bacteria. One type of these beneficial bacteria, *Lactobacillus johnsonii Lj1*, has been patented by Nestlé. Interestingly *L. johnsonii Lj1* has subsequently also been shown to protect skin cells from solar damage as well as help maintain the skin's immune system.

Cellulite

Of course, what most women want is a cure for cellulite. This much-despised surface effect on the hips and thighs is said to affect 9 out of 10 women, to varying extents from pin-cushion to Chesterfield armchair. Magazines abound in articles promising ways of losing it, and on almost every page there are advertisements for all sorts of 'cures'. This very multiplicity of cures is suspect in itself. It seems to cast doubt on the effectiveness of any one of them. Would not one be enough, if it worked?

In fact, much research is being done, because of the enormous commercial opportunity for any firm patenting and producing a really effective remedy for this condition. This "jodhpur trouser" effect, somewhat incorrectly called cellulite, appears to be an increase in subcutaneous fat mass, associated with an alteration in the tethering of collagen fibres, with resulting loss of skin smoothness. (True cellulitis, as its name implies, is an inflammation/infection of the cell - a condition seen in particular in vascular diseases.)



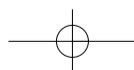
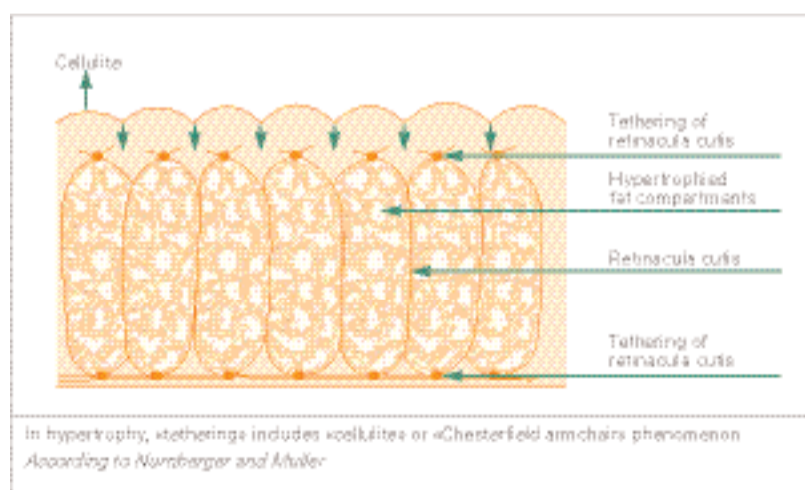
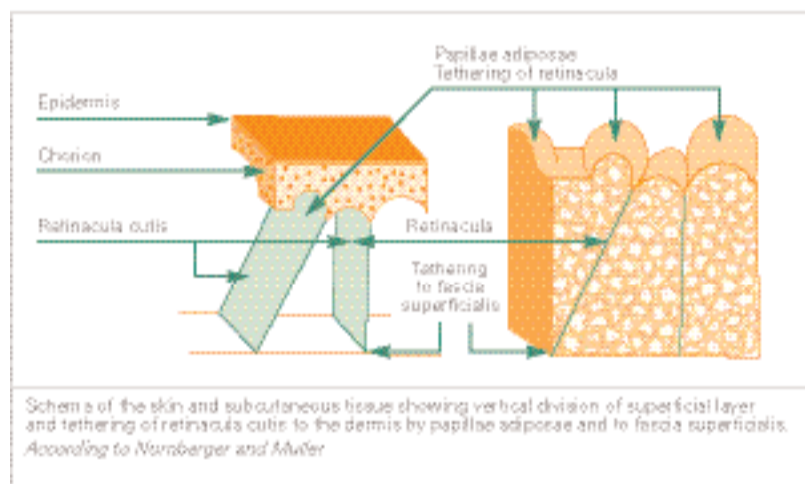
Many women wanted to know whether there was a difference between the fat they saw as “cellulite” and other fat on the body. In the 1980’s, the general medical view based on endocrine, metabolic and histology studies concluded that the fat cells themselves were practically the same in “cellulite” and in fat from other parts of the body. This holds true, but it was in **the organisation of the fat cells under the skin’s surface**, not in the fat cells themselves, that a difference was to be revealed. A decade later plastic surgeons distinguished between two layers of fat: a top layer of fat cells occupying “compartments” divided vertically by membranes tethered to a deeper layer of corneum tissue, to form a structure like an accordion which allows for movement and traction of the skin, and a deeper layer of immobile fat belonging to the internal fat stores of the body. Lumps of this deeper layer of fat in certain areas of the body are known as steatomes. The steatomes increase in size and push upwards against the accordion layer, pulling on the tethering membranes with the result that the skin surface takes on its blown “parachute” appearance.

