



dnaskin[®]

Welcome

Example

to your DNA Skin report

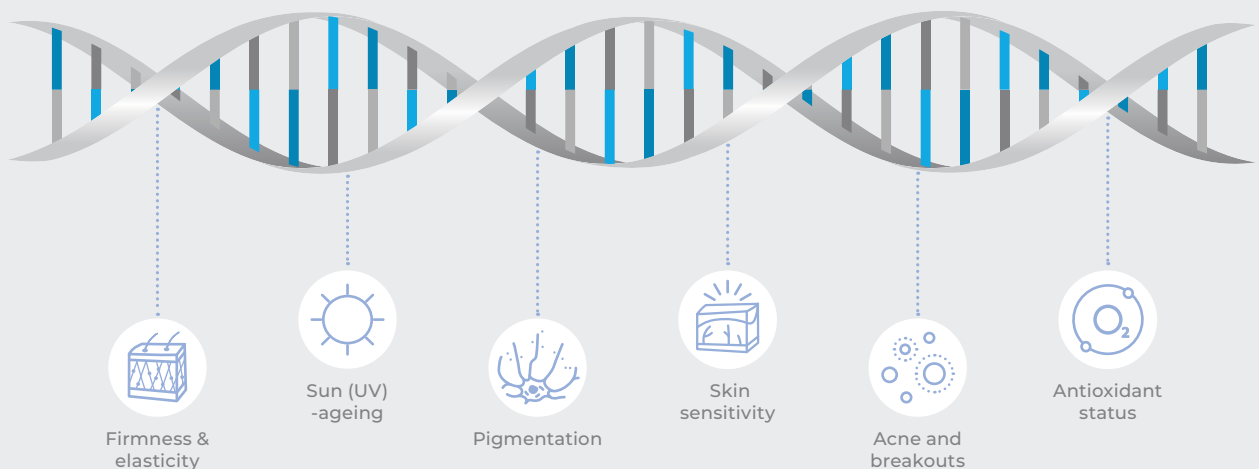
Date of birth: 01 Jan 2001

Date reported: 07 Dec 2021

Sample number: 12345678

Referring practitioner: Private

DNA Skin is a genetic test that offers insight into key areas that influence skin ageing, offering personalised topical, nutraceutical, diet, and lifestyle recommendations for improved outcomes.



Genetics and personalised medicine

Genes are segments of DNA that contain the instructions your body needs to make each of the many thousands of proteins required for life. Each gene is comprised of thousands of combinations of “letters” (called bases) which make up your genetic code. The code gives the instructions to make the proteins required for proper development and function.

Genetic variations (small differences in our DNA) can affect the expression of a gene, thereby affecting metabolic processes that are important for maintaining cellular health and how we respond to environmental interventions such as diet, lifestyle, supplements, and medication. Knowledge of these genetic variations offers unparalleled insight into your biological systems, allowing your healthcare practitioner to recommend precise interventions aimed at helping you reach your goals and achieve optimal health.



NORMAL GENE

Genotype resulting in expected response to interventions

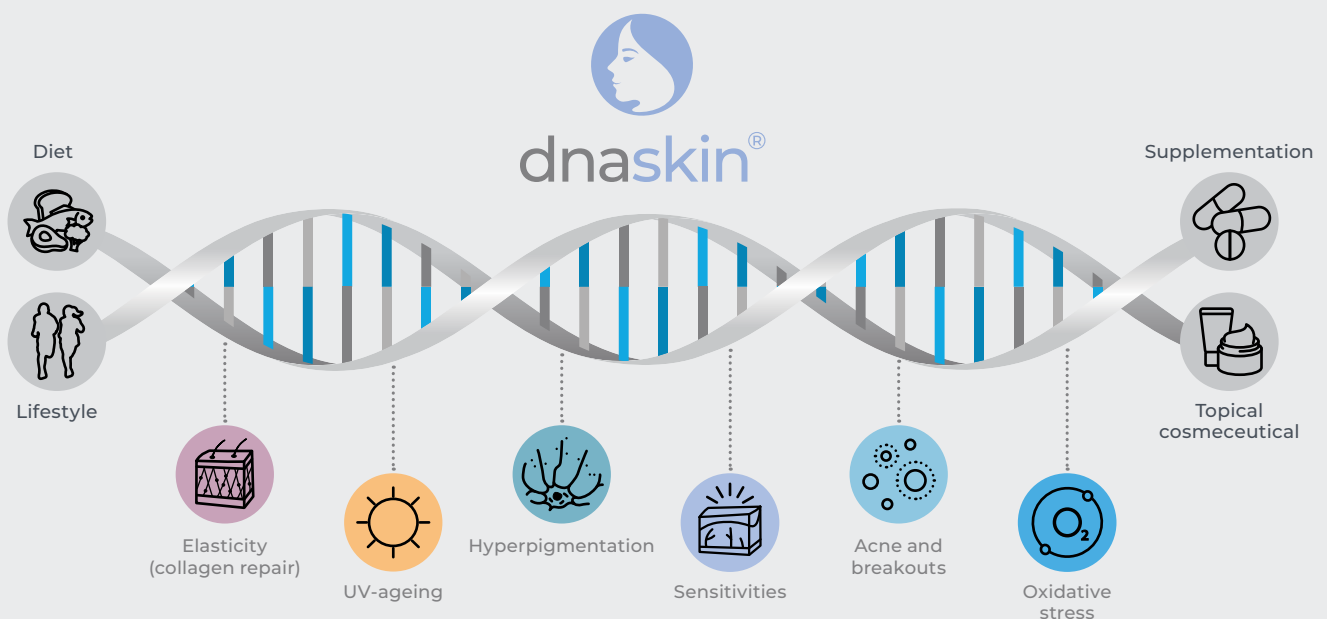


VARIANT GENE

Genotype resulting in altered functioning of a biological area and a need for personalised skin care recommendations

Personalised medicine and skincare

In general, the health of your skin can be measured by considering its appearance through any visual signs of ageing – wrinkles and fine lines, hyper/dyspigmentation, and course skin texture. Your ethnicity, age, UV-exposure, nutrient intake, cosmeceutical use, exposure to environmental pollutants, stress levels, weight management and exercise routine all contribute toward the status of your skin’s health. Within each of these factors, genetics has a major role to play in determining the interindividual variability that exists in the ageing process as well as your response to environmental input to improve skin health. DNA Skin reports on your unique genetics and how gene variations that you may carry could affect your skin and the way it ages. This unique genetic information is your own perfect “skin assistant”. You can use the “skin assistant” information to make personalised skincare decisions. Insight into the gene variations that you carry assists in personalising and optimising your lifestyle, diet, beauty supplements and topical skincare regime.



