

# Facing up to ageing: what makes us appear old

Over many hundreds of years one of the key areas for the application of personal care products has been the face. The human face is exposed to the elements for most of the year, whether it be bright sunshine in the summer or cold, dry winds in the harshest of winters. It also bears the brunt of other environmental exposure from, for example, traffic fumes, cigarette smoke, etc., so suffers from the effects of both intrinsic and extrinsic ageing. Facial skin can also, through its colour and expressions, reflect many emotions and feelings. Blushing for example, resulting from dilation of blood vessels in the skin, can show embarrassment.<sup>1</sup> So the face signals many different things in the way it appears to the casual observer.

Over time the skin covering the face changes, dryness may make the skin look rough and scaly, fine lines and wrinkles begin to appear, coloration alters, pores can become enlarged and sagging of the cheeks and jowls is often observed. When all these factors are combined they result in influencing how old we actually appear or are perceived to be, as opposed to our actual chronological age. Beauty products can be used to change this perception, enhancing certain features such as the lips and eyes to draw the observer's gaze to them or camouflaging and covering up redness, blemishes and less attractive areas to minimise their impact.<sup>2,3</sup>

In the following article we will identify the key factors that can affect our appearance and describe changes that can happen over time, the causes of these changes and what can be done to either prevent this happening, rejuvenate the skin, or camouflage problem areas.

## Fine lines and wrinkles

Recently an excellent review of 'wrinkle theory' has been produced by Humbert *et al.*<sup>4</sup> which gives comprehensive details of the causes and effects of wrinkle formation. It is stated that as age increases, fine and reducible lines evolve to form permanent wrinkles, one of the earliest and most visible signs of skin ageing, developing mainly on the face,



neck and hands (i.e. areas which are both exposed to the elements but also visibly on show).<sup>4</sup> Wrinkles appear over time due to changes in the support structures of the skin from chronological ageing, but photoageing speeds the process considerably leading to quickly formed, deep wrinkles.<sup>5</sup> A recent study has shown that facial skin undergoes a considerable change around the age of thirty years, showing a step change in wrinkling morphology at age thirty-three years.<sup>6</sup> It has also been noted that skin surface topography is more important in terms of perceived age than skin colour and that only small changes are needed to alter perceived age significantly.<sup>7,8</sup> As well as the crow's feet area (at the side of each eye) fine lines and wrinkles were also observed to occur in the forehead, glabella, upper and lower eyelids, nasolabial groove, cheek and corner of the mouth of older volunteers.<sup>19</sup>

Fortunately there are a number of excellent products to protect the skin from such damage and further ones which even go some way towards turning back the clock.

SPFs go a long way in protecting the skin from UV rays which cause so much of the damage. Most moisturisers now

contain at least SPF 15 and a degree of UVA protection, but if one is exposed to sunlight for any length of time a specific sun cream is needed. The newer water phase UV filters such as Tinosorb M and Tinosorb S Aqua from BASF, allow for efficient UVA and UVB protection without overloading formulations with oils, allowing for light textures.

Retinol has been shown to be an effective treatment for lines and fine wrinkles. It increases cell turnover and stimulates the production of more collagen and elastin. Vitamin C is essential for the synthesis of collagen and is an antioxidant, so can help reduce skin damage caused by free radicals, and there are a large variety of skin rejuvenation and anti-wrinkle products containing it such as The Body Shop's Vitamin C collection.

Oils are gaining popularity in facial skin care as they can produce very good results. The buzz word used by testers is 'plumped'. These oils gently sink into the skin plumping out lines and wrinkles while also smoothing and nourishing skin. One such product is Nude Replenishing Night Oil which contains a blend of natural oils including jojoba, raspberry and cranberry. Omega 3, 6, 7 and 9 restore cellular metabolic function, essential nutrients and

antioxidants help cells renew and resist damage.

Of course there is good old fashioned moisturiser too. On application these improve the appearance of fine lines as humectants draw moisture to the skin plumping it out. Silicone elastomers impart a soft silky feel to skin and have a matte finish which leaves a soft focus effect on the skin helping to optically blur imperfections.