Deep skin steatome areas are those accessible to lipo-aspiration techniques. Taking out the pressure from below, the top layer can return to a flatter base. On the other hand, in areas such as around the ankles where only the top layer of fat cells is present, cosmetic surgery presents excessive risks, and far from making an aesthetic improvement can damage the body’s protective skin structure and plasticity.

For those who do **not** envisage plastic surgery as a solution, cosmetic researchers nowadays attempt to find active ingredients to limit the number or the volume of the fat cells. The best known ingredients are caffeine and L-carnitine. Other ingredients aim to reduce water retention and include horse chestnut, and *ginko biloba*. Yet others are aimed at the conjunctive tissue that surrounds the fat cells. Within the products, the base, or expipient ensures the stability of the

active ingredient and helps it to play its role, and other means such as liposomes are used to vehicle the active ingredients through the skin. Much progress has been made, at least in the technological domain, for getting active ingredients through the skin barrier.

Some laboratories claim that bio-rhythms can have an effect on cellulite. Lotions formulated for night-time use count on the body’s reduced need for energy and when adipocytes tend to capture





any surplus glucose from ingested food. Certain ceramides are thought to help limit the entry of glucose into the adipocytes. Other ingredients are used to try to prevent the formation of rigid “bridges” between the collagen fibres.

Other studies have concentrated on the role of the hormone leptin in the adipocyte. Leptin acts as a satiety factor on the central nervous system, but it also acts on the fat cells themselves, which may increase ‘fat burning’.

Many different plants, some with anti-inflammatory properties are used with the aim of helping to ‘drain’ cellulite by stimulating the micro-circulation... despite the fact that inflammation is not really the problem here.

There is **no simple solution** to cellulite because the intervening factors are multiple. From the nutritional and cosmeceutical point of view this is still a ‘work in progress’ but a fascinating one.

Physical exercise on a fairly intensive, frequent and long-term basis should be the first line of attack for a visible result in the reduction of both fat and cellulite. Stimulating the blood and lymph flow to affected regions and increasing muscle tissue can only be beneficial.

Age spots (*popularly known as Liver spots or “Fleurs de Cimetière”*)

In older people, melanosomes or age spots appear particularly on the backs of the hands on the forehead and the neck, areas often exposed to sunlight. Skin-whitening creams, (products needing careful handling) or laser treatments are available, but the condition tends to re-appear. The cosmetic industry is concentrating new research in this area in view of demand from older but still active men and women wanting to preserve an even complexion.

Thread veins

When fine skin is exposed to harsh weather or extremes of temperature, a network of thread veins can develop on the cheeks and nose. Skiers in particular were victims of this problem before the thick white sunblock creams came into use in the 1980s. Some treatments including very bright light treatment, lasers or the older electrocoagulation with fine needles can make a difference. Irritants and abrasives of all types should be avoided to prevent the condition from becoming worse. Antioxidants from food, and supplements such as French maritime pine bark extract, rich in polyphenols, are proposed for their supposed role in strengthening blood capillaries and helping to prevent leakage of fluids into the surrounding tissues.

Babies’ skin – Nappy rash

Some babies suffer from painful nappy (diaper) rash on their highly sensitive skin. A study on the effect of long term consumption of infant formulas containing bifidobacteria on bowel function, showed that the babies receiving probiotic formula had better, softer and less frequent stools, and a marked decrease in diaper rash than those on regular formula. This study, (Johns Hopkins University, Baltimore School of Medicine) was carried out using Nestlé probiotic infant formula [4]. The probiotics in this case improve the fecal quality which in turn reduces irritation of the skin.