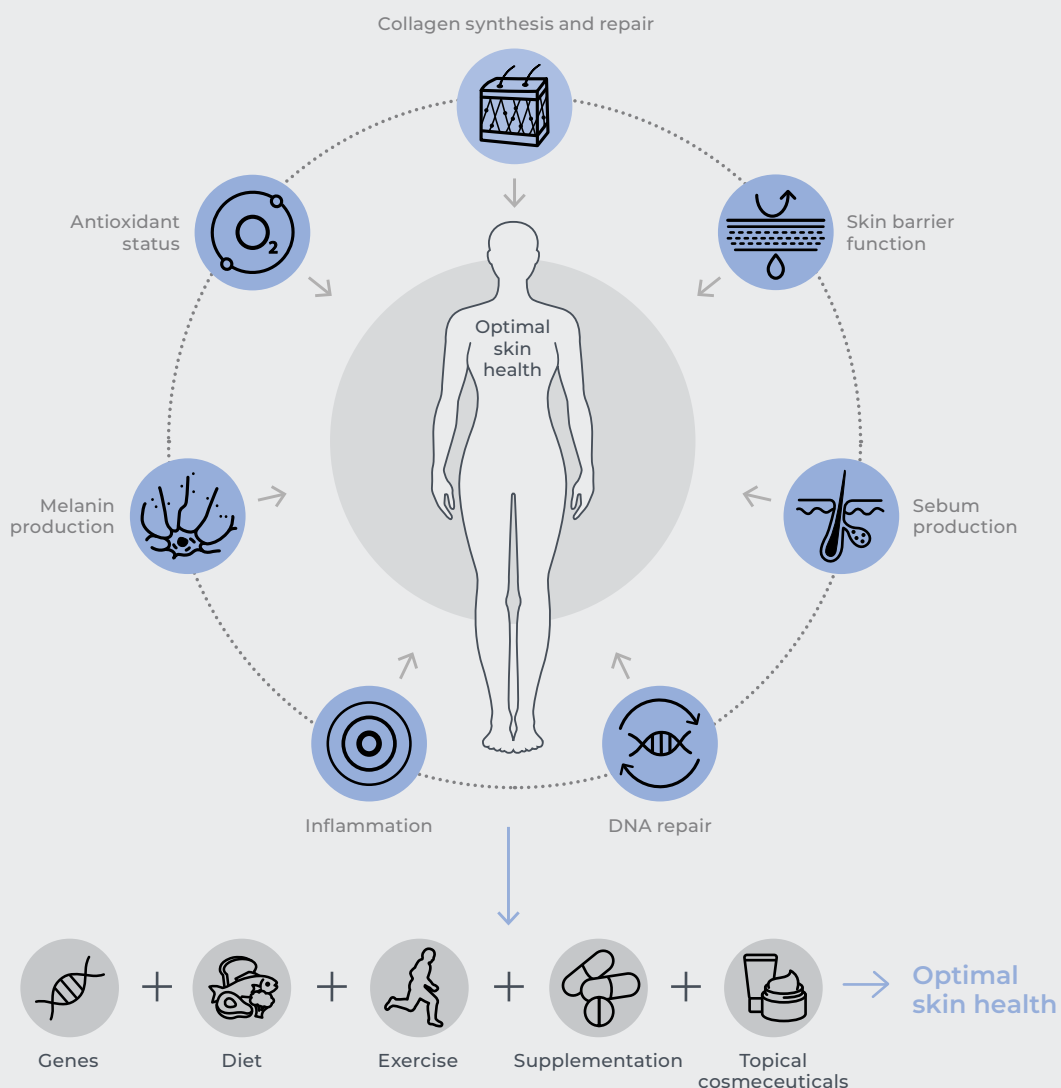
Understanding healthy skin ageing

Your skin's health results from a complex interplay between your genes (your blueprint) and what you are exposed to on a daily basis and is thus polygenic and multifactorial in nature. This means that whilst your susceptibility to skin concerns has a strong genetic contribution, many other factors also play a significant role, including environmental exposure to toxins and stress, gut health, hormonal health and age, exercise behaviour, and dietary intake. Therefore, both genes and environment should be considered to better understand the mechanisms behind skin ageing.

The underlying biological mechanisms that have key functions in skin ageing include:













- Collagen breakdown & repair – influencing skin elasticity
- Antioxidant defence & detoxification – influencing skin barrier function and formation of fine wrinkles
- DNA repair mechanisms – protecting from ultraviolet (UV) ageing
- Melanin production – influencing (hyper)pigmentation and risk for freckles/solar mottling
- Moisture retention – influencing barrier function and sensitivities
- Sebum production – important in acne control, and
- Inflammation – playing a major role in being prone to acne and (dys)pigmentation.

DNA SKIN PROVIDES INSIGHTS INTO KEY AREAS FOR IMPROVED SKIN AGEING








Result summary

Outcomes: Skin priorities

CATEGORY	IMPACT
 Elasticity	 HIGH
 Antioxidant status and environmental pollution	 MODERATE
 UV-ageing	 MODERATE
 Pigmentation	 MODERATE
 Breakouts	 LOW
 Sensitivities	 MODERATE








Summary recommendations

Based on your priority area outcomes, we have provided summary recommendations for the key area's you should be focusing on for optimal skin health.