### Skin colour

Skin colour is mainly influenced by melanin content, blood chromophores such as haemoglobin and oxyhaemoglobin and scattering and reflectance from collagen fibres.<sup>9,10</sup> Various factors influence the colour of the skin, for example UV exposure, leading to a tan or redness due to burning, blushing, pressure causing blanching of the skin, bruising, etc. Redness can be altered by inflammation or irritation, certain cosmetic treatments (e.g. facial peels and scrubs), excessive alcohol intake causing damage to micro-capillaries and also varying oxygen content. Similarly, yellowness can be influenced by sun exposure, smoking and diseases such as jaundice causing a build up of bilirubin.<sup>1</sup>

However, certain aspects of skin coloration can be a direct result of both the chronological and photoageing processes, changing with time and exposure. As we age the skin takes on a distinctive yellow pallor, widely acknowledged as one of the clinical signs of photodamage.<sup>11</sup> It was originally thought that this was due to melanin, but skin autofluorescence measurements have recently shown this is also due to advanced glycation end products (AGEs) which build up in the skin over time. Indeed all proteins which have a long turnover time, such as dermal collagen, undergo glycosylation and become yellow. One of the advanced glycosylation products which has been identified, 2-(2-furoyl)-4(5)-(2-furanyl)-1H-imidazole, has a distinctly yellow hue.<sup>12</sup> Following the development of an AGE index it was discovered that both this value and also the  $b^*$  value (the blue-yellow component of the Lab colour scale), measured colorimetrically, both correlated significantly with subject age.<sup>13</sup> As we age, the red colouration of our cheeks changes; it is not necessarily an increase in redness but the red colour becomes less even and more disrupted.<sup>2</sup> Hence a younger person may have a healthy pink glow to their appearance whereas an older individual will have uneven redness, often associated with micro-capillary damage and dilation (telangiectasis). It is an uneven and blotchy complexion which contributes most to the skin appearing older than it actually is.<sup>7,14,15</sup>



Hormonal changes can also contribute to a change in the skin's coloration. Melasma can occur during pregnancy, after the use of certain contraceptives or other hormonal treatments and is presented as light to dark brown areas of skin on the face, commonly on the lip, forehead and chin. It may become more obvious at certain times during the menstrual cycle, often appearing and then disappearing for no apparent reason.<sup>1</sup>

A number of colour cosmetics can camouflage discoloration. For a long time green tinted moisturisers have been used to tone down a ruddy complexion but there are now more subtle takes on this concept. Opposite colours counteract one another, for example yellow cancels out blue and violet diminishes yellow. This knowledge can be put into practice when working with interference pearlescent pigments – their subtle effects are very beneficial in correcting such imperfections as under-eye shadows the blueness of which can be reduced with a gold based pearl. Likewise a sallow complexion can be attenuated by adding a violet interference pearl to a foundation. Redness, of course can be subtly minimised by adding a green interference pearl to a foundation or primer. Blemish Balm (BB) and more recently Colour Control (CC) creams have been developed to give lighter coverage with the additional benefits of providing moisturisation, skin repair or anti-ageing benefits along with SPF protection. The dewy luminous effect which they give disguises imperfections but the lightness means that there is no caking or risk of high pigment levels migrating towards lines, for example Chanel's Complete Correction Cream.