Skin and Nutrition in the Elderly

Wound Management from Nestlé Nutrition

Pressure sores are a terrible problem for elderly people in homes or long-term care facilities. Almost one in four residents is concerned with the problem of poor healing of pressure ulcers on their skin. These open sores can develop on any prominent part of the body subjected to pressure, such as the lower back, elbows and heels. Poor blood circulation, hindering oxygen and nutrient supply to the wounds, aggravates the condition. Good nursing care is essential and includes stopping the bleeding, preventing and treating any infection, and regularly removing debris from the wound so that vascularization can re-establish itself and a new collagen matrix can develop. Ultimately the wounds can close and heal. Nursing care also includes frequent positioning and re-positioning of the patient to prevent breakdown at a pressure point, as well as attention to the patient's diet (nutrient and total calorie intake). The whole process of healing can take several months to complete, and each stage can be optimized with high quality nutrition, with a special emphasis on nutrients known for their effect on wound healing. High quality protein, enriched with specific amino acids, antioxidant vitamins, and the minerals selenium and copper have been shown in the scientific literature to play an important role. Collagen is the protein which forms the base of new tissue for wound healing. The amino acids proline and arginine are known collagen precursors. Nestlé Nutrition's product **Clinutren Repair** offers elderly or disabled patients this valuable nutritional support. It is well known that elderly patients often lose their appetites. Clinutren Repair offers the great advantage of tasting delicious, so patients are quite willing to drink it.



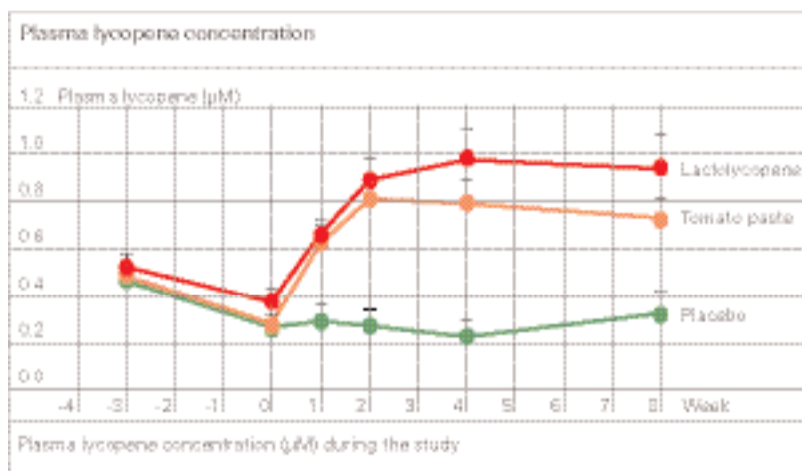
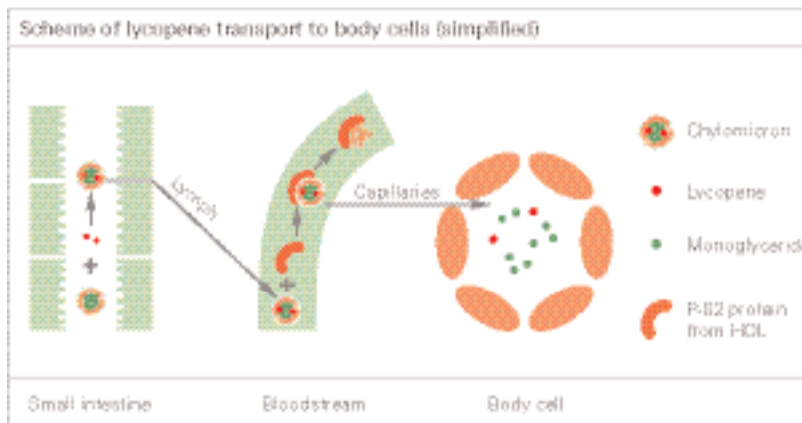
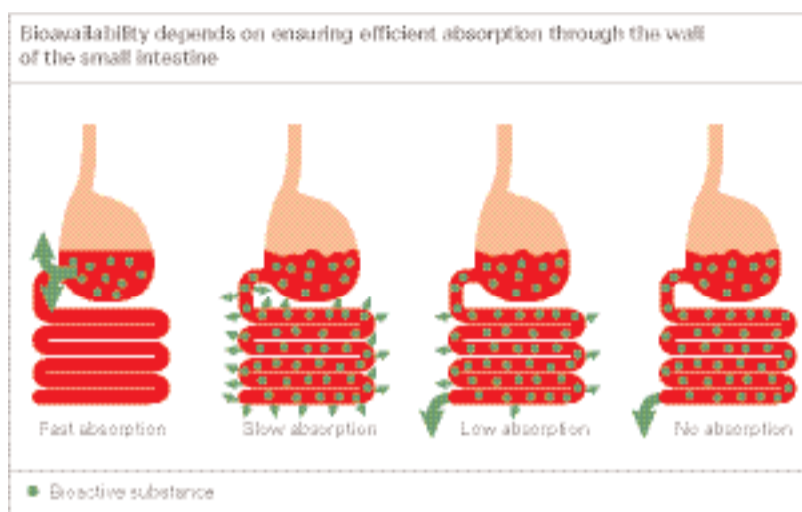
Bioavailability of Nutrients: A Major Research Domain for Nestlé [5]