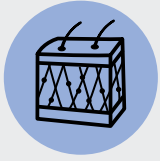
		YOUR GOOD SKIN MANTRA			
		1	2	3	
		Prevent & protect	Repair	Be pro-active	
SKIN CONCERN	YOUR PRIORITY				
Elasticity 	Collagen is responsible for keeping your skin youthful looking & firm. Accelerated degradation & slow production of collagen can lead to skin laxity, sagging, wrinkles & slower healing.	You either rapidly break down your existing collagen and/or produce less new collagen. Look after your collagen to maintain a healthy, resilient skin.	Collagen is damaged by sun & visible light. Use a good quality, mineral sunscreen. Super antioxidants help to protect collagen against damage.	Hydrate with a pro-collagen moisturiser. <ul style="list-style-type: none"> Topical super antioxidants repair existing collagen. Topical exfoliants remove dead skin cells, stimulating new collagen. 	Consider a beauty supplement. Nourish your good gut – good skin axis with probiotics, digestive enzymes & hydrolysed collagen.
Antioxidant status/pollution 	Free radical formation is triggered by environmental pollutants. You have an imbalance (oxidative stress) when free radicals outnumber your antioxidants. This is linked to premature skin ageing.	There is a decrease in your antioxidant & detoxification activity, meaning you are more inclined to an impaired skin barrier (flaking, tightness, redness, itchiness) & fine wrinkles.	Add a gentle, cleanser to remove pollutants. Avoid foaming cleansers. Combine protective, oil-rich emollients containing plant oils & butters with natural moisturising factors (NMF) – ceramides & plant sterols to nourish your skin barrier.	Environmental pollutants disrupt the balance between good and bad bacteria. Use topical pre- & probiotics to promote a healthy skin barrier. Apply topical antioxidants to repair daily damage.	Consider a beauty supplement. Probiotics nourish your good gut – good skin axis, sulforaphane & resveratrol support your “defence system” from within. Increase intake of antioxidants. Minimise exposure to pollutants.
UV-ageing 	UVA & UVB sun rays cause UV (sun)-ageing. UVA is linked to skin ageing. UVB is the main risk factor for burning & cancer. Gene variants tested for UV-ageing increase/decrease your ability to repair DNA damage from exposure to UV radiation.	You are naturally more inclined to: Deep & crisscross wrinkling, sagging, & skin abnormalities.	Protect your skin with a broad spectrum UVA & UVB mineral sunscreen. Determine your skin's response to sunlight based on the Fitzpatrick scale. If you are fair (1-3) aim for a SPF 20+. If your skin is darker (4-6) aim for at least a SPF 15 or higher.	Use topical retinoids (vitamin A at night) to inhibit the breakdown of existing collagen & promote new collagen production. Topical antioxidants (vitamin C, niacinamide, beta-carotene) reduce & neutralise free radicals.	Consider an antioxidant-rich beauty supplement. Resveratrol & anthocyanins (found in blueberries & grapes) rebalance oxidative stress from within.
Pigmentation 	Hyperpigmentation includes freckling & solar mottling/sunspots (more prevalent in lighter skin tones), & post-inflammatory hyperpigmentation (PIH) (more prevalent in darker skin tones).	You are genetically more inclined to freckling & solar mottling/sunspots, uneven skin tone, & PIH.	Avoid excessive sun exposure. Use a broad-spectrum UVA + UVB mineral sunscreen daily. For PIH, address the source first by following a routine to control breakouts. This will have a big impact on controlling your PIH.	Remove & depigment surface skin cells that are already stained with melanin. Use a keratolytic like vitamin A. Exfoliants, such as salicylic & azelaic acid, are equally effective.	Prevent overproduction of melanin – use topical melanin suppressants: vitamin C, phytic acid, niacinamide, azelaic acid & vitamin A. Nourish your good gut – good skin axis with a daily antioxidant, anti-inflammatory & probiotic rich beauty supplement.
Sensitivities 	Sensitive skin is highly reactive to treatments & environmental factors. Reported gene variants are associated with a pre-disposition for underlying inflammation, impaired barrier function & skin sensitivity.	You may be naturally more inclined to dry, sensitive skin & an impaired skin barrier (flaking, tightness, redness, itchiness). Aim for a skin barrier repair & anti-redness routine.	Discontinue use of harsh foaming face cleansers & exfoliating scrubs. Avoid heat & sun which can dilate blood vessels. Use a mineral sunscreen with zinc oxide suitable for sensitive skin. Be careful with highly acidic products & synthetic fragrances.	Lipid ingredients help repair barrier function, & improve hydration making irritants less able to penetrate. Use lipid complexes with a mix of ceramides & phospholipids, free fatty acids (from natural plant oils & butters) & plant sterols.	Adopt an anti-inflammatory diet. Consider a daily anti-inflammatory, phytonutrient & probiotic-rich beauty supplement. Choose topical products made with antioxidants, probiotics & skin microbiome-friendly ingredients.

Genotype results

No Impact
 Low Impact
 Moderate Impact
 High Impact
 Beneficial Impact

BIOLOGICAL AREA	GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
 Collagen breakdown and repair	COL1A1	1546 G>T	GG	<input type="radio"/> <input type="radio"/> <input type="radio"/>
	MMP1	1G>2G	1G/2G	<input type="radio"/> <input type="radio"/>
 Antioxidant defence and detoxification	CAT	-262 C>T	CC	<input checked="" type="radio"/>
	GPX1	C>T	CT	<input type="radio"/> <input type="radio"/>
	SOD2	47 T>C (Val16Ala)	CC	<input type="radio"/> <input type="radio"/> <input type="radio"/>
	EPHX1	C>T	CT	<input type="radio"/> <input type="radio"/>
	GSTP1	313 A>G	AG	<input type="radio"/> <input type="radio"/>
	NQO1	T>C	CC	<input type="radio"/>
 DNA repair mechanisms	XRCC1	Q399R (T>C)	CC	<input type="radio"/> <input type="radio"/>
	XRCC1	R280H (G>A)	AA	<input type="radio"/> <input type="radio"/>
	hOGG1	C>G	CG	<input type="radio"/> <input type="radio"/>
	TERT	C>T	CT	<input type="radio"/> <input type="radio"/>
 Melanin production	ASIP	G>A	AA	<input type="radio"/>
	ASIP	G>T	TT	<input type="radio"/> <input type="radio"/> <input type="radio"/>
	IRF4	C>T	CT	<input type="radio"/> <input type="radio"/>
	MATP (SLC45A2)	1122 C>G	CC	<input type="radio"/>
	MC1R	Arg160Trp (C>T)	TT	<input type="radio"/> <input type="radio"/> <input type="radio"/>
	MC1R	C>T	CT	<input type="radio"/> <input type="radio"/>
	TYR	A>G	AG	<input type="radio"/> <input type="radio"/>
 Inflammation	CRP	G>A	GG	<input type="radio"/> <input type="radio"/> <input type="radio"/>
	IL6	-174 G>C	GG	<input type="radio"/>
	IL6R	A>C	CC	<input type="radio"/> <input type="radio"/> <input type="radio"/>
	TNFA	-308 G>A	GG	<input type="radio"/>
 Sebum regulation	FST	G>A	GG	<input type="radio"/>
 Skin moisture control	TEWL	G>A	AA	<input type="radio"/>

Your results and recommendations



Elasticity

Collagen is the lovely protein that makes up approximately 75% of skin and is responsible for keeping it youthful looking and firm. Elastin, another protein-based fiber in your skin is responsible for its ability to stretch and bounce back to its original form. Collagen loss starts at 18-29 years of age, after 40 you can lose around 1% per year, and at around 80 years collagen synthesis in the body can decrease 75% overall in comparison to that of young adults. Certain variations in genes will result in an increase in the breakdown of existing collagen and less synthesis of new collagen.



Collagen breakdown and repair results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
COL1A1	1546 G>T	GG	●●●
MMP1	1G>2G	1G/2G	●●



Outcome: High priority area

A variant on MMP1 gene means:

You rapidly break down your existing collagen.

COL1A1 gene variation:

Your capacity to produce new, strong/high quality collagen is lower.

