

**PYCNOGENOL®**

Oral Skin Care



## Pycnogenol® in Oral Skin Care

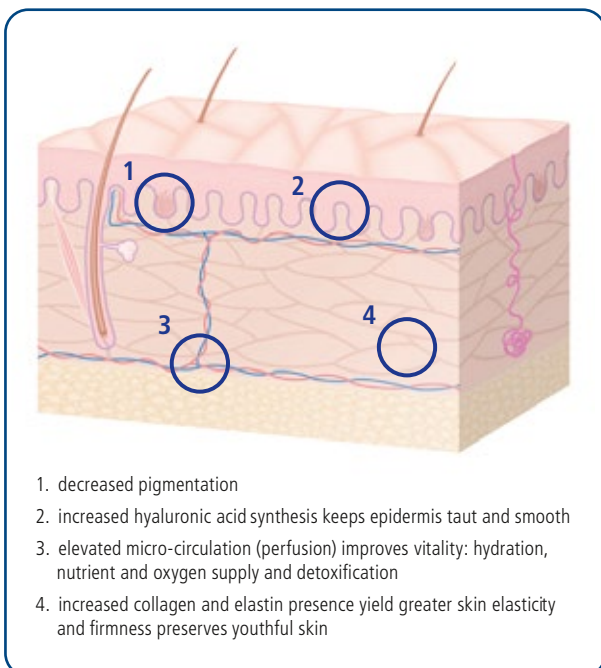
The dermis represents the largest body organ, burdened with shielding the organism from environmental impact. The skin health and appearance serves as proxy for the general health and age status of a person, and skin attractiveness represents one of the most cared after daily obligations. The skin, being the largest body organ represents the tissue most heavily exposed to environmental impact. The visible appearance of the skin mirrors the general health status, the degree of self-care, nutritional status and age of an individual.

Pycnogenol® is widely used in oral as well as topical applications for improved skin health and appearance. Pycnogenol® contributes an unmatched variety of physiological functions for improvement of both health and aesthetic appearance of human skin.

### Pycnogenol® provides numerous health benefits to the dermis

Pycnogenol® is a popular active component in dermatological formulations and cosmeceuticals, as a result of manifold contributions to healthier and better looking skin, exemplified by more than 20 published clinical

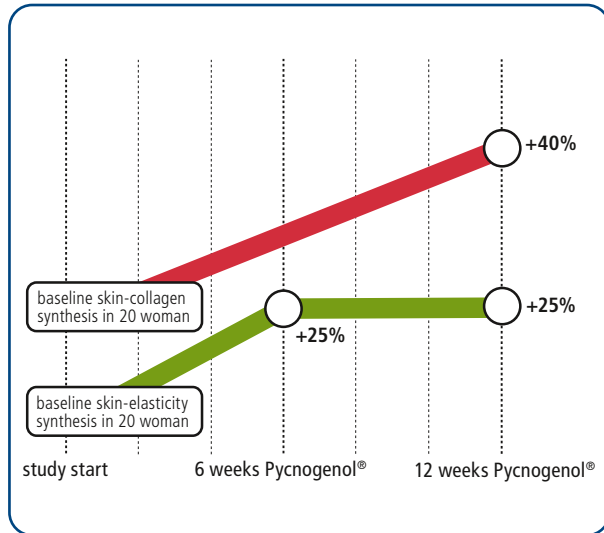
investigations in dermatology. It is the multiple functionality of Pycnogenol® which makes it stand out as key ingredient in formulations dedicated to good skin health and looks. In brief, Pycnogenol® supports increased presence of collagen and elastin, improves skin micro-circulation, elevates skin hydration and elasticity by upping dermal hyaluronic acid generation and, furthermore, balances pigmentation for brighter skin complexion and quenches inflammatory processes, such as during UV exposure.



### Pycnogenol® stimulates collagen synthesis in women and correspondingly significantly elevates their skin elasticity

A study with 20 healthy women, presenting with Caucasian skin types II and III, found that daily supplementation with Pycnogenol® over a period of twelve weeks, significantly increased new collagen (type 1) synthesis in their skin by increasing gene expression by 41% [Marini et al., 2012]. Correspondingly, women's skin elasticity, as measured by means of a cutometer, was in average elevated by 25% after six weeks supplementation with Pycnogenol® and remained at this value until trial completion. In parallel, skin fatigue decreased by 30% during the same time period.





The elevated collagen synthesis identified in the dermis of 20 women supplementing with Pycnogenol® coincided with significant increase of their skin elasticity parameters, as judged from cutometer measurements, after both 6 and 12 weeks of supplementation with Pycnogenol®, respectively.