While pigmented products give an instant, camouflage effect, skin care products can also be used as part of a regime to brighten and lighten the complexion resulting in more radiant, younger looking skin. A whole host of facial creams, scrubs and masks are now available with colour correcting actives in them, as are a whole host of actives which can brighten, lighten and even the complexion and smooth the topography.<sup>16</sup>

### Eye bags and dark circles

Distinct changes in the area around the eyes are also observed with age, above and beyond that of the crow's feet area. It has been stated that the eyes are one of the main features of ageing in the middle third of the face.<sup>1</sup> Eye bags are characterised by the skin under the eyes showing signs of slackness and swelling. Colour analysis has indicated large differences between the area under the eyes and the skin of nearby cheek sites, suggesting eye bags are strongly associated with oedema, varying haemoglobin levels and also increased melanin levels. Cutometer measurements have indicated a significant lowering of skin elasticity so the skin in this area is slacker and less supportive.<sup>17</sup>

Innovations for the treatment of eye bags have been very pack-orientated with the use of roll-on packs prevalent, often using a metal roller to give instant relief due to a cooling effect. Cooling eye gels are also popular including ones which can be placed in the fridge prior to use. Actives will focus on a draining effect to counter the oedema and reduce swelling. Formulators should be aware that the skin in this area can be very fine and thin so ingredients which are hypo-allergenic and

gentle should be chosen to avoid irritation and any subsequent redness. Products should also be light and easy to rub in.

Dark circles (darkness in the infraorbital eyelid areas) are caused by multiple factors including excessive pigmentation, slackening of skin and the skin in this area becoming thinner and more translucent, and also become more severe and noticeable with age.<sup>18,19</sup>

The best instant remedy for dark circles is concealer. It is tempting to plaster on a hefty dose of the high coverage stuff, however this is not a good option for those who also have lines as this heavy product migrates towards them making the area look more crepe than it really is. A light textured light reflecting product is a much better option.

It is not just women but men who are concerned about such issues. Male grooming brand, Bulldog, have an under eye product available - Original Eye Roll-On contains avocado oil, cucumber and Brazilian Ginseng extract to reduce appearance of dark circles, puffiness and fine lines.

### Age spots

A commonly seen feature on aged skin of both the face and hands are solar lentigines, more commonly known as age spots, observed as brown to red, circular markings though severe cases may be quite large and irregular shaped. Although these are associated with chronological ageing their number and intensity are linked directly to sun exposure so they serve as a key indicator of photodamage.<sup>1</sup> When observed by reflectance confocal

microscopy these appeared to have characteristic features including regular honeycomb patterns, edged dermal papillae and cord-like rete ridges at the dermoepidermal junction.<sup>20</sup> It is not fully understood how these are formed though recent research suggests it may be down to disruption of the skin's melanin units, triggered by UV exposure.<sup>21</sup>

Intense spot treatment serums in tubes with narrow apertures are excellent for applying product directly to the spot and can be used before or after a daily moisturiser. The best way to prevent age spots is to avoid UV exposure by wearing a suitable SPF product. But what do you do if they are already there? Products such as Estée Lauder's Re-Nutriv Intensive Age Spot Corrector is said to reduce the appearance of dark spots and discolouration as is Boots No7 Lighten & Brighten Age-Spot Corrector. Active ingredients tend to be focused on inhibiting tyrosinase activity and reducing melanin synthesis.

### Dryness

As our skin ages its ability to hold on to water is diminished leading to dry skin. It has been previously reported that Trans Epidermal Water Loss (TEWL) shows an age-related increase in facial skin sites, particularly those of the perioral area which, combined with a lowering in the ability to produce sebum, results in dryness.<sup>1,22,23</sup> Dry skin appears cracked, rough and scaly, surface features such as fine lines may be more apparent and the skin will feel tight, dry, itchy and uncomfortable. In particular, dryness in

the lip area can lead to cracking, lines and discomfort.

As skin ages, the lips are very much affected becoming thinner and drier accentuating fine lines around the mouth – particularly in smokers. Aside from the rather drastic step of having dermal fillers injected, much can be done to improve their appearance. A good barrier product will prevent moisture from being lost. Vaseline has always been exceptionally popular as a lip protector as has Elizabeth Arden's eight hour cream but in today's market, natural alternatives are becoming increasingly sought after. Plant oils and butters effectively provide protection and hydration. Strahl & Pitsch's Natural Wax Jelly is a natural alternative to Vaseline and is made with a blend of natural waxes and oils. Hydration is an important aspect of plumping out a pout and exfoliating scrubs can do much to improve the appearance of dry skin on the lips and other parts of the face and body.

