

## Maximising skin care with the use of advanced skin penetration techniques.

By Dr. Des Fernandes

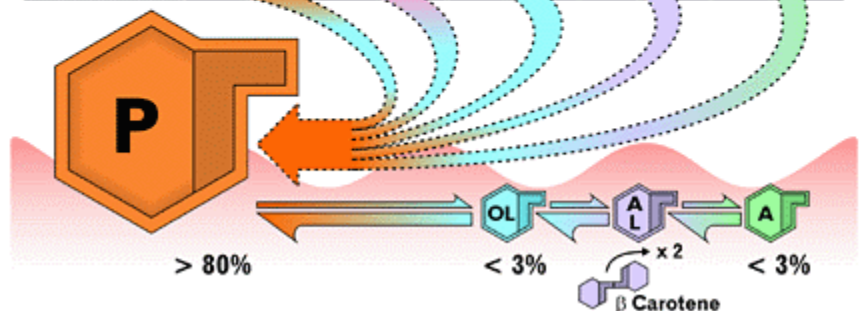
Skin care has now become scientifically based and is no longer simply hope and magic. As we understand more and more about the physiology of the skin, we also learn how to maintain skin in better health, and as a result, slow down the process of ageing. Vitamin A has long been known to be the essential vitamin for healthy skin and as time passes we are learning more about how it acts on the DNA to promote healthy keratinocytes, with a better horny layer, reduction of excessive pigmentation and increased collagen and elastin formation.

Vitamin C has also come into the limelight because of its ability to reduce pigmentation and also accelerate collagen formation, but it should always be remembered that vitamin C works best when combined with vitamin A and other anti-oxidants.

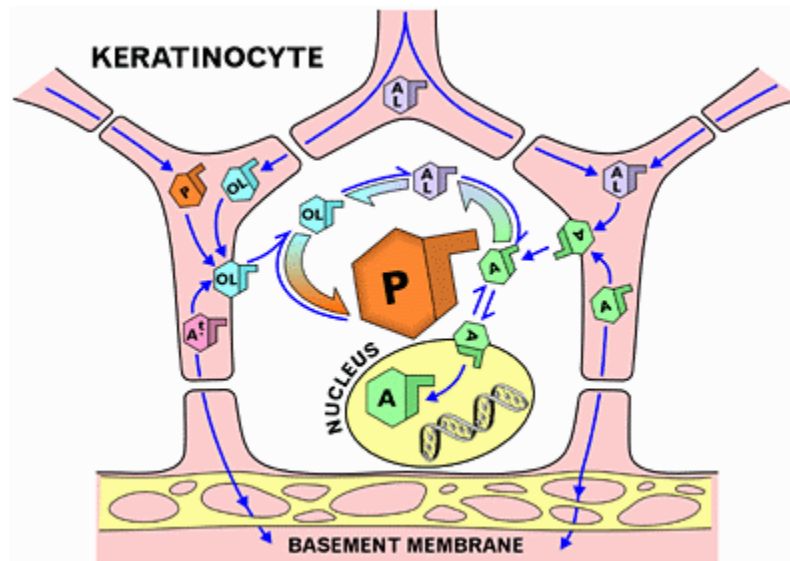
### Vitamin A

At this stage there is a lot of marketing hype about the ideal form of vitamin A to use on the skin. Some claim that only the acid form (retinoic acid) actually works whereas others state that retinol, the alcohol form is the most effective. Most companies pretend that the ester of vitamin A,

	PALMITATE	ACETATE	RETINOL	RETINAL	RET. ACID
Skin irritation	+	++	+++	++	+++++
Penetration speed	+	+++++	++++	++	+++
Stability	+++++	+++++	+		+
Topical application	P	A <sup>t</sup>	OL	AL	A



alcohol form is the most effective. Most companies pretend that the ester of vitamin A, retinyl palmitate, is ineffective whereas physiologically, retinyl palmitate is the most important form of vitamin A for the skin because more than 80% of the vitamin A normally found in skin is as retinyl palmitate. Even when one applies retinol or retinoic acid to the skin, it is normally converted to retinyl palmitate and stored in the skin. Only a very small fraction of the vitamin A is found as retinol or retinoic acid. The truth is that vitamin A in all its forms e.g. palmitate, acetate, propionate, aldehyde, alcohol or acid all act as DNA regulators and produce the healthy skin, with good collagen and elastin production and better pigment control. Retinoic acid is not normally found outside the cell walls and that may explain why it tends to be irritant to skin. Retinyl palmitate is the least irritant version of vitamin A and for that reason may well be the most useful form because people will apply it more regularly if they get less dryness and irritation of the skin.



In the keratinocyte or fibroblast retinyl palmitate is converted by enzymes through retinol and retinyl aldehyde to retinoic acid. This is the form that actually works on the DNA. (See diagram 2).

Vitamin A is very sensitive to light and is easily destroyed by UVA light at about 332-334 nanometres. We

constantly encounter this level of UV light and so it is not surprising that in our light exposed areas, we suffer from a localised deficiency of vitamin A. This eventually causes photoageing. It is not surprising that vitamin C is also denatured by exposure to light, and therefore also contributes towards photoageing. Ascorbic acid is more vulnerable to blue light.

### Vitamin C

Vitamin C has been shown to augment the effects of improving skin elasticity and reduction of pigment formation. Since these essential vitamins are generally extremely

sensitive to all-pervasive UV-A light, their daily replacement is an essential for healthy skin. The same is true for the other important skin antioxidants that are sensitive to light such as vitamin E and the carotinoids.

With the knowledge of the physiological changes that occur following exposure of skin to light, one has the ability to create a physiological treatment to counteract those changes. The easiest regime would be to replace the vitamins that have been damaged by exposure to light. What people fail to realise is that replacement of lost vitamins should start soon after the first exposure to the sun in order to maintain as youthful and healthy a skin as possible. Even when photo ageing is advanced, simple daily application of a combination of vitamins A, C, E and beta carotene can make significant changes. (see illustration 1)

Where photo damage has become established, the replacement of these vitamins can be facilitated with the use of iontophoresis and sonophoresis. Up to 400% better penetration (compared to simple topical application) can be achieved with iontophoresis. By using low energy ultrasound, up to 4000% better penetration can be achieved, but unfortunately only small areas may be treated this way. Wrinkles can actually be safely "melted" away.

The skin of the neck is difficult to treat with surgery and this case demonstrates the important role that iontophoresis of vitamin A and C has for rejuvenation of skin. The lower part of the neck skin was



wrinkled and was treated for three months with iontophoresis of vitamin A and C twice a week for 20 minutes with the Environ® IONZYME DF 1998 machine. The photograph was taken three months after completion of the treatment. The skin is now smooth without any intervening surgery.

The use of iontophoresis of vitamin A and C can also be used to reduce scars and the author believes gives better results than dermabrasion. Dermabrasion thins the skin and results in an artificial looking surface whereas iontophoresis of the skin nutrients actually makes the skin thicker, healthier and more beautiful.

### **Summary**

The topical replacement of light sensitive vitamins A, C, E and beta carotene is essential

to maintain skin health. To get even better results, iontophoresis may be used to facilitate the penetration of ionised forms of vitamin A and C.

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