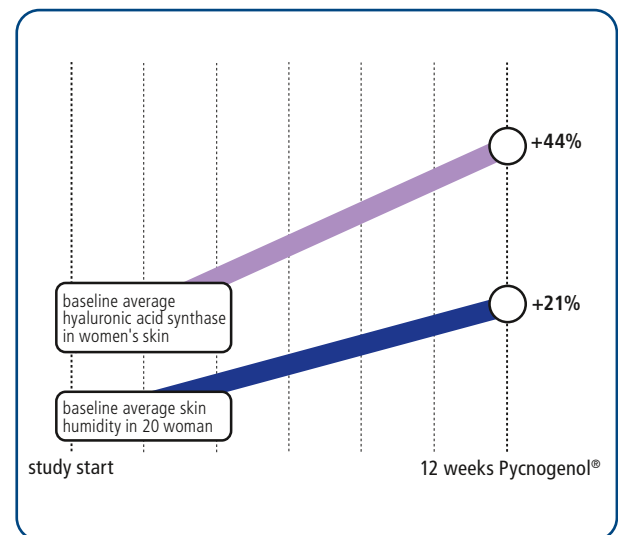
Pycnogenol® metabolites represent potent inhibitors of destructive enzymes matrix metallo-proteinases (MMPs) -1, -2 and -9, which break down dermal tissue proteins collagen, elastin and gelatine, respectively [Grimm et al 2004; Grimm et al., 2006]. The reduced activity of lytic enzymes extends connective tissue half-life in the dermis, representing the basis for maintaining an elastic, smooth and youthful looking skin.

### Pycnogenol® moisturises the skin

Pycnogenol® is the sole active dietary ingredient demonstrated to stimulate hyaluronic acid generation in women's skin, to naturally improve skin moisture.

Pycnogenol® supplementation significantly elevates generation of hyaluronic acid synthase by increasing gene expression in women's skin, the enzyme

representing the natural source of water-binding hyaluronic acid in the dermis [Marini et al., 2012]. The gene expression of the hyaluronic acid generating enzyme was increased significantly by average 44% in women taking Pycnogenol® for twelve weeks, as compared to baseline values. Furthermore, Pycnogenol® stabilises dermal barrier functions which further contributes to defy skin dryness.



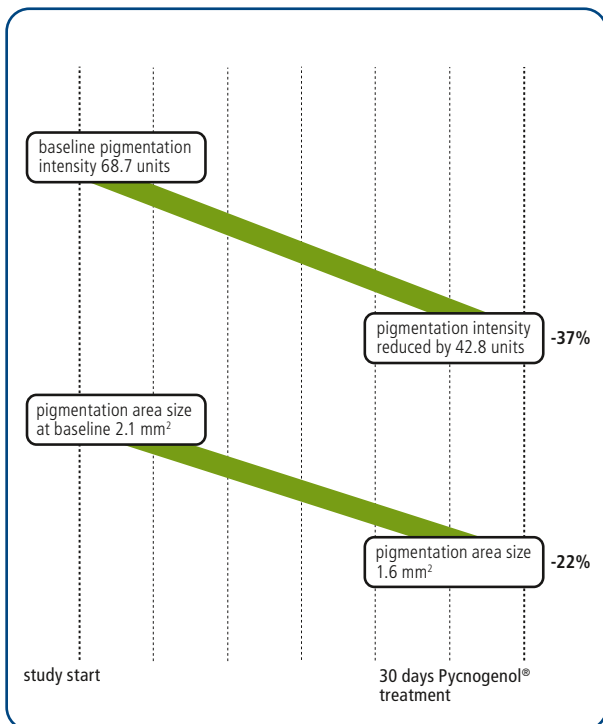
### Pycnogenol® elevates skin hydration

In parallel to increased hyaluronic acid synthesis taking place in women's skin, in response to supplementation with Pycnogenol®, the more abundant hyaluronic acid binds larger water quantities in the dermis, thus significantly increasing skin hydration particularly in women presenting with dry skin. In women presenting with normal skin moisture, as measured by corneometry, supplementation with Pycnogenol® was demonstrated to still further improve skin humidity significantly by 8% [Marini et al., 2012]. As a matter of fact, to date no other dietary supplement was found to naturally stimulate dermal expression of hyaluronic acid synthase.