This is a high priority area for you, meaning you will be prone to:

- Skin laxity
- Sagging
- Wrinkles
- Slower healing



Recommendations

Look after your collagen to maintain a healthy, resilient skin. A good skin mantra is:



Topical skincare

BROAD SPECTRUM UVA + UVB:

- **Zinc Oxide** – Natural mineral. Protects against UVA and UVB.
- **Titanium Dioxide** – Natural mineral. Protects against UVB.

ACTIVES:

- **Bulbine frutescens** – Stimulates collagen. Inhibits collagenase.
- **Calendula** – Inhibits UV-induced MMP1 expression. Inhibits down regulation of COL1A1 gene.
- **Rooibos (Aspalathin)** – Potent antioxidant flavonoid. Down regulates free radicals. Protects collagen.
- **Vitamin B3 (Niacinamide)** – Repairs collagen. Increases the antioxidant capacity of skin.
- **Vitamin C (Sodium Ascorbyl Phosphate)** – Skin friendly derivative of vitamin C. Potent antioxidant. Neutralises free radicals. Protects collagen.
- **Vitamin E (Tocopherol)** – Natural vitamin E. Reacts with UV-induced free radicals. Absorbs energy from UV light.

EXFOLIANTS:

- **Azelaic acid** – Effective, multitasking exfoliant. Accelerates shedding of dead skin cells. Stimulates cell turnover.
- **Vitamin A (Retinaldehyde)** – Pro-collagen vitamin. Stimulates production of new and organised collagen bundles. Use only at night.
- **Willow bark (Salicylic Acid)** – Mild, self-neutralising acid. Increases cell turnover. Stimulates new collagen.

Lifestyle | Diet | Supplements



PRO-COLLAGEN:

- **Hydrolysed marine collagen** – Building blocks for new collagen.
- **MSM** – Critical co-factor for good quality collagen.
- **Vitamin C** – Pre-cursor for effective collagen production.
- **Baobab** – Rich in natural vitamin C. Assist with effective collagen production.

ANTIOXIDANTS:

- **Astaxanthin** – Super antioxidant. Protects existing collagen from oxidative stress.
- **Green tea** – Powerful antioxidant. Inhibits collagenase.
- **Also look out for:** Ashwagandha, co-enzyme 10, glutathione, honeybush, turmeric (curcumin), pterostilbene, rooibos.

GOOD GUT – GOOD SKIN AXIS:

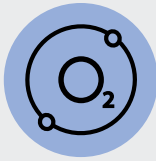
- **Probiotics** – From all three categories, Lactobacillus, Bifidobacterium, Saccharomyces.
- **Digestive enzymes** – Amylases for carbohydrates, cellulases for fibre, lactases for dairy, lipases for fat, proteases for protein.



You should know this...

- Topical skincare products containing collagen are ineffective. Topical collagen molecules are too large to penetrate. It will remain on the surface of your skin.
- For collagen to be effective you need to ingest it in the form of hydrolysed collagen.
- As elasticity is an area of high priority for you, it may take longer for your skin to heal. Keep this in mind when considering laser treatments or chemical peels.





Antioxidant status | Environmental pollution

Environmental pollutants include sunlight, smoke and water contaminants. Pollutants generate free radicals in your body and skin. The end product of free radicals cause skin to produce “self-destruct” enzymes, such as collagenase which destroys collagen, and elastase which destroys elastin. When there is an imbalance in your system (the free radicals outnumber all your antioxidants) this causes oxidative stress. Oxidative stress in turn is linked to premature skin ageing.

There are three types of antioxidants that form part of your defense system:

- Enzymatic antioxidants and detoxification enzymes found naturally in your body.
- The antioxidants your body makes when you feed it the right building blocks.
- Antioxidants from the food you eat and topical antioxidants you apply to your skin.

Variations in genes associated with your own enzymatic antioxidant response against free radicals make you more susceptible to the damaging effects of free radicals caused by environmental pollutants and prone to premature ageing related to oxidative stress. Detoxifying genes help to neutralise and excrete a lot of these environmental pollutants and toxins to which you are exposed, reducing the risk of free radicals forming and damaging your skin.



Antioxidant defence and detoxification results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
CAT	-262 C>T	CC	✓
GPX1	C>T	CT	●●
SOD2	47 T>C (Val16Ala)	CC	●●●
EPHX1	C>T	CT	●●
GSTP1	313 A>G	AG	●●
NQO1	T>C	CC	○



Outcome: **Moderate priority area**

Variations on your SOD2, CAT, GPX1, EPHX1, NQO1, and GSTP1 genes mean:

You will have lower enzymatic antioxidant activity and slower detoxification.

You will naturally be more inclined to:

- An impaired skin barrier (flaking, tightness, redness, itchiness)
- Fine wrinkles



Recommendations

1

PREVENT & PROTECT



Topical skincare

SKIN BARRIER:

- **Ceramide III** – Impacts ability of skin to retain moisture.
- **Hyaluronic acid** – Draws moisture to the upper layers of skin.
- **Moringa oil** – High monounsaturated/saturated fatty acids (MUFA/SFA) ratio and sterols. Improves skin barrier.
- **Pomegranate sterols** – Structurally close to the skin's natural moisture factor (NMF), cholesterol improves cell membrane stability and skin moisture.
- **Rosehip oil** – Rich in polyunsaturated fatty acids (PUFA) and phytosterols. Natural barrier repair.
- **Safflower oil** – Omega-rich safflower enhancing skin barrier function.
- **Seabuckthorn** – Rare palmitoleic acid (omega 7). A component of skin lipids, improves skin barrier.

2

REPAIR

MICROBIOME:

- **Lactobacillus** – Probiotic. Colonises healthy skin flora. Balances microbiome for improved skin barrier.
- **Yoghurt protein** – Creates ideal environment for strong, balanced skin microbiome.

TOPICAL ANTIOXIDANTS:

- **Rooibos (Aspalathin)** – Potent antioxidant flavonoid. Down regulates free radicals.
- **Vitamin B3**
- **(Niacinamide)** – Increases the antioxidant capacity of skin.
- **Vitamin C (Sodium Ascorbyl Phosphate)** - Skin friendly derivative of vitamin C. Potent antioxidant. Neutralizes free radicals.
- **Vitamin E (Tocopherol)** – Natural vitamin E. Reacts with UV-induced free radicals.

3

BE PRO-ACTIVE

Lifestyle | Diet | Supplements



DETOXIFICATION:

- **Vitamin B2, B3, B5, B6, B12** – Detoxification helpers.
- **Glucoraphanin** – Cruciferous vegetable family (broccoli, cabbage). Supplements include Sulforaphane or DIM.
- **Zinc** – Essential role in Phase 1 detoxification.
- **Magnesium** – Detoxification helper.
- **Vitamin C** – Detoxification helper. Found in cantaloupe, grapefruit, mangoes and oranges.
- **Amino acids** – Necessary for Phase 2 detoxification. Found in collagen, meat, fish, nuts, seeds and beans.
- **Bioflavonoids** – Abundant in citrus fruit, vegetables and tea (peppers, celery, carrots, milk thistle).

