dna oestrogen®

optimal health for life

Welcome

to your dna osetrogen report

Date of Birth:	Date Reported:	Sample Number:
Referring Practitioner:		

Welcome to your dna oestrogen report

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 sequences in some of your genes.

Considerable inter-individual variability has been observed in biological areas that are involved in carcinogen metabolism, metabolism of steroid hormones, and phase I and phase II detoxification. Variations in genes involved in these biological processes help identify a sub-population of women and men with higher lifetime exposure to oestrogens, oestrogen metabolites and other carcinogens. Understanding an individual's genetic variability will allow for targeted diet, lifestyle and hormone intervention.

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"?

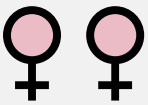
In general, variations should not be considered good or bad. Rather, genetic variations are simply slight differences in the genetic code. The key is to know which form of the variation you carry in order to make appropriate lifestyle choices.

How to read your results

You will find your genetic results in the following pages. On the left side you will see the gene name and description. On the right side you will find your specific result and an explanation of the results, associated risks, and diet and lifestyle recommendations. The impact can be identified by the colour of the circle (please see the key below).

No impact

Low impact



Moderate impact

High impact

Summary of results

Gene Name	Genetic Variation	Your Result	Gene Impact
CYP1A1	Msp1 T>C	**CT**	♀♀
CYP1A1	A>G Ile462Val	**AA**	♀
CYP1B1	C>G Val432Leu	**GC**	♀♀
CYP17A	34 T>C	**TT**	♀
MnSOD	47 T>C Ala16Val)	**TC**	♀
GSTM1	Insertion/Deletion	**Absent**	♀♀♀
GSTT1	Insertion/Deletion	**Present**	♀
COMT	472 G>A (Val158Met)	**AA**	♀♀♀
MTHFR	677 C>T	**CC**	♀
SULT1A1	638 G>A Arg213His	**AA**	♀♀
NQ01	609 C>T	**CC**	♀
FACTOR V	G1691A	**GG**	♀

The combination of gene variants identified in this analysis indicates possible inefficiencies in oestrogen detoxification, and additional support would be recommended.

Test results

CYP1A1 Msp1 T>C

The CYP1A1 gene encodes a phase I cytochrome P450 enzyme that converts environmental procarcinogens such as PAHs and aromatic amines to reactive intermediates having carcinogenic effects. In addition, CYP1A1 is involved in the oxidative metabolism of oestrogens, which may play a critical role in the aetiology of breast and prostate cancer. CYP1A1 enzyme catalyses the 2-hydroxylation of oestradiol (E1 and E2) in several extra hepatic tissues including breast tissue. It is also involved in activating cigarette smoke, diet and environmental pollutants, and producing carcinogens.

YOUR RESULT: **CT** ♀♀

The variant allele C is associated with increased enzyme activity resulting in elevated levels of activated metabolites and DNA damage, and is associated with increased production of catechol oestrogens and oestrogen quinones in breast tissue.
In the presence of the C allele it is important to reduce exposure to all diet and environmental procarcinogens such as PAH, aromatic amines, nitrates, and smoking of any kind. In addition attention should be paid to optimising phase 2 detoxification.

CYP1A1 Ile462Val A>G

The CYP1A1 gene encodes a phase I cytochrome P-450 enzyme that converts environmental procarcinogens such as PAHs and aromatic amines to reactive intermediates having carcinogenic effects. In addition, CYP1A1 is involved in the oxidative metabolism of oestrogens, which may play a critical role in the aetiology of breast and prostate cancer.

YOUR RESULT: **AA** ♀

No variant was detected.

CYP1B1 1294 C>G

CYP1B1 enzymes catalyses the 4-hydroxylation of oestradiol, it also activates many PAHs and arylamines.

YOUR RESULT: **GC** ♀♀

This SNP has been found to have the most profound impact on the catalytic properties of CYP1B1, with the 4-hydroxylase activity of the G allele displaying three-fold higher activity compared to the C allele.
In the presence of the G allele it is important to reduce exposure to all diet and environmental procarcinogens such as PAH, aromatic amines, nitrates, and smoking of any kind. In addition attention should be paid to optimising phase 2 detoxification.

CYP17A 34 T>C

CYP17 mediates both steroid 17α-hydroxylase and 17,20-lyase activities, and catalyses a rate-limiting step in ovarian and adrenal biosynthesis leading to the precursor, dehydroepiandrosterone. The C allele increases enzyme activity, thereby increasing the amount of bioavailable oestrogen.

YOUR RESULT: **TT** ♀

For individuals with the C allele beneficial modulation of oestrogen metabolism can be accomplished through dietary and lifestyle modifications. Key interventions include increasing insoluble fibre, avoiding refined CHO, increasing phytoestrogen intake, losing weight, and increasing exercise. In addition, select nutrients and micronutrients effectively reduce oestrogen load by supporting preferred oestrogen pathways. These are included at the end of the report.