For many years now, scientists at the Nestlé Research Centre have been working to understand bioavailability, what affects it, and through the fine control of specific bioactive ingredients, how to transfer this knowledge into products that deliver guaranteed health and wellness benefits.

What is bioavailability and why is it important?

A food package label may inform you how much of particular substance is contained in the food, but between how much is in the food, and how much is actually absorbed by the body, there is often a very great difference.

Lycopene for example, has to find its way from the food through the body to reach the skin. Once consumed, in order to bring its health benefit to the skin, the active molecule must survive the hostilities of gastric acidity and enzymes before reaching the intestine. There, it must be biometrically "allowed" through the intestinal wall into the bloodstream. The circulating blood carries it around the body to different destinations where it has to pass another set of checks to be allowed into certain cells and not others. These multiple controls along the pathway from the product in the package to the target tissue are part of the mechanism by which the body protects itself against the invasion of potentially dangerous pathogens and contaminants.





The bioavailability of an active ingredient is the fraction ingested that is absorbed by the intestine, and is subsequently used by the tissues of the body.

Many factors affect this fraction, including age, health status, gender and individual genetics of the consumer, as well as the complexity of the food matrix, other foods ingested at the same time, rate of gastric emptying and intestinal transit time. These and other factors can result in large variations in bioavailability [6].

With food and food supplements, the challenge is to find an active substance which can be consumed in normal, safe quantities and which is adequately absorbed and easily utilized by the body.

In fact bioavailability is an extremely complex subject, situated on the interface between the biological and physical sciences, bringing together human physiology on the one side and food structures on the other.



Source: Nguyen and Schwartz, *Lyopene: Chemical and biological properties*, *Food Technol.*, 53 (2): 38-45 (1999)

Note: The term 'bioavailability' does not apply to probiotics. Skin probiotics interact with the gut wall to induce the synthesis of biological mediators, which are freed into the blood stream to speed up regeneration of the skin cell defence mechanisms.

Consumers often perceive processed food as less "healthy" and nutritious than raw foods. Bioavailability studies prove that in many cases, cooked or processed food releases more nutrients for absorption by the body than do raw foods.

Physiology:

The bioavailability of micro-ingredients depends on five processes summarised below [6]:

- Liberation from the food matrix after consumption
- Absorption into the systemic circulation
- Distribution to body tissues
- Utilisation by the tissues for biological purposes
- Excretion from the body

Nestlé research has been looking at specific health benefits offered by non-classical nutrients, namely naturally occurring molecules from plants like sterols, carotenoids and polyphenols. The latter wide-ranging class of molecules are constituents of many foods and drinks, often present as red, orange, blue, purple or brown colour pigments. They are strong antioxidants broadly considered to be beneficial to health with a multitude of effects to protect most tissues in the body [7].

Nestlé scientists are among the world's leading players in methods to assess the bioavailability of active molecules derived from plants, adding human studies through genomics and proteomics. Much more detailed information on bioavailability will emerge in the next decade and provide a firm basis for exploiting the health benefits of phytochemicals in foods [6] and moving towards the individualized diet [8].



Some Common Skin Conditions and Diseases [9]

So far in this review, (with the exception of the sections dealing with pressure ulcers and nappy rash), we have spoken mainly about healthy skin, and making a healthy skin more beautiful and for longer. This next section briefly describes some of the most frequent skin conditions that require medical attention from the dermatologist.

Psoriasis

Psoriasis is recognizable by its plaques of pink or red lesions ranging from a few millimetres diameter to very extensive plaques, with a scaling surface and well-defined edges scattered on areas of normal skin. The increased thickness of the epidermis, presence of nuclei above the basal layer and thick keratin indicate an abnormal acceleration in the turnover rate of skin cells. The scaly build-up can easily flake off to reveal clearly the blood vessels beneath. This is known as the "Auspitz Sign". Erythema or redness is often present. All parts of the body can be affected, including the palms of the hands and soles of the feet and nails.

