



dnaskin

optimal skin for life

Welcome

Sample Report

to your dna skin report

Date of Birth: **01 Jan 1990**

Date Reported: **15 Jul 2019**

Sample Number: **DNA123**

Referring Practitioner: **Sample Report**

Introduction

From your buccal swab sample we have used a process called the Polymerase Chain Reaction (PCR), which copies the DNA of your genes many times over so that we can generate sufficient quantities to analyse your genetic material. We then identify unique DNA variations in some of your genes.

Understanding genetics

Before reading your full assessment, please take a few minutes to review this background information. This will help you better understand your results and enhance the value of this personalised report.

What are genes?

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" which make up your genetic code. The code gives the instructions to make the proteins required for proper development and function.

What are gene variations?

With the exception of identical twins, all people have small differences (variations) in their genetic code. It is these differences that make each of us unique. An example of a genetic variation is that one "letter" may be replaced by another. These variations can lead to changes in the resulting proteins being made. For example a "C" may be changed to a "G" at a point in the genetic code. When the variation affects only one genetic "letter" it is called a Single Nucleotide Polymorphism, or SNP (pronounced "snip"). Variations can however also affect more than one "letter".

Are gene variations "bad"?

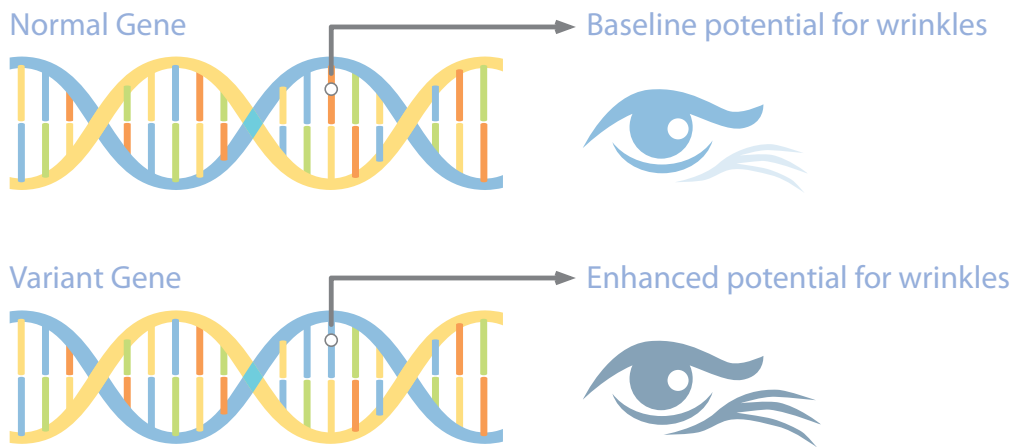
In general, variations should not be considered good or bad. Rather, genetic variations are simply slight differences in the genetic code. The key is to know which form of the variation you carry in order to make appropriate lifestyle choices.

DNA Skin analyses variations on your 18 genes associated with the following key areas involved in skin health and aging.

- Collagen formation
- Protection from sun & UV exposure
- Inflammation
- Protection from oxidative stress

Based on the results from the DNA Skin test, personalised lifestyle, nutrition, nutraceutical and cosmceutical recommendations can be given for improved skincare and to decrease the visible signs of aging.

Example:

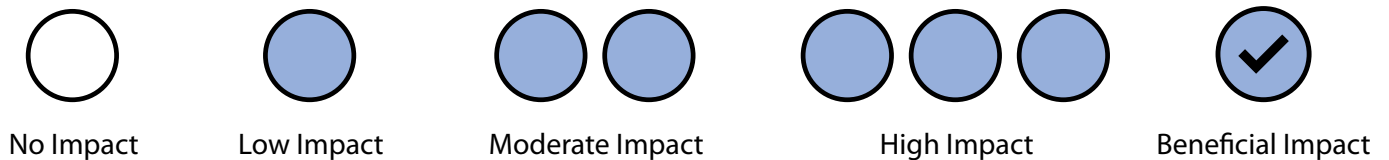


How to read this report

You will find a summary of your report as well as your specific genetic results on the following pages. An overall priority is assigned for each section based on your gene results.

An explanation will be given regarding the area in which the genes are acting, associated risks, as well as specific skin, diet, nutraceutical and lifestyle recommendations based on your genotype.