Colour cosmetics can be used to further enhance the appearance of the lips. This spring has seen the emergence of several new lip colours which are somewhere between a balm and a lipstick. Chanel Rouge Coco Shine is a new light feeling lipstick with a balm-like texture which becomes fluid on contact with the lips and provides a gloss effect with natural shine. The product is said to provide continuous eight-hour-long hydration thanks to the Hydratender complex. L'Oréal Rouge Caresse Lipstick gives a soft, light-weight application of colour. It has a delicate texture which glides onto lips to create a veil of colour which gives luminous shine.

Shine is key to making lips look plumper and therefore younger.

### Sebum production

As mentioned above, as we age there is a decrease in the ability of the sebaceous glands to secrete sebum. However, despite this decrease in the production of sebum the sebaceous glands increase in size, so pore size increases.<sup>1,24</sup> This leads to a grainy appearance to the surface of the skin and contributes to a dull, grey appearance. Enlarged pores create an irregular texture and tone which reduces the attractiveness of skin, particularly in the T-zone where skin tends to be oiliest. As skin ages and produces less collagen, pores lose elasticity and dilate. Several tactics can be employed to improve the texture of the skin, professional facials remove bacteria and reduce oiliness, while exfoliators take away the dead skin cells, revealing fresher skin underneath.

A cream foundation may be more beneficial than a liquid one as it is more likely to fill in pores. A soft focus mattifying product also helps to disguise this imperfection. For example adding a material like 3M's Cosmetic Microspheres CM-111 (magnesium silicate) will neutralise shine and create a soft-focus effect to blur any visible pores.

### Jowls

As well as wrinkling of the skin it is also observed that the skin is prone to sagging as time goes by, leading to the cheeks falling and the loss of jaw line definition and ultimately the formation of jowls. Research by Shiseido has shown this is significantly related to reduction in skin elasticity, mimetic muscle function (the muscles of facial expressions) and an increase in fat mass.<sup>25</sup> Sagging of the cheeks has also been shown to promote the formation of folds in the nasolabial region which, again, contribute to the perception of an increase in age of the face.<sup>26</sup>

Products on the market which target jowls include Clarins Extra Firming Foundation and Vichy LiftActiv, both of which firm and lift to give a more youthful appearance. Actives will focus on promoting the synthesis of collagen and firming via reinforcing the network of fibres which support the skin from within. Formulations may include quite heavy night creams so that the face benefits from a massage effect as they are rubbed in and they then have all night to work their magic.

### Conclusion

When all the factors mentioned above are taken as a whole these are the areas which contribute the most to how old we actually



appear. Thankfully there are many cosmetic solutions to help prevent, camouflage and treat the signs of ageing. More recently there has been a shift away from identifying and focusing on specific areas of the face which impact on our appearance, such as wrinkles, to taking a more holistic approach, trying to understand how it all comes together to contribute to a final impression of how old we look. Products will talk about radiance, brightening and evening of the complexion combined with anti-wrinkle claims, pore minimising, etc. This has resulted in the launch of products which combine the positive attributes of both colour cosmetics, for an instant effect, with those from skin care which give a longer term solution.<sup>3</sup> When formulating such products it is important to be aware of all the areas which are involved in ageing so that multifunctional formulations can be developed which give both instant and long-term benefits. **PC**