Psoriasis can manifest itself at any time from childhood to old age. There may be a family history – if one parent has psoriasis, 25% of the children will have it – if both parents are affected the figure is 60%. This condition does not usually produce itching.

Galderma offers a range of high-potency corticosteroid products Clobex and a Vitamin D analog Silkis for the treatment of psoriasis.

A severe form: *erythrodermic psoriasis*, is a very serious condition. In it there is considerable increase in cutaneous blood

flow, heat loss, metabolism change, and water loss. Exposure to ultraviolet light makes this type of psoriasis worse. There is evidence that hormonal and immunological mechanisms are involved at cellular level.

Eczema (or Dermatitis)

Eczema is an inflammatory condition of the skin characterised by groups of vesicular lesions with a variable degree of exudate and scaling. In some cases dryness and scaling predominate. In more acute cases there may be inflammation and vesicle formation – a vesicle is a raised lesion containing fluid – in keeping with the Greek word meaning "to boil out" from which Eczema is derived. The characteristic feature is oedema between the cells of the epidermis giving a spongy texture.

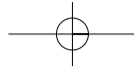
Outbreaks of eczema seem to accompany stressful life situations both in children and adults. As always the rule for the doctor is to treat the patient not just the rash. Children with eczema are often also asthma and rhinitis sufferers. They are also more susceptible to infection by herpes viruses and develop "cold sores" on the lip. Infection can modify the presentation of any type of eczema or contact dermatitis. There are many forms of eczema; from allergic or irritant contact dermatitis, to Paget's disease of the breast, in which there is underlying carcinoma of the milk ducts.

Lichenification or thickening of the damaged skin surface by friction can worsen the condition.

Studies in nutritional skin care indicate a potentially beneficial effect of dietary polyunsaturated fatty acids in both atopic Dermatitis and Psoriasis [10].

Common sources of allergic contact dermatitis

Jewellery, clothing, watch, scissors, cooking utensils	Nickel and cobalt occasionally
Cement, leather	Chromate
Hair dyes, tights, shoes	Paraphenylenediamine
Rubber gloves and boots	Preservative chemicals
Creams, ointments, cosmetics	Preservatives (parabenzquaternium), balsam of Peru, fragrances, lanolin, neomycin, benzocaine, in medicated ointments



Fungal conditions

Pityriasis versicolor is a skin eruption that usually develops after sun exposure with numerous small white patches on the tanned skin, but pale brown patches on the covered areas (hence its name-versicolor). The causative organism is a yeast fungus *Pityrosporum orbiculare*, and the traditional treatment has been simple, with a selenium sulphide soap.

Apart from athlete's foot, toenail infections and *tinea cruris* (popularly called "ringworm" although nothing to do with worms), other fungal conditions are less often seen nowadays.

Galderma produces Loceryl, a very successful topical anti-fungal treatment.

Lupus

There are two forms of *lupus erythematosus* – **discoid**, generally limited to the skin, and **systemic** which is associated with kidney disease or disease of other organs. An acute red rash occurs on the face. It is more common in women. The lesions are well defined in a combination of atrophy and hyperkeratoses of the follicles, giving an abrasive feel to the skin. The lesions also resemble those observed in drug users.

Vasculitis

This is a condition with inflammation around dilated capillaries and small blood vessels. It is a common component of the erythemas. It may occur as red macules and papules with necrotic lesion on the extremities. Systemic lesions may occur with renal, joint, gastrointestinal and central nervous system involvement. The term vasculitis is also used clinically to describe a variable clinical picture with red macules and papules and with necrosis in severe cases.

Purpura

Associated with vasculitis, purpura, (dark purple patches on the skin) can be seen as the result of platelet deficiency. Senile purpura is due to withering of capillaries as a result of defective supporting connective tissue in elderly skin. In another form of purpura known as Shamberg's disease brown spots resembling peppercorns appear on the lower legs. The condition is seen in other circumstances such as in patients on corticosteroid treatments.

Urticaria

In this condition itching red weals develop resembling the effect of stinging nettles on the skin. The condition may be associated with allergic reactions, infection or physical stimuli, but in most patients no cause can be found.