**Pycnogenol® lowers pigmentation intensity and brightens skin complexion**

Pycnogenol® lightens over-pigmented skin, lowering pigmentation intensity resulting in brighter skin complexion. Pycnogenol® dose-dependently inhibits α-MSH (melanocyte stimulating hormone) stimulated pigment formation (melanogenesis) in melanocytes [Kim et al. 2008]. In a clinical trial with 20 women oral supplementation with Pycnogenol® was shown to significantly lower UV-induced expression of pigment synthesising enzymes, tyrosinase-related protein 1 (TRP1) and tyrosinase, related to melanogenesis [Grether-Beck et al., 2016]. This further supports Pycnogenol® ability to reduce hyperpigmentation

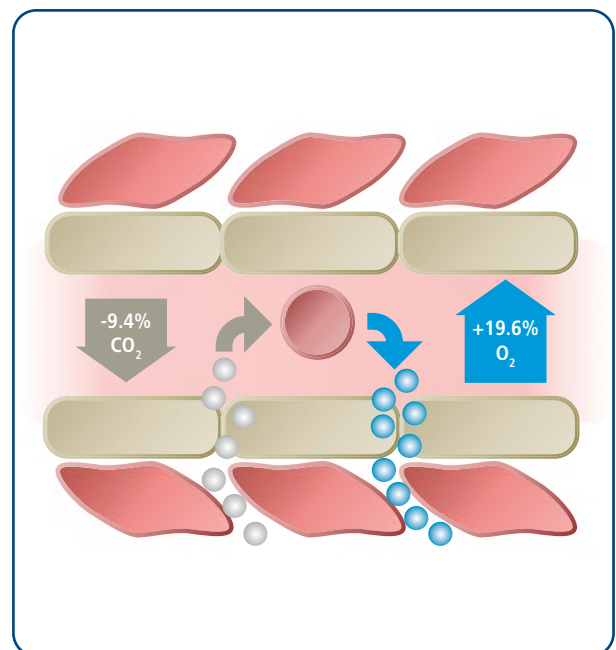
**A clinical study demonstrated that supplementation with Pycnogenol® effectively lightens-up over-pigmented skin areas [Ni et al., 2002].**



**Pycnogenol® enhances blood-microcirculation in dermal capillaries for improved perfusion, hydration, nutrient and oxygen supply, as well as waste removal**

Pycnogenol® is well described to improve endothelial function, resulting from expanded endothelial nitric oxide synthesis [Fitzpatrick et al., 1998]. Supplementation with Pycnogenol® was demonstrated to increase blood perfusion of the dermis, resulting in greater oxygen and nutrient abundance as well as better waste removal [Belcaro et al., 2006]. Dermal capillaries are fragile, yet they carry the burden of supplying required nutrients, meet the required oxygen and hydration demand, as well as waste removal. Pycnogenol® was demonstrated in clinical trials to significantly elevate dermal oxygen prevalence and, correspondingly, reduce carbon dioxide presence [Belcaro et al., 2005]

**Pycnogenol® significantly improves dermal blood micro-circulation**

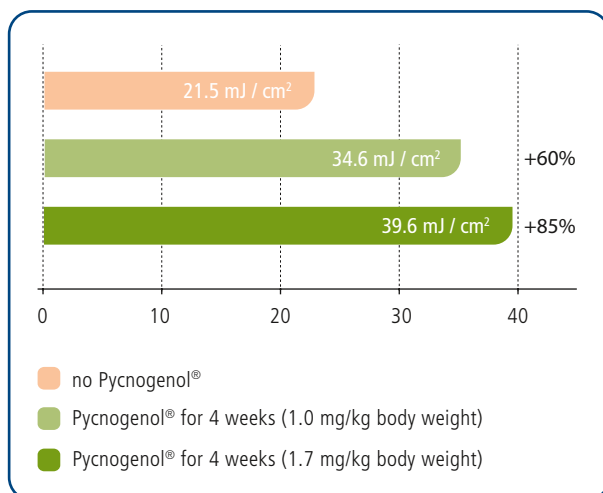


### Pycnogenol® contributes to save the skin from photo-ageing

Exposure of skin to energetic light, especially UV radiation, exacerbates skin ageing processes. Pycnogenol® is demonstrated in clinical trials to significantly contribute to photo-protection, while it is not suggested to replace adequate skin-protective measures in situations of intense sun exposure. Taken as daily dietary supplement Pycnogenol® provides potent photo-protective effects from inside the skin, which is very beneficial in addition to topical skin protection and shadowing.

Oral supplementation of 21 healthy volunteers, presenting with fair skin (predominantly skin types I and II) with Pycnogenol®, at different dosages in repeat experiments, demonstrated significant photo-protective effects, reducing the minimal erythema dosage [Saliou et al., 2000]. The minimum UV dosage leading to first visible signs of skin reddening (erythema) was demonstrated to increase in response to Pycnogenol® supplementation in a dose-dependent fashion.

