Each year new skin care ingredients are launched by the major ingredient suppliers as they strive to improve sales by providing new active materials and applications. These are often too costly to use in mainstream products and may only be added in adequate quantities to truly achieve the effects desired in very expensive luxury items

An on-line search on luxury skin care reveals numerous contenders with items costing less than £50.00 per 50ml but somewhat more expensive is Crème de la Mer at £92 per 30ml, even more costly are RéVive products at up to £400 per 30ml and Perricone offers a 30ml serum for nearly £600 and there are many others within the £100 - £600 price bracket.

The majority of the ingredients in these items are to be found in any good skin care product; what sets them apart is their content of expensive active ingredients and very successful marketing. Moisturising, collagen replacement and anti-wrinkle therapy are the prime targets for the luxury end of skin care and to achieve these aims are plant-derived active ingredients, peptides and materials with a Botox-like effect and minerals and precious stones are promoted to give additional marketing if not therapeutic benefits.

As examples of plant-based actives **Gattefosse** provide Gatuline Skin Repair Bio incorporating an aqueous-alcoholic extract of *Onopordum acanthium* as a skin barrier repair ingredient claimed to help skin heal itself and to reduce TEWL. **Gatuline In-Tense** is Spilanthes acmella flower extract in caprylic/capric triglyceride said to boost cellular dynamism, tightening the dermal web of protein fibres, leading to reduced wrinkles and creases. **Cytobiol Lumin-Eye** is Fraxinus excelsior bark extract with niacinamide and silanetriol potassium citrate, the combination of which simultaneously tackles each mechanism responsible for puffy eyes and dark circles.

Sesaline Bio from **Expanscience** is the unsaponifiable fraction obtained by molecular distillation from Sesamum indicum (Sesame) oil with strong antioxidant and free radical scavenging properties. Vitasource from **Provital** is a purified fraction obtained from the roots of *Scutellaria baicalensis Georgi* standardised in baicalin that extends the active life of human fibroblasts *in-vitro* by approximately 10%, delaying their aging process. Noline, also from Provital, is an active ingredient obtained from nutmeg seeds that increases the volume of adipose tissue underneath the skin, filling the wrinkles and expression lines characteristic of mature skin.

Silab supply active materials from botanical sources including Pro-Coll-One+ comprising purified glycopeptides obtained from soya to promote the synthesis of Collagen-1. Retilactyl D extracted from black pepper is for firming supporting tissues and it corrects damage caused by photo-aging by improving the density and firmness of the skin and remodelling the contours of the face. p-Refinyl is rich in oligosaccharides from lentils and is offered as a long-term solution to dilated pores and Affiness is described as a new anti-cellulite ingredient from sweet orange and coriander. It activates lipolysis favouring the elimination of fats stored in the adipose cells and reduces the storage and metabolism of lipids.

Animal products are no longer popular cosmetic ingredients but exceptions are made for caviar and snake venom. Caviar is the roe of sturgeon, extracted directly from the female fish with a high cosmetic value based on its content of amino acids, structuring peptides, proteins, essential fatty acids and oligoelements. Nutrisea from **Provital** is an

aqueous extract of caviar claimed to have a strong repair and regenerative power and is recommended for products for aged-skin care.

Botox is the trade name for an attenuated derivative of the deadly Botulinum Toxin that works by paralysing facial muscles, preventing them from contracting. This effect generally lasts from a few weeks to a several months. An alternative to injections is the topical application of active ingredients that have a similar but less long-lasting effect. Argireline from **Lipotec** is one such; it is acetyl hexpeptide-3 that attenuates muscle contraction so the muscle is relaxed and wrinkles are smoothed.

Syn-Ake from **Pentapharm** is dipeptide diaminobutyroyl benzylamide diacetate, which mimics the activity of a polypeptide found in the venom of the Temple viper, *Tropidolaemus wagleri*. Clinical trials show that Syn-Ake is capable of reducing mimic wrinkles by inhibiting muscle contractions and has excellent smoothing and fast anti-wrinkle activity. Also from Pentapharm, Regu-Stretch is complex of panthenol, Marrubium vulgare extract and palmitoyl tripeptide-5 that protects the skin's structure from stretch marks and activates the repairing process by stimulating the synthesis of collagen and reducing skin inflammation.

Peptides are the current miracle ingredients in skin-care with numerous examples providing a wide range of beneficial properties. They are polymers of synthetic amino acids linked by peptide bonds and chemically have the same structure as proteins. By convention a polypeptide consists of up to 50 amino acids while a protein consists of one or more polypeptides and totals more than 50 amino acids. Different peptides produce different biological effects by signalling cells to perform various functions by attaching to receptors found on the surface of each cell, described as the lock and key mechanism. The majority of peptides recommended for cosmetic applications consist of less than 10 amino acids and claim very specific properties.