Angio-oedema can occur causing the face and mucous membranes to swell. When the larynx is affected, breathing

becomes difficult calling for swift medical action. Certain food allergies can cause urticaria including fish, eggs dairy products, chocolate, nuts, strawberries, pork and tomatoes. Other irritants such as household chemicals, inhaled house dust or animal dander can set off an urticaria reaction.

Blisters

Many diseases present blisters or pustules on the skin surface. Among these is chickenpox. This disease is usually mild, the blisters turning to pustules then breaking down into crusts in two to three days. Herpetiform dermatitis is a blister presenting disease occurring later in life, which is sometimes linked to Coeliac disease (gluten intolerance). In the elderly, Pemphigoid blisters of the bullous type can affect mucous membranes including areas around the eyes and the mouth. Generalised pemphigus is a serious condition associated with the deposit of immunoglobulin in the intercellular spaces of the epidermis.

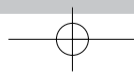
Acne

Acne, as we all know, is predominantly associated with adolescence, but it can last well on into adulthood. Acne spots develop from the sebaceous glands associated with hair follicles on the face and body. These sebaceous glands contain holocrine cells that secrete triglycerides, fatty acids, wax esters and sterols as "sebum". In acne there is an increase in sebum secretion, a thickening of the keratin lining of the sebaceous duct, an increase in certain bacteria in the duct, and increase in free fatty acids, and inflammation around the gland, probably as a result of the release of bacterial enzymes. There are various underlying causes, notably hormonal changes and fluid retention leading to increased hydration and swelling of the ducts. Most acne clears up spontaneously. Mild cases can be treated with plain soap and water washing followed by topical application of retinol or Vitamin A acid ointments.

Galderma's product Differin is world leader in anti-acne treatment.

Rosacea, which in past years has been incorrectly listed as a type of acne, has more recently been classified as an allergic condition. It is characterised by severe erythema with papules, pustules and prominent blood vessels which give a red and lumpy aspect to the face. **Rhinophyma**, characterised by thickened, reddened skin of the nose, and enlarged follicles, is a variant. Conjunctivitis and blepharitis of the eyes, often co-exist with this condition.

Galderma offers a convenient and easy to follow daily treatment regimen with MetroGel 1% for patients with chronic Rosacea.





Bacterial infections

Staphylococci and streptococci are responsible for many conditions including impetigo, folliculitis, boils, carbuncles, ecthyma and erysipelas. Work on building sites, contact with animals, use of swimming pools and many other situations have been associated with the development of these conditions.

Treatment includes checking for underlying diseases, for example diabetes, in the case of Ecthyma. Use of topical of systemic antibiotics and improved nutrition are part of the treatment for most of these conditions.

Viral infections

Like pyogenic bacteria, viruses produce local lesions and may cause a widespread reaction to the infection. Local infective lesions are caused by DNA viruses, which can be isolated from the lesions themselves and include the herpes and the pox groups. In AIDS patients, widespread viral infections of the skin occur. Herpes viruses are usually controlled with acyclovir but there is no cure for the virus. Once installed it can remain dormant but will always be ready to reappear. There are said to be around 10 million herpes simplex carriers in France alone.

People working in rural areas with animals can become infected with animal viruses. Pox viruses such as *Orf*, easily diagnosed by veterinary surgeons, and dermatologists working in rural areas, is contracted from sheep and lambs during the lambing period.

Measles and Rubella that affect children are in decline since widespread inoculation.

Warts

Papilloma viruses cause warts. The common wart is one of the few tumours in which a virus can be seen to proliferate within the cell nucleus. There are about as many treatments available as types of wart observed. They range from intense cold treatment to hypnosis! However in common cases, salicylic and lactic acid with formalin in various proportions are applied daily with good results.

Moles and Freckles

The vast majority of moles (naevi) and freckles (ephelides) are completely harmless. Moles are made up of a proliferation of melanocytes and a variable number of dermal naevus cells. Freckles are small pigmented macules, less than 0.5cm in diameter that occur in areas exposed to the sun in fair skinned people, especially of the blond Celtic type.

Melanomas

Melanomas, if ignored, are anything but harmless. They are invasive malignant tumours of the melanocytes, resembling, in their early stages, ordinary moles, hence the anxiety created by any change in the appearance of a mole (which should be reported without delay to a dermatologist). Most cases occur in white adults over the age of 30 with a predominance in fair skinned women. The incidence has been very high 40/100,000 in Australia, where the population is exposed to intense sunshine for long periods of the year. The prognosis for anyone diagnosed of this skin cancer is related to the thickness and depth of the lesion. It is very often fatal. Public health campaigns are very active today in creating awareness of the absolute necessity for sun protection of the skin, avoiding midday sun and wearing hats, sunglasses, sun block cream and protective t-shirts when exposed to glare from sun, especially when reflected on water, as on the beach.