### References

- Shai A, Maibach H, Baran R. *Handbook of cosmetic skin care*, 2nd edn. Informa Healthcare, 2009.
- Long S, Whitby D, Stendhurst N, Godfrey M, Marlow I. *A technique for the assessment of the appearance of age*. Poster Presentation at 25th IFSCC Congress October 2008.
- Allen J. Actives in colour cosmetics. *Personal Care Europe* 2011; **4** (2): 63-5.
- Humbert P et al. In the shadow of the wrinkle: theories. *J Cosmet Dermatol* 2012; **11** (1): 72-8
- Gilchrist BA. Skin aging and photoaging: an overview. *J Am Acad Dermatol* 1989; **21** (3 Pt 2): 610-3.
- Kuwazuru O, Miyamoto K, Yoshikawa N, Imayama S. Skin wrinkling morphology changes suddenly in the early 30s. *Skin Res Technol* 2012; Jan 11.
- Fink B, Matts PJ. The effects of skin colour distribution and topography cues on the perception of female age and health. *J Eur Acad Dermatol Venereol* 2008; **22** (4): 493-8.
- Samson N, Fink B, Matts P. Interaction of skin color distribution and skin surface topography cues in the perception of female facial age and health. *J Cosmet Dermatol* 2011; **10** (1):78-84.
- Anderson RR, Parish JA. The optics of human skin. *J Invest Dermatol* 1981; **77** (1): 13-9.
- Li L, So-Ling Ng C. Rendering human skin using a multilayer reflection model. *Int J Math Comput Simulat* 2009; **3** (1): 44-53.
- Nishimori Y, Pearse AD, Edwards C, Marks R. Elastotic degenerative change and yellowish discoloration in photoaged skin. *Skin Res Technol* 1998; **4** (2): 79-82.
- www.telemedicine.org/dm/dmupdate.htm#yellow
- Ohshima H, Oyobikawa M, Tada A et al. Melanin and facial skin fluorescence as markers of yellowish discoloration with aging. *Skin Res Technol* 2009; **15** (4): 496-502.
- Matts PJ, Fink B, Grammer K, Burquest M. Color Homogeneity and visual perception of age, health and attractiveness of female facial skin. *J Am Acad Dermatol* 2007; **57** (6): 977-84.
- Fink B, Matts PJ, Klingenberg H, Kuntze S, Weege B, Grammer K. Differences in visual perception of age and attractiveness of female facial and body skin. *Int J Cosmet Sci* 2011; **33** (2): 126-31.
- Oxygeskin (www.silab.fr).
- Nakazawa Y, Ma X, Li L et al. Characterization of eye bags in Chinese women. *Int J Cosmet Sci* 2010; **32** (4): 316.
- Freitag FM, Cestari TF. What causes dark circles under the eyes? *J Cosmet Dermatol* 2007; **6** (3): 211-5.
- Roh MR, Chung KY. Infraorbital dark circles: definition, causes and treatment options. *Dermatol Surg* 2009; **35** (8): 1163-71.
- Tsukahara K, Fujimura T, Yoshida Y et al. Comparison of age-related changes in wrinkling and sagging of the skin in Caucasian females and Japanese females. *J Cosmet Sci* 2004; **55** (4): 351-71.
- Richtig E, Hofmann-Wellenhof R, Kopera D et al. *In vivo* analysis of solar lentiginos by reflectance confocal microscopy before and after Q-switched laser treatment. *Acta Derm Venereol* 2011; **91** (2): 164-8.
- C. Nizard, M. Cario-André, S. Lepreux et al. Epidermal dermal junction and spots in human skin. *Int J Cosmet Sci* 2005; **27** (1): 62-6.
- Marrackchi S, Maibach HI. Biophysical parameters of skin: map of human face, regional and age related differences. *Contact Dermatitis* 2007; **57** (1): 28-34.
- Kobayashi H, Tagami H. Distinct locational differences observable in biophysical functions of the facial skin: with special emphasis on the poor functional properties of the stratum corneum of the perioral region. *Int J Cosmet Sci* 2004; **26** (2): 91-101.
- Matsubara A. Differences in the surface and subsurface reflection characteristics of facial skin by age group. *Skin Res Technol* 2012; **18** (1): 29-35.
- Ezure T, Hosoi J, Amano S, Tesuchiya T. Sagging of the cheek is related to skin elasticity, fat mass and mimetic muscle function. *Skin Res Technol* 2009; **15** (3): 299-305
- Ezure T, Amano S. Involvement of upper cheek sagging in nasolabial fold formation. *Skin Res Technol* 2011; Aug 18.