ChroNoline from **Unipex Innovations** is a short peptide linked to a lipid that decreases the appearance of wrinkles and fine lines in 28 days. This peptide is a biomimetic lipopeptide derived from epidermal growth factor that stimulates production of key components at the Dermal-Epidermal Junction (DEJ) level to make the skin smoother and firmer for a younger look. Also from Unipex, Peptide β-White is said to be more efficacious at reducing the appearance of age-spot than either arbutin or vitamin C.

Neutrazen from Unipex is described as a high-tech peptide to be used in post-dermatological treatments to reduce redness, irritation and oedema. It acts on neurogenic inflammation caused by the nervous system and is suggested for products designed for soothing skin stressed by micro-dermabrasion, AHA and laser treatments, chemicals peels, anti-acne therapies and other post-dermatological surgeries. Another material recommended for post-treatment repair is Vitaskin E by **Solabia.** Vitaskin E combines unsaturated fatty acids from raspberry seed oil with tocopheryl succinate aminopropanediol esters in a ceramide-like structure to stimulate tissue regeneration, both in the dermis and the epidermis following peeling or dermabrasion.

Ronacare Cyclopeptide-5 is a new peptide from **Merck** and is said to be the first cyclic peptide for cosmetic applications. The cyclic structure of Ronacare Cylcopeptide-5 means that it has high selectivity to particular receptors and has better stability than other peptides. It is delivered as a liposome for optimal absorption to improve skin elasticity and firmness and to reduce wrinkles by stimulating proteasome activity.

The proteasome is a complex protein present in the nucleus and cytoplasm that degrades damaged proteins, preventing the accumulation of damaged, potentially toxic proteins. The degradation process yields peptides of about seven to eight amino acids long, which can then be further degraded into amino acids and used in synthesising new proteins.

Prolixir S20 from **ISP-Vincience** is a dimer tripeptide specifically designed to target the ubiquitin-proteasome (Ub-P) system to provide sustained proteasome efficacy and lessen protein damage. When collagen is broken down in skin the broken collagen chains stimulate further collagen synthesis. AC Collagen Prepeptide from **Active Concepts** is the same as fragments of broken collagen and cells exposed to it start synthesising collagen in response to the presence of these fragments.

A tetrapeptide from **ISP-Vincience** is trade-named Chronagen and is said to specifically boost cellular natural defences against UV damage during the day and to assist DNA repair at night. Chronocyclin from **Exsymol**, INCI; Glutamylamidoethyl imidazole, is described as a chronopeptide that can mimic the effect of the sun on the skin and reset the natural circadian rhythm to improve wrinkle reduction, vitamin D activation and cellular proliferation and regeneration.

Several genes are involved in skin ageing resulting in physiological changes to the dermis and epidermis. Delaying the onset of ageing characteristics is the claim of TimeCode and SurviCode from **Seppic**. Interleukin-6 is present at high concentrations in the elderly. This pro-inflammatory cytokine plays a significant role in the ageing process and TimeCode inhibits its expression. It also restores the skin's microcirculation adding radiance to the complexion while strengthening the structure of the dermis for a firmer skin. Together these three activities turn back the ageing clock.

SurviCode, INCI; Sodium cocoyl alaninate, increases the longevity of stem cells in order to delay the development of wrinkles by acting on two proteins: Sirtuin-1 and nuclear Survivin, which are essential to cellular longevity. Sirtuin-1, linked to the survival of all cells, ensures skin integrity and nuclear Survivin, specific to stem cells survival, guarantees the regeneration potential of the epidermis. The expression of these two proteins falls significantly with ageing, triggering a slow-down in the vital functions of the cells. According to Seppic, with SurviCode the expression of Survivin and that of Sirtuin-1 is much improved with significant improvements in facial appearance noted after 42 days when trialed with cosmetic compositions containing 1% SurviCode.

Peptides are of particular interest because they have specific activity on human skin. It is possible to isolate stem cells from plants that also have specific physiological benefits on human skin and the **Istituto di ricerche biotecnologiche, IRB**, offers a wide range of plant stem cells for cosmetic applications. Their botanical name is meri**stem**atic cells and they are undifferentiated cells obtained from plant buds. Buds are more exposed than other tissues to environmental attack and for this reason they are particularly rich in phenylpropanoids, which are highly effective defensive substances. The mechanism of action of plant meri**stem**atic cells is based on the presence of phenylpropanoids which act both chemically and biologically.