### Pycnogenol® dose-dependently increases resistance to solar UV exposure (solar light dose needed to trigger skin redness)



In conclusion, Pycnogenol®, as part of daily sun protection routines, such as UV-blockers and sun-protective garments, significantly contributes to defy skin photo-ageing.

### Pycnogenol® acts in concert with key vitamins and minerals to significantly elevate skin elasticity and smoothness in double-blind, placebo-controlled trial.

A double-blind, placebo-controlled clinical study with 62 women supplementing with a complex dietary formulation with Pycnogenol® as lead active ingredient, demonstrated significantly increased skin elasticity after 6 weeks by 9% as compared to placebo [Segger et al., 2004]. In addition to Pycnogenol® this complex formulation (Evelle™) bears various natural antioxidants, minerals and vitamins. Continuous intake of the complex formulation for 12 weeks demonstrated significantly improved skin smoothness by 6% as compared to placebo.

Visible attractiveness and a healthy skin physiology are inseparable from another. The dermis largely appreciates same key micro-nutrients, vitamins and minerals as most organs, the quantities however may vary considerably, and supply gaps manifest visibly as rough, reddened, scaling or even itchy skin. The demonstrated synergies of key vitamins and minerals acting in concert with Pycnogenol® as lead active component, demonstrates the potential of Pycnogenol® for radiant beautiful skin.

### **Pycnogenol® contributions to healthy and beautiful skin**

- Pycnogenol® stimulates synthesis of new collagen in the skin
- Pycnogenol® increases skin elasticity and reduces skin fatigue
- Pycnogenol® elevates hyaluronic acid generation in skin
- Pycnogenol® moisturises the skin
- Pycnogenol® arrests activity of enzymes breaking-down collagen and elastin
- Pycnogenol® contributes to limit photo-ageing, in addition to sun-protective measures
- Pycnogenol® reduces pigmentation for an even, bright looking skin

### **References**

- Grether-Beck S, Marini A, Jaenicke T, Krutmann J.*  
French Maritime Pine Bark Extract (Pycnogenol®) Effects on Human Skin: Clinical and Molecular Evidence. *Skin Pharmacol Physiol.* 29: 13-17, 2016.
- Marini A, Grether-Beck S, Jaenicke T, Weber M, Burki C, Formann P, Brenden H, Schönlau F, Krutmann J.*  
Pycnogenol® effects on skin elasticity and hydration coincide with increased gene expressions of collagen type I and hyaluronic acid synthase in women. *Skin Pharmacol Physiol.* 25: 86-92, 2012.
- Kim YJ, Kang KS, Yokozawa T.*  
The anti-melanogenic effect of Pycnogenol® by its anti-oxidative actions. *Food Chem Toxicol* 46: 2466-2471, 2008.
- Belcaro G, Cesarone MR, Errichi BM, Ledda A, Di Renzo A, Stuard S, Dugall M, Pellegrini L, Gizzi G, Rohdewald P, Ippolito E, Ricci A, Cacchio M, Cipollone G, Ruffini I, Fano F, Hosoi M.*  
Diabetic ulcers: microcirculatory improvement and faster healing with Pycnogenol®. *Clin Appl Thromb Hemost* 12: 318-323, 2006.
- Grimm T, Chovanová Z, Muchová J, Sumegová K, Liptáková A, Duracková Z, Högger P.*  
Inhibition of NF-kappaB activation and MMP-9 secretion by plasma of human volunteers after ingestion of maritime pine bark extract (Pycnogenol®). *J Inflamm (Lond)* 27;3: 1, 2006.
- Grimm T, Schäfer A, Högger P.*  
Inhibition of NF-kappaB activation and MMP-9 secretion by plasma of human volunteers after ingestion of maritime pine bark extract (Pycnogenol®). *Free Radic Biol Med* 15: 811-822, 2004.
- Segger D, Schönlau F.*  
Supplementation with Evelle improves skin smoothness and elasticity in a double-blind, placebo-controlled study with 62 women. *J Dermatolog Treat* 15: 222-226, 2004.
- Ni Z, Mu Y, Gulati O.*  
Treatment of melasma with Pycnogenol®. *Phytother Res.* 16: 567-571, 2002.
- Saliou C, Rimbach G, Moini H, McLaughlin L, Hosseini S, Lee J, Watson RR, Packer L.*  
Solar ultraviolet-induced erythema in human skin and nuclear factor-kappa-B-dependent gene expression in keratinocytes are modulated by a French maritime pine bark extract. *Free Radic Biol Med.* 15: 154-160, 2001.
- Fitzpatrick DF, Bing B, Rohdewald P.*  
Endothelium-dependent vascular effects of Pycnogenol®. *J Cardiovasc Pharmacol* 32 :509-515, 1998.



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