The impact factors can be identified by the following:



Your summary results

Below is a summary of your key priority areas based on your unique gene results:

| | |
|--|---|
| Firmness & Elasticity | Sun Sensitivity & Pigmentation |
| | |
| Based on your gene results, risk for accelerated skin ageing is a high priority area for you. | According to your gene results, you have a moderate risk of UV damage, skin sensitivity and pigmentation. |
| Sun Damage, Protection & Repair | Protection from Oxidative Stress |
| | |
| Based on the genes analysed you have a moderate risk of skin damage when exposed to high volumes of UV and pollutants. | You do not have an increased risk for oxidative stress. |
| Detoxification & Skin Sensitivity | Inflammation |
| | |
| You have a moderately reduced detoxification capacity. | Based on your gene results, you have a high risk for excess inflammation. |

Firmness & elasticity

Changes in the extracellular matrix, with regards to synthesis and degradation, is an important contributing factor of skin aging, and gene variation relevant for extracellular matrix remodeling may be responsible for the underlying susceptibility of accelerated skin aging. The genes in this area are involved in cell growth regulation & tissue remodeling. SNPs tested have association to accelerated aging after UV exposure & oxidative stress insult.

| Gene Name | Genetic Variation | Your Results | Gene Impact |
|-----------|-------------------|--------------|-------------|
| MMP1 | 1G/2G | 1G/2G | |
| COL1A1 | G>T | GG | |

What does this mean for me?

Changes in the extracellular matrix, with regards to synthesis and degradation, is an important contributing factor of skin aging, and gene variations relevant for extracellular matrix remodeling may be responsible for the underlying susceptibility of accelerated skin aging.

What can I do about it?

According to your gene variations, this is a high priority area. You may experience more skin sensitivity, pre-mature aging and formation of lines and wrinkles, especially after sun exposure. It is important to make use of a good quality, high SPF sunscreen, as well as a moisturiser, targeting matrix protein synthesis, visible skin firmness and improved cell differentiation daily. Other topicals, which include the following ingredients, may also be beneficial; retinoids & ceramides, vitamin C, peptides, and hyaluronic acid. Intake of certain nutrients may also be beneficial to promote healthy collagen formation. These include oral supplementation of hydrolysed type 1 collagen, vitamin C, iron, and vitamin D.

Sun sensitivity & pigmentation

The gene variants tested in this area have been associated with normal pigmentation and protecting the skin against sun damage. The ability to produce a specific type of melanin, the pigment (or colour) in one's skin, is dependent on genes involved in melanin production. Certain gene variants increase predisposition for having higher amounts of the pigment, pheomelanin, which is associated with a decreased tanning ability and an increased risk for skin sensitivity and skin damage with sun, and UV, exposure.

| Gene Name | Genetic Variation | Your Results | Gene Impact |
|-----------|-------------------|--------------|-------------|
| MC1R | Arg151Cys | CT | |
| ASIP | 8818 G>A | GA | |
| ASIP | rs4911414 G>T | GT | |

What does this mean for me?

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What can I do about it?

Your genotype combination in this area indicates a medium priority, and you may be at increased risk for skin damage from UV exposure, specifically with regards to skin sensitivity, pigmentation and increased freckling. It is important to remain vigilant with regards to limiting UV exposure. Daily application of a good-quality sunscreen, as well as a topical moisturizer that contains photoprotective agents, and vitamins such as Vitamin C and B3 is recommended. For existing pigmentation concerns, a tyrosinase inhibitor such as ellagic acid should be applied topically. A vitamin D supplement may be required if sun exposure is limited.

Sun damage, protection & repair

The genes tested in the area play an important role in DNA protection and repair. Variations have been associated with increased risk of aging caused by UV exposure. Exposure to UV rays, as well as synthetic compounds and environmental pollutants, increases the risk for oxidative stress and cellular damage, which has been associated with premature aging. Certain genes help to repair damaged DNA, therefore protection against cellular damage. Variations in these genes lead to decreased efficiency to repair damage.

| Gene Name | Genetic Variation | Your Results | Gene Impact |
|-----------|-------------------|--------------|-------------|
| XRCC1 | Q399R | CC | |
| | R280H | GG | |
| hOGG1 | Ser326Cys | CC | |
| TERT | C>T | CT | |

What does this mean for me?

Exposure to UV rays, as well as synthetic compounds and environmental pollutants, increases the risk for oxidative stress and cellular damage, which has been associated with premature aging. Certain genes help to repair damaged DNA, thereby offering protection against cellular damage. Variations in these genes lead to decreased efficiency to repair damage.

What can I do about it?

Your genotype combination in this area indicates a medium priority for you, and there may be an increased risk for accelerated aging with regular, high UV exposure, and exposure to environmental pollutants. Include a good quality sun protection cream in your daily regimen. Consider a lipid and ceramide-rich moisturiser that contains photoprotective agents, resveratrol and anti-oxidants, as well as retinoids to repair and rebuild the skin. A flavonoid-rich diet is recommended to improve DNA repair, and specific oral supplementation shown to have beneficial effects in this area include resveratrol, selenium, and carotenoids such as astaxanthin.

Protection from oxidative stress

The genes tested in this are code for the key antioxidant enzymes that scavenge free radicals and protect against oxidative stress. Free radicals are highly reactive molecules that can cause damage to our DNA and cells, leading to increased oxidative stress. This has been related to accelerated aging processes in the body and may increase the risk of the appearance of wrinkles and prematurely aged skin. We are exposed to free radicals when we have a high exposure to pro-carcinogens in the environment. These include cigarette smoke, synthetic chemicals, smoked foods and a diet high in sugar and trans-fats. Free radicals are also a normal by-product of the body's energy-generating processes.

| Gene Name | Genetic Variation | Your Results | Gene Impact |
|-----------|-------------------|--------------|-------------|
| SOD2 | C>T | TC | |
| GPX1 | C>T | | |
| CAT | -262 C>T | CC | |

What does this mean for me?