Over 100,000 people in the United States were diagnosed with malignant melanomas in 2005.

Two other types of skin cancer are less dangerous if seen in time. These are basal cell carcinoma and squamous cell carcinoma. They are identified by the dermatologist and confirmed by the biopsy laboratory.

Basal cell carcinoma

This is the most common form of skin cancer. In fact, it is the most common of all cancers. One out of every three new cancers is a skin cancer, and the vast majority are basal cell carcinomas. These cancers arise in the basal cells, which are at the bottom of the epidermis (outer skin layer). Although the number of new cases has increased sharply each year in the last few decades, the average age of onset of the disease has steadily decreased. More women are getting BCCs than in the past; nonetheless, men still outnumber them greatly.

Chronic exposure to sunlight is the cause of almost all basal cell carcinomas, which occur most frequently on exposed parts of the body — the face, ears, neck, scalp, shoulders, and back. Rarely, however, tumors develop on non-exposed areas. In a few cases, contact with arsenic, exposure to radiation, and complications of burns, scars, vaccinations, or even tattoos are contributing factors.

Anyone with a history of frequent sun exposure can develop BCC, but people who have fair skin, blonde or red hair, and blue, green, or grey eyes are at highest risk. Those whose occupations require long hours outdoors or who spend extensive leisure time in the sun are at particular risk [11].

Metvix, a photodynamic therapy, is a treatment offered by Galderma for BCC.



Squamous cell carcinoma (SCC)

This is the second most common skin cancer after basal cell carcinoma. The lesions arise in the surface layers of the skin, and may occur on all areas of the body including the mucous membranes, but are most common in areas exposed to the sun. Although SCCs usually remain confined to the epidermis for some time, they eventually penetrate the underlying tissues if not treated. When this happens, they can be disfiguring. In a small percentage of cases, they spread to distant tissues and organs and can become fatal. SCCs that metastasize most often arise on sites of chronic inflammatory skin conditions or on the mucous membranes or lips. Chronic exposure to sunlight is once again the principal cause. That is why tumors appear most frequently on sun-exposed parts of the body: the face, neck, bald scalp, hands, shoulders, arms, and back. The rim of the ear and the lower lip are especially vulnerable to the development of these cancers [11].

Auto-immune diseases

Auto-immunity is the state in which the normal mechanisms of tolerance to self antigens are broken down. Auto-antibodies and auto antigen specific T lymphocytes develop. The skin is often an indicator such internal conditions. Pigmentation accompanies Addison's disease, Hachimoto's thyroid disease and primary biliary cirrhosis. Non organ-specific autoimmune diseases often have prominent skin disease, e.g. *lupus erythematosus* and generalized sclerosis. Organ-specific disorders such as pemphigus and pemphigoid are mentioned above. Autoimmune diseases often run in families.

Diabetes (see also Food and Nutrition Communication 2, The Metabolic Syndrome)

Diabetes patients have an increased susceptibility to microangiopathy with red papules slowly resolving to a scaling macula on the limbs. In diabetes the disturbances of carbohydrate-lipid metabolism, small blood vessel lesions, and neural involvement may be associated with skin lesions. The most common of these include infection from staphylococci, coliform bacteria and yeast infections. Ulceration on the feet occurs due to the impaired blood supply.

To conclude:

In contrast to the complexity of the dermatological science we have seen above, a generally accepted consensus on lifestyle measures for basic skin health is very simple, and can be summed up as follows:

Lifestyle Measures to Protect the Skin

- Wash the skin thoroughly every day with mild soap and water.
- Eat a healthy balanced diet with plenty of antioxidant fruit and vegetables, lean meat and fish, whole grains and low-fat dairy products.
- Get enough sleep, fresh air and exercise.
- Drink sufficient water to refresh the body and eliminate waste.
- Do not smoke, and avoid smoky atmospheres.
- Try to avoid stress
- Avoid exposing skin to extreme weather conditions
- In the sun, wear protective clothing and sunscreen cream of a minimum of SPF 15.



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