IRB is able to offer a wide range of stem cell based products from its consolidated bank of plant cell lines, with virtually unrestricted potential. The current range includes anti-ageing properties from *Leontopodium alpinum*or (Edelweiss); an anti-stress remedy

from *Echinacea angustifolia* and firming activity to improve skin tone and elasticity from *Centella Asiatic.* Protection from UVA photo-damage and oxidative stress is said to be offered by *Buddleja davidii* and *Gardenia jasminoides* stems protect the collagen system, boosting its synthesis and reducing collagen degradation.

ACB Stem Cell Factor from **Active Concepts** is a fermented botanical extract that increases the proliferation of CD 34+ hematopoietic stem cells in the dermis while offering much needed antioxidant protection. It is a blend of natural botanicals that includes sea buckthorn, gooseberries, sweet marjoram and green tea in an aqueous-glycolic base and has the INCI name Saccharomyces/Camellia sinensis leaf/Origanum majorana leaf/Hippophae rhamnoids fruit/Ribes grossularia fruit ferment extract.

Vitamins will always be popular as food supplements and cosmetic additives but the water-soluble ones like vitamin C are difficult to stabilise while the oil-soluble ones like vitamin E are difficult to incorporate unless the product is an emulsion. Vitamin E TPGS from **Cognis** is D-alpha tocopheryl polyethylene glycol 1000 succinate; it is water-soluble and is said to increase the bioavailability of poorly soluble drugs.

AA2G from Hayashibara is ascorbyl glucoside, a stabilised form of Vitamin C that reduces melanin synthesis to diminish the appearance of age spots and pigmentation irregularities. It has free radical scavenging activity and new tests demonstrate that AA2G promotes involucrin production, a key protein related to the barrier function of the epidermis, and that it delays the progress of skin ageing by preventing the degradation of sirtuin.

Minerals are represented by Oli'vine from **Gattefosse**, an aqueous extract of olivine. Olivine is a magnesium iron silicate and is one of the most common minerals on Earth that has also been identified in meteorites, on the Moon, Mars and in comet dust. The Acqua-Biomin products from **Arch** are yeast-derived complexes of metals with peptides. Thus **Acqua-Biomin Copper Y3 PF** is copper polypeptide that consists of elemental copper bonded to protein to increase bio-availability. Copper is key to the absorption and utilisation of iron because of its role as a cofactor in several oxidative enzymes and works to form elastin in the skin.

Granpowder PSQ-Diamond-10 from **Grant Industries** is a combination of a silky silicone powder and a cosmetic-grade of micronized diamond powder. Technically, it provides soft focus, skin polishing effects, and a great skin feel. According to Grant Industries, because of its high refractive index virtually all light entering the top face of the diamond particle is reflected internally and the appearance is softened since the light emerges in random directions. The suppliers believe that claiming 1/4 carat or more of real diamond in a product will provide new marketing claims. It also sells cosmetic raw materials containing gold, silver and platinum as colloidal suspensions and confirms there is a trend for providing jewellery grade metals and gemstones for cosmetics.

Lithocosmetic from **Soliance** is based on the chakras, which are described as being aligned in an ascending column from the base of the spine to the top of the head and are associated with certain colours. They are considered loci of life energy and their function is to keep the spiritual, mental, emotional and physical health of the body in balance. According to the suppliers Tourmalina triggers microcirculation through far infra-red energy emission and improves the complexion by stimulating blood flow. Amethysta stimulates the combustion of fat and protects the hair against parasites.

Sapphira can be used to fight against skin eruptions and excessive perspiration. Rubisa tones the skin and promotes skin well-being while Citrina and Diamond help to activate microcirculation and improve skin complexion. Literature from Soliance describes the source of the gem stones and also provides metaphysical characteristics.

Persons who can afford luxury skin care products are also likely to visit spas and beauty salons for treatment by expert therapists. Many such treatments involve an exfoliation step for which **Provital** suggest the use of Exfo-Amber, a fossilised resin from forests of *Pinus succinifera*, ground to a particle size less than 400 μm. Amber is not a mineral, but a product of organic origin with an amorphous structure that was formed about 45 million years ago and which has subsequently hardened and lost its content of volatile oils. AC Diamond Dust from **Active Concepts** consists of diamonds that are ground into a fine powder and is also suggested for use as an exfoliant in personal care and cosmetic products.

Some light sources have been clinically shown to have benefits on the skin. Ultraviolet light is one such example, as it is used for the treatment of psoriasis and dermatitis. A novel material from **Arch Personal Care** is BioLumen Firm comprising naturally derived polyphenols bonded to an inert mineral backbone and further blended with yeast amino acids to harness the power of UV light, and transform it into positive and beneficial light energy to elicit an anti-aging effect on skin.

There are many more ingredients available that would be effective if their price enabled sufficient quantity to be added to products and if marketing departments could persuade consumers to purchase the expensive results. Unfortunately the properties of many of these materials are reduced to a name on the label and result in a disappointment for the user.