Free radicals are highly reactive molecules that can cause damage to our DNA and cells, leading to increased oxidative stress. This has been related to accelerated aging processes in the body and may increase the risk of the appearance of wrinkles and prematurely aged skin. We are exposed to free radicals when we have a high exposure to pro-carcinogens in the environment. These include cigarette smoke, synthetic chemicals, smoked foods and a diet high in sugar and trans-fats. Free radicals are also a normal by-product of the body's energy-generating processes.

What can I do about it?

Your genotype combination is associated with normal anti-oxidant enzyme function, and this is therefore a low priority area for you.

Detoxification & skin sensitivity

The genes tested in the area code for detoxification enzymes that help process toxins and pollutants from the environment, where variants have been associated with decreased detoxification capacity, and therefore an increased risk for cellular damage and accelerated aging. The body's natural detoxification process involves two steps; phase 1 and phase 2. A toxin initially enters phase 1, the P-450 cytochrome system, and is reduced to smaller fragments. These fragments then progress to phase 2, where they are bound to molecules such as glutathione, glycine and sulfate. This process creates a new non-toxic molecule that can be excreted.

| Gene Name | Genetic Variation | Your Results | Gene Impact |
|-----------|-------------------|--------------|-------------|
| GSTP1 | A>G | AG | |
| EPHX1 | rs1051740 | CT | |
| NQO1 | T>C | TC | |

What does this mean for me?

The body's natural detoxification process involves two steps; Phase 1 and Phase 2. A toxin initially enters Phase 1, the P-450 cytochrome system, and is reduced to smaller fragments. These fragments then progress to Phase 2, where they are bound to molecules such as glutathione, glycine and sulfate. This process creates a new non-toxic molecule that can be excreted.

What can I do about it?

Your genotype combination is associated with reduced phase 2 detoxification processes, making this a medium priority area for you. It is important to decrease exposure to pollutants from the environment and increase dietary intake of vegetables. Topical actives that are associated with benefits in this area include: Orientalis & Centaury extract, resveratrol, Tocopherol, L-carnosine, vitamin C and vitamin B3. Consider supplementing or focusing on food-rich sources with nutrients that are associated with benefits in this area, such as sulforaphane, resveratrol, NAC, vitamin C and curcumin.

Inflammation

Pro-inflammatory cytokines are involved in regulating inflammation. If increased expression occurs, due to variations in these genes, there is increased risk for skin sensitivity and chronic, low-grade inflammation. Inflammation is a normal immune response and an essential step in tissue healing. The release of these inflammatory substances is controlled by genes that govern inflammation. However, when these genes are not 'switched off' the inflammatory response continues. Increased inflammation is associated with skin sensitivity and may accelerate premature aging.

| Gene Name | Genetic Variation | Your Results | Gene Impact |
|-----------|-------------------|--------------|-------------|
| IL6 | G>C | CG | |
| IL6R | A>C | CC | |
| CRP | G>A | GG | |
| TNFA | G>A | AG | |

What does this mean for me?

Inflammation is a normal immune response and an essential step in tissue healing. The release of these inflammatory substances is controlled by genes that govern inflammation. However, when these genes are not 'switched off' the inflammatory response continues. Increased inflammation is associated with skin sensitivity and may accelerate premature aging.

What can I do about it?

Based on your gene variants, this is a high priority area for you, where managing inflammation is essential. Follow an anti-inflammatory diet, including phytonutrient food sources, as advised by your healthcare practitioner. The following nutrients could be considered to improve the management of this area: omega 3 fatty acids, curcumin, ginger, resveratrol and zinc. A good quality pro-biotic may also be beneficial. Consider using the following in a topical serum to manage the amount of inflammation: Thermus Thermophilus Ferment, hesperdin, L-carnosine, heat shock proteins and vitamin B3.

Gene explanations

Firmness & elasticity

MMP1

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

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.

Sun sensitivity & pigmentation

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.

ASIP

ASIP, encoding Agouti Signalling Protein, is involved in regulating the production of melanin by acting as an inhibitor to 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.

Sun damage, protection and repair

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 the improved activity of the protein, therefore conferring protection against DNA damage caused by UV exposure.

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 aging, 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.

Protection from oxidative stress

SOD2: Superoxide dismutase

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.

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.

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.

Detoxification & skin sensitivity

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.

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.

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 aging.

Inflammation

IL6

IL-6 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.

IL6-R

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

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 leads to higher levels of CRP being produced, and is linked to disorders related to 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 skin sensitivity and chronic, low grade inflammation.