ANTIOXIDANTS:

- **Consume a wide variety of antioxidant-rich food. Supplement, if necessary.** Astaxanthin, blueberries, co-enzyme Q10, glutathione, green tea, green rooibos, honeybush, pterostilbene, resveratrol, curcumin, vitamin C and vitamin E.

GOOD GUT – GOOD SKIN AXIS:

- **Probiotics** – From all three categories, Lactobacillus, Bifidobacterium, Saccharomyces.
- **Digestive enzymes** – Amylases for carbohydrates, cellulases for fibre, lactases for dairy, lipases for fat, proteases for protein.

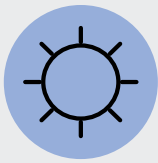


You should know this...

- The liver is the most important organ to detoxify toxins. Skin, lungs, kidneys and intestines also play a big part.
- External toxins to avoid:

- Air pollutants	- Herbicides	- Pesticides
- PCB's Phthalates	- BPA (Bisphenol-A)	- Parabens
- Food additives	- Alcohol	- Pharmaceuticals
- For more insights into the functioning of your internal detoxification system, consider doing a DNA Health test.





UV-ageing

Sun (UV)-ageing is caused by UVA and UVB sun rays. UVA is linked to skin ageing. UVB is the main risk factor for burning and cancer.

UVA(geing): UVA is the most prevalent form of UV radiation on earth. UVA presents with equal intensity during all daylight hours. It penetrates clouds, fog and glass. UVA rays play a smaller role in sunburn than UVB rays. That doesn't mean UVA isn't dangerous. UVA is the chief tanning ray (also used for tanning in sunbeds). Any sign of a tan means DNA damage.

UVB(urning): UVB rays are the chief culprit behind skin reddening and sunburn. UVB rays cannot penetrate through glass and vary in intensity. For this reason sunburn depends on weather, the time of day and location. UVB damages the skin's outermost layers. You will know this as the familiar peeling after burning. UV-ageing presents as skin with a leathery and coarse texture, sagging and wrinkling, discolouration and uneven pigmentation, skin abnormalities including skin cancer.



DNA repair mechanisms results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
XRCC1	Q399R (T>C)	CC	●●
XRCC1	R280H (G>A)	AA	●●
hOGG1	C>G	CG	●●
TERT	C>T	CT	●●



Outcome: Moderate priority area

If you have a variation on the XRCC1 gene it will affect the repair of DNA damage from exposure to sun radiation.

The gene hOGG1 affects your DNA repair when damaged from reactive oxygen species (ROS) – keep in mind sun exposure leads to the formation of free radicals and oxidative stress.

TERT gene variation is linked to sun-associated skin abnormalities.

You will naturally be more inclined to:

- Deep and crisscross wrinkling
- Sagging
- Skin abnormalities



Recommendations

1

PREVENT & PROTECT



Topical skincare

BROAD SPECTRUM UVA + UVB:

- **Zinc Oxide** – Natural mineral. Protects against UVA and UVB.
- **Titanium Dioxide** – Natural mineral. Protects against UVB.

2

REPAIR

ACTIVES:

- **Bulbine frutescens** – Stimulates collagen. Inhibits collagenase.
- **Carrot (Beta-carotene)** – Potent antioxidant. Neutralises free radicals, protects collagen.
- **Calendula** – Phytosterols inhibit UV-induced MMP1 expression. MMP1 breaks down collagen. Inhibits the down regulation of COL1A1. COL1A1 is responsible for new collagen.
- **Rooibos (Aspalathin)** – Potent antioxidant flavonoid. Neutralises free radicals, protects collagen.
- **Vitamin B3 (Niacinamide)** – Increases the antioxidant capacity of skin.
- **Vitamin C (Sodium Ascorbyl Phosphate)** – Skin friendly derivative of vitamin C. Potent antioxidant. Neutralises free radicals. Protects collagen.
- **Vitamin E (Tocopherol)** – Natural vitamin E. Reacts with UV-induced free radicals. Absorbs energy from UV light.

3

BE PRO-ACTIVE

Lifestyle | Diet | Supplements



PRO-COLLAGEN:

- **Hydrolysed marine collagen** – Building blocks for new collagen. Phase 2 detoxification.
- **MSM** – Critical co-factor for good quality collagen.
- **Vitamin C** – Pre-cursor for effective production of collagen.
- **Baobab** – Rich in natural vitamin C. Assist with effective collagen production.

ANTIOXIDANTS:

- **Mega doses of a few antioxidants are not enough. Consume a wide variety of antioxidant-rich food. Supplement, if necessary.** Astaxanthin, blueberries, co-enzyme Q10, glutathione, green tea, green rooibos, honeybush, pterostilbene, resveratrol, curcumin, vitamin C and vitamin E.
- **Grapes, blueberries (Resveratrol)** – Increase the expression of your two DNA damage repair genes.

GOOD GUT – GOOD SKIN AXIS:

- **Probiotics** – From all three categories, Lactobacillus, Bifidobacterium, Saccharomyces.
- **Digestive enzymes** – Amylases for carbohydrates, cellulases for fibre, lactases for dairy, lipases for fat, proteases for protein.



You should know this...

- Sunlight exposure is the primary source of vitamin D for most people. Covering exposed skin or using sunscreen whenever outside may lead to possible vitamin D deficiency.
- The Recommended Dietary Allowance (RDA) for vitamin D is 600 IU/day for adults 19+ years of age.
- Consider testing blood levels and supplementing with Vitamin D.





Pigmentation

Hyperpigmentation, amongst others, includes freckling and solar mottling/sunspots which mostly affects lighter skin tones on the Fitzpatrick scale (1-3) and post inflammatory hyperpigmentation (PIH) which is more prevalent in darker skin tones on the Fitzpatrick scale (4-6).

The Fitzpatrick skin tone scale:



I
Light, pale white



II
White, fair



III
Medium white to olive



IV
Olive, mid brown



V
Brown, dark brown



VI
Very dark brown, black

Freckling and solar mottling

Uneven pigment or solar mottling is a symptom of cumulative sun damage. Solar mottling includes areas of uneven, dark splotches on your face. Sun and age (liver) spots are related to this type of pigmentation.

Post inflammatory hyperpigmentation

Post-inflammatory hyperpigmentation (PIH) is caused by inflammation after a scrape, minor injury, or pimples. An immune response to the inflammation triggers melanin overproduction.

Other types: Hormonal imbalance and pregnancy pigmentation, referred to as melasma. Side effects of certain medications can also be contributing factors.

Sun exposure worsens all types of hyperpigmentation including PIH. Gene variations tested include those related to the predisposition of developing solar mottling and a tendency for freckling. Genetic predisposition for inflammation, which in turn increases your tendency for PIH is also tested.



Melanin production results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
ASIP	G>A	AA	○
ASIP	G>T	TT	●●●
IRF4	C>T	CT	●●
MATP (SLC45A2)	1122 C>G	CC	○
MC1R	Arg160Trp (C>T)	TT	●●●
MC1R	C>T	CT	●●
TYR	A>G	AG	●●



Inflammation results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
CRP	G>A	GG	●●●
IL6	-174 G>C	GG	○
IL6R	A>C	CC	●●●
TNFA	-308 G>A	GG	○



Outcome: **Moderate priority area**

If you have a variant on your ASIP gene it means you will have a poor tanning ability and a predisposition for solar mottling.

Variants on MC1R, IRF4, TYR, and MATP are linked to poor tanning ability and freckling.

Variations on CRP, IL6, IL6R, and TNFA genes are linked to an increased inflammatory response and predisposition to PIH.

You will be genetically more inclined to:

- Freckling & solar mottling/sunspots
- Uneven skin tone
- Post inflammatory hyperpigmentation





Recommendations

1

PREVENT & PROTECT



Topical skincare

BROAD SPECTRUM UVA + UVB:

- **Zinc Oxide** – Natural mineral. Protects against UVA and UVB.
- **Titanium Dioxide** – Natural mineral. Protects against UVB.

2

REPAIR

EXFOLIANTS:

- **Azelaic acid** - Effective, multi-tasking exfoliant. Accelerates shedding of dead skin cells. Removes existing stains.
- **Vitamin A (Retinaldehyde)** – Powerful keratolytic. Removes existing stains. Night time only.
- **Willow bark (Salicylic acid)** – Mild, self-neutralising exfoliating acid. Increases cell turnover. Removes existing stains.

3

BE PRO-ACTIVE



Lifestyle | Diet | Supplements

MELANIN SUPPRESSANTS:

- **Azelaic acid** – Inhibits hyperactive melanocytes.
- **Phytic acid** – Melanin formation blocker. Iron specific antioxidant. Reduces inflammation (PIH).
- **Vitamin B3 (Niacinamide)** – Inhibition of melanosome transfer. Decreases hyperpigmentation.
- **Vitamin C (Sodium Ascorbyl Phosphate)** – Inhibits melanin production. Anti-inflammatory activity.

ANTIOXIDANTS:

- **Verbascoside** – Age-defying antioxidant. Boosts skin's natural ability to fight free radical damage. Blocks melanin.
- **Glutathione** – Scavenges free radicals. Inactivates tyrosinase.
- **Consume a wide variety of antioxidant-rich food. Supplement, if necessary.** Astaxanthin, blueberries, co-enzyme Q10, green tea, green rooibos, honeybush, pterostilbene, resveratrol, curcumin, vitamin C and vitamin E.
- **Maintenance of antioxidant status of the skin** is an important prerequisite for the photo-protective effect of omega 3.

ANTI-INFLAMMATORY:

- **Omega 3 (oily fish, flax seeds)** – Your body cannot produce this essential fatty acid. Omega 3 is obtained from diet or supplements.

GOOD GUT – GOOD SKIN AXIS:

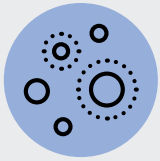
- **Probiotics** – From all three categories, Lactobacillus, Bifidobacterium, Saccharomyces.
- **Digestive enzymes** – Amylases for carbohydrates, cellulases for fibre, lactases for dairy, lipases for fat, proteases for protein.



You should know this...

- The Mediterranean Diet is beneficial in improving inflammation.
- This style of diet is mainly based on extra virgin olive oil, whole grains and lentils, fresh fruit and vegetables. A moderate amount of fish, low fat dairy products and meat is consumed. Many herbs and spices are also used.





Breakouts

Acne is an inflammatory skin condition dependant on various factors including the amount or the way your skin sheds dead cells, the presence of an acne forming bacteria, called Propionibacterium acnes (P. acnes), found at the bottom of your follicles, and the amount of sebum you produce. Genetics play a key role in these determining factors namely the number, size, and productivity of your sebaceous glands. Hormones, also influenced by gene variation and other factors, have an added impact on skin oiliness.

Oiliness = more food for P. acnes

P. acnes multiplies constantly - making new bacteria - but is also constantly kept in check by oxygen that kills it off. Clogged pores, filled with sticky cells, block oxygen from penetrating to the very bottom of the follicle which in turn allows P. acnes to flourish unchecked. In a short time, the follicle becomes swollen with bacteria, dead cells, solidified sebum, and inflammation. The result is acne. Gene variations tested are associated with a higher odds of developing acne.



Inflammation and sebum regulation results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
TNFA	-308 G>A	GG	<input type="radio"/>
FST	G>A	GG	<input type="radio"/>



Outcome: **Low priority area**

This is a low priority area for you, however, to maintain a healthy, resilient skin you should:

- PREVENT & PROTECT:** Use a good quality sunscreen to protect against sun damage.
- REPAIR:** Cleanse your skin and hydrate with a moisturiser. Regularly use a gentle exfoliant to remove dead skin cells.
- BE PRO-ACTIVE:** Follow a healthy diet to nourish your good gut – good skin axis.



Sensitivities

Sensitive skin is highly reactive to treatments and environmental factors. At least 40% of people consider themselves to be in this category. In addition to being more reactive, sensitive skin can also have skin barrier function defects. Skin types 1-3 on the Fitzpatrick system are thinner. Thin skin is more likely to have barrier issues. An impaired barrier allows for easier penetration of irritants. This leads to inflammation and redness. Burning, stinging, and itching, therefore, go hand-in-hand with sensitive skin.



Light, pale white



White, fair



Medium white to olive

NOTE: A hypersensitive allergic reaction is something different. It is often confused with having sensitive skin. A hypersensitive allergic reaction is the body's immune system rejecting a particular substance. These substances include food, airborne substances or topical cosmetic ingredients. A hypersensitive reaction triggers an immediate response. The result is skin reddening (often a fine red rash), swelling or hives. Hypersensitivity is not linked to an impaired skin barrier.



Inflammation and skin moisture control results

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
CRP	G>A	GG	●●●
IL6	G>C	GG	○
IL6R	A>C	CC	●●●
TNFA	-308 G>A	GG	○
TEWL	G>A	AA	○



Outcome: Moderate priority area

IL6, IL6R, CRP and TNFA are pro-inflammatory genes. Inflammation is a normal immune response. If these genes are not "switched off" the inflammatory response continues. Long term, underlying inflammation is related to an increased tendency for skin sensitivities.

A gene variant involved in skin barrier function is related to an increase in transepidermal water loss (TEWL).

Dry, sensitive skin is caused by too much water escaping from the surface layers of your skin. This is called transepidermal water loss or TEWL for short.

You will naturally be more inclined to:

- Sensitive skin
- An impaired skin barrier (flaking, tightness, redness, itchiness)

A sound approach to sensitive skin is:

LESS = MORE



Recommendations

1

PREVENT & PROTECT



Topical skincare

BROAD SPECTRUM UVA + UVB:

- **Zinc Oxide** – Natural mineral. Protects against UVA and UVB.
- **Titanium Dioxide** – Natural mineral. Protects against UVB.

2

REPAIR

LIPID COMPLEX:

- **Beta-glucan** – Anti-inflammatory. Anti-redness.
- **Ceramide III** – Impacts ability of skin to retain moisture.
- **Hyaluronic acid** – Draws moisture to the upper layers of skin.
- **Moringa Oil** – High monounsaturated/saturated fatty acids (MUFA/SFA) ratio + sterols. Improves skin barrier.
- **Pomegranate sterols** – Structurally close to the skin's natural moisture factor (NMF), cholesterol improves cell membrane stability. Skin barrier repair.
- **Rosehip oil** – Rich in polyunsaturated fatty acids and phytosterols. Natural barrier repair.
- **Safflower oil** – Rich in omega 6. Enhances skin barrier function.
- **Seabuckthorn** – Rare palmitoleic acid (omega 7). Component of skin lipids. Improves skin barrier.
- **Schisandra** – Imperfection corrector. Redness reduction.

3

BE PRO-ACTIVE

Lifestyle | Diet | Supplements



MICROBIOME:

- **Lactobacillus** – Colonise healthy skin flora.
- **Yoghurt protein** – Creates ideal environment for strong, balanced skin microbiome.

ANTI-INFLAMMATORY:

- **Antioxidants** – Consume a wide variety of antioxidant-rich food. Supplement, if necessary. Astaxanthin, blueberries, co-enzyme Q10, green tea, green rooibos, honeybush, pterostilbene, resveratrol, curcumin, vitamin C and vitamin E.
- **Omega 3 (oily fish, flaxseeds)** – Maintenance of antioxidant status of the skin is an important prerequisite for the protective effect of omega 3.

GOOD GUT – GOOD SKIN AXIS:

- **Probiotics** – From all three categories, Lactobacillus, Bifidobacterium, Saccharomyces.
- **Digestive enzymes** – Amylases for carbohydrates, cellulases for fibre, lactases for dairy, lipases for fat, proteases for protein.



You should know this...

- The Mediterranean Diet has been shown to be beneficial in improving inflammation:
 - This style of diet is mainly based on extra virgin olive oil, whole grains and lentils, fresh fruit and vegetables. Moderate amounts of fish, low fat dairy products and meat are consumed. Many herbs and spices are also recommended.
- Avoid refined carbohydrates, high sugar and processed foods.
- Weight management is imperative to controlling inflammation.
- Drink plenty of water throughout the day.



Gene descriptions

Collagen breakdown and repair: Elasticity



COL1A1

COL1A1 encodes a component of the type 1 collagen, which is the main collagen found in skin. It is important in maintaining the integrity of the extracellular matrix. The G allele of the COL1A1 gene is associated with decreased collagen production.



MMP1

MMP1, encoding matrix metalloproteinase 1, is responsible, in part, for the degradation of the extracellular matrix. During skin ageing, there is an upregulation of MMP1, leading to increased breakdown of collagen in the skin. The variant is associated with increased collagen breakdown, and therefore increased susceptibility for wrinkling.

Antioxidant defence and detoxification: Antioxidant status and environmental pollutants



CAT

CAT encodes the antioxidant enzyme, catalase, which is most highly expressed in the liver, kidney and erythrocytes. The enzyme is responsible for the rapid conversion of hydrogen peroxide to water and oxygen, where one molecule of this enzyme can catalyse more than 1 million hydrogen peroxide molecules per second. The variant is associated with decreased CAT activity leads to increased concentrations of hydrogen peroxide, hence leading to increased oxidative stress.



GPX1

Glutathione peroxidase 1 (GPx1) is the most abundant of the selenoperoxidase enzymes, and is expressed in almost all tissues in the body. It is responsible for catalysing the conversion of hydrogen peroxide into water, as well as reducing fatty acid hydroperoxides and peroxynitrite using glutathione as a substrate, and thus helps to maintain redox balance. The variant is associated with decreased enzyme activity and increased risk for oxidative stress.



SOD2

The SOD2 enzyme destroys the free radicals which are normally produced within cells and which are damaging to biological systems. The enzyme thus has important anti-oxidant activity within the cell, especially within the mitochondria.



EPHX1

EPHX1 encodes Epoxide Hydroxylase, which is a critical detoxification enzyme that converts epoxides from the degradation of aromatic compounds to trans-dihydrodiols which can be conjugated and excreted from the body. Sources of these compounds include smoke and chemical cleaners. Epoxide hydrolase functions in both the activation and detoxification of epoxides. The variant leads to decreased activity of the enzyme and is associated with increased oxidative stress and may also increase risk for skin sensitivity and premature ageing.



GSTP1

GSTP1 encodes Glutathione S-Transferase P1, which is a phase 2 detoxification enzyme. Glutathione S-transferases are a family of enzymes that play an important role in detoxification by catalysing the conjugation of many hydrophobic and electrophilic compounds with reduced glutathione. It is involved in efficiently detoxifying toxic compounds so that they can be safely metabolised and converted to water. The variant leads to decreased enzyme activity and is associated with increased risk of skin sensitivities.



NQO1

NQO1 encodes NADP(H:) quinone oxidoreductase 1, which is primarily involved in the detoxification of potentially mutagenic and carcinogenic quinones derived from tobacco smoke, diet and oestrogen metabolism. NQO1 also protects cells from oxidative stress by maintaining the antioxidant forms of ubiquinone and vitamin E. The variant leads to significant decreased activity of the enzyme and is associated with increased risk for oxidative stress.

DNA repair mechanisms: UV-ageing



hOGG1

hOGG1 encodes the enzyme, 8-oxoguanine DNA glycosylase 1. This is the main enzyme that is responsible for repairing the 8-oxoguanine DNA mutation caused by 8-oxo-G radicals as a result of exposure to reactive oxygen species. The variant is associated with decreased ability to repair damaged DNA, thus increasing risk for accelerated ageing, as well as diseases related to oxidative stress.



TERT

TERT codes for telomerase reverse transcriptase, a catalytic subunit of the enzyme, telomerase, which is essential in maintaining telomeres (the repeated segments of DNA found at the ends of chromosomes). Telomeres protect chromosomes from abnormally sticking together or breaking down, and so the enzyme is responsible for preventing degradation of the chromosomal ends following multiple rounds of replication. The C allele of the SNP is associated with a decrease in telomere length, and contributed toward increased risk for non-melanoma skin cancers.



XRCC1

XRCC1 encodes the protein X-Ray Repair Cross-Complementing Protein 1. It is involved in the efficient repair of DNA single-strand breaks formed by exposure to ionizing radiation, UV rays from the sun. The variant is associated with improved activity of the protein, therefore conferring protection against DNA damage caused by UV exposure.

Melanin production: Hyperpigmentation & environmental pollutants



ASIP

ASIP, encoding Agouti Signalling Protein, is involved in regulating the production of melanin by acting as an inhibitor to the Melanocortin 1 Receptor. Variations in the ASIP gene are associated with over-expression of the gene, and unbalanced melanin production, leading to higher pheomelanin, which predisposes to a fair skin type, offering less protection for the skin against UV rays and sun exposure.



IRF4

This gene encodes interferon regulatory factor 4, which is related to regulation of melanin production. A variant in this gene is strongly associated with sensitivity of skin to sun exposure, freckles, blue eyes and brown hair color.



MATP (SLC45A2)

MATP, also called SLC45A2 (solute carrier family 45 member 2), provides instructions for making a protein that is located in melanocytes. The function of this protein is to transport molecules necessary for the normal function of melanosomes, which are the structures in melanocytes where melanin is produced. A variant is associated with altered functioning of this transporter and increased susceptibility to hyperpigmentation.



MC1R

MC1R encodes the protein, Melanocortin 1 Receptor, which plays an important role in normal pigmentation. The receptor is primarily located on the surface of melanocytes, which are cells that produce a pigment called melanin. A variation in this gene is associated with increased production of a pigment that leads to a lighter, or fairer skin tone and increased predisposition to freckles. Individuals with this variant have a poorer tanning ability and have an increased risk of skin damage caused by sun exposure.



TYR

TYR encodes the enzyme, tyrosinase, which is located in melanocytes and is involved in the first step of melanin production. A variant in this gene is associated with fair skin and predisposition to hyperpigmentation and skin abnormalities.

Inflammation: Hyperpigmentation, breakouts and sensitivities



CRP

CRP encodes the proinflammatory marker, C-Reactive Protein, which assists in complement binding to foreign and damaged cells and enhances phagocytosis by macrophages. It is also important in immunity regulation. The variant is leads to higher levels of CRP being produced, and is linked to disorders related to chronic low-grade inflammation.



IL6

IL6 encodes Interleukin 6, which is a pro-inflammatory cytokine that plays a crucial role in inflammation and regulates expression of CRP. The variant leads to increased expression and is associated with higher baseline levels of CRP.



IL6R

IL6R encodes for the encodes Interleukin 6 receptor, which influences the proinflammatory IL6 cytokine action. The variant has been associated with increased risk for chronic low-grade inflammation.



TNFA

TNFA encodes for Tumour Necrosis Factor Alpha, which is a pro-inflammatory cytokine involved in regulating inflammation. The variant leads to increased expression TNFA, which may lead to increased risk for chronic, low-grade inflammation, acne formation, and skin sensitivity.

Sebum regulation: Breakouts



FST

FST encodes for the protein, follistatin, which has an inhibitory effect on TGF-Beta. The variation in this gene is related to alterations in the structure and maintenance of the skin, in particular the pilosebaceous unit, partly by inhibiting TGF-Beta, more sebum can be produced, which results in increased risk for acne development.

Skin moisture control: Sensitivities

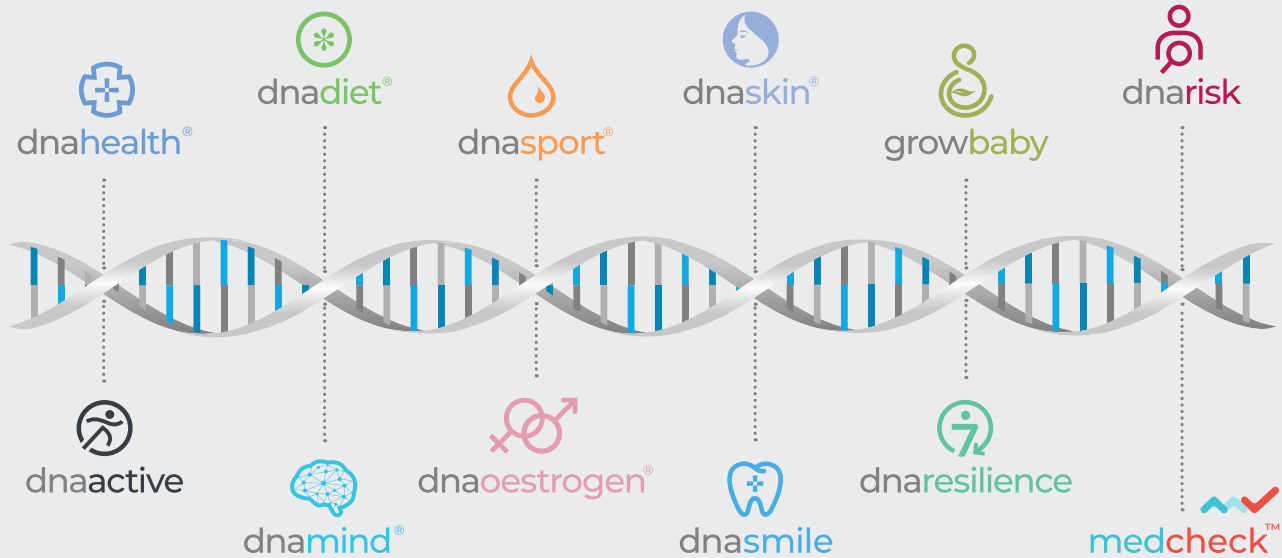


TEWL

This gene is related to the amount of moisture that evaporates through the skin, which is known as transepidermal water loss. A variant in this gene has been associated with accelerated loss of water from the skin, which can lead to high predisposition for a dry, sensitive skin.

A lifetime of optimal health awaits you

Your genes do not change, which means our laboratories will only ever need one sample* from you. Throughout your life, as your health goals and priorities change, we can continue to provide valuable health insights from this single sample* to support your unique health journey.



*Requires finger prick blood spot sample collection

Our Commitment

DNALYSIS Biotechnology is continuously developing new tests with the highest standards of scientific rigour. Our commitment to ensuring the ethical and appropriate use of genetic tests in practice means that gene variants are only included in panels once there is sound motivation for their clinical utility and their impact on health outcomes.

ADVANCED | **ACTIONABLE** | **APPROPRIATE**
technology | interventions | use in practice

From the laboratories of:

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