NQ01 609 C>T

NADP(H:) quinone oxidoreductase 1 (NQO1) often referred to as Quinone Reductase 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.

YOUR RESULT: **CC** ♀

The analysis identified no genetic variation at the 209 C>T locus.

GSTM1 Insertion/Deletion

Glutathione S-transferase M1 is the most biologically active member of the GST super-family and is involved in Phase II detoxification in the liver. It is responsible for the removal of xenobiotics, carcinogens, and products of oxidative stress. These enzymes are involved in the phase 2 conjugation of oestrogen quinones to glutathione.

YOUR RESULT: **ABSENT** ♀♀♀

A deletion results in an absence of the enzyme, leading to reduced capacity for hepatic detoxification & reduced metabolism of quinones.
GST enzyme activities are induced in part by the products of cruciferous and allium vegetables. These should be increased significantly in the diet to increase activity of other GST enzymes to compensate for decreased activity. Daily intake is recommended. When dietary intake is inadequate a high quality supplement containing DIM may be required. We also recommend a diet rich in antioxidants avoid exposure to dietary and environmental toxins.

GSTT1 Insertion/Deletion

Glutathione S-transferases (GSTs) are a family of multifunctional enzymes involved in the metabolism of a variety of xenobiotic compounds, including mammary carcinogens. These enzymes are involved in the conjugation of oestrogen quinones to glutathione.

YOUR RESULT: **PRESENT** ♀

The GSTT1 gene is present.

COMT 472 G>A or Val158Met

Soluble catechol-O-methyltransferase (S-COMT) helps control the levels of certain hormones and is involved in methylation and inactivation of catechol oestrogens. Accumulation of oestrogen metabolites appears to confer increased risk of breast cancer via oxidative DNA damage.

YOUR RESULT: **AA** ♀♀♀

The A allele is associated with a 3-4 fold reduction in the methylation activity of the COMT enzyme.
For A allele carriers beneficial modulation of oestrogen metabolism can be accomplished through dietary and lifestyle modifications. Key interventions include increasing insoluble fibre, managing the quality of dietary fat intake, increasing phytoestrogen intake, losing weight, and increasing exercise. In addition, select nutrients and micronutrients effectively reduce oestrogen load by supporting preferred oestrogen pathways. These are included at the end of the report.

MTHFR 677 C>T

Methylenetetrahyrdofolate Reductase (MTHFR) is a key enzyme in the folate metabolic pathway. Reduced activity influences the balance between DNA synthesis, repair and methylation processes.

YOUR RESULT: **CC** ♀

No variant was detected at the 677 C>T locus.

SULT1A1 638 G>A

Sulfotransferase 1A1 (SULT1A1) is involved in the inactivation of oestrogens and bio-activation of heterocyclic amines and polycyclic aromatic hydrocarbons.

YOUR RESULT: **AA** ♀♀

A allele carriers have a substantially lower activity of this enzyme, and has been associated with a greater risk for post-menopausal breast cancer, increased with higher BMI, and longer exposure to endogenous hormones.
For individuals with the A allele beneficial modulation of oestrogen metabolism can be accomplished through dietary and lifestyle modifications. Key interventions include increasing insoluble fibre, avoiding refined CHO, increasing phytoestrogen intake, losing weight, and increasing exercise. In addition, select nutrients and micronutrients effectively reduce oestrogen load by supporting preferred oestrogen pathways. These are included at the end of the report.

MnSOD Ala16Val or -28 C>T

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.

YOUR RESULT: **TC** ♀

There is evidence that people without the variant, i.e. those with the C allele, and with a lower consumption of fruits and vegetables, are at increased risk of developing disease, including the risk of developing breast cancer.
Women with the C allele who had ever used HRT or smoked were at a higher risk of breast cancer. It is therefore important for individuals with the C allele to ensure adequate fruit and vegetable intake. Supplementation with ant-oxidant nutrients can reduce the oxidation of catechols and promote greater excretion of these metabolites through the methylation pathway.

FACTOR V G1691A

Factor V functions as a cofactor to allow factor Xa to activate the enzyme thrombin, and in turn cleaves fibrinogen to form fibrin, which polymerizes to form the dense meshwork that makes up the majority of a clot. Activated protein C (aPC) is a natural anticoagulant that acts to limit the extent of clotting by cleaving and degrading factor V. Factor V Leiden gene mutation is characterised by a poor anticoagulant response to APC and an increased risk for venous thromboembolism (VTE). Deep venous thrombosis (DVT) is the most common VTE, with the legs being the most common site however it VTE can also occur in other parts of the body including the brain, eyes, liver, and kidneys.

YOUR RESULT: **GG** ♀

No variant was detected at the 1691 G>A locus.

Nutrition and oestrogen

If a moderate or high impact gene variant is present for COMT, SULT1A1 or CYP17A, the following nutritional support is recommended to effectively reduce estrogen load by supporting preferred estrogen pathways:

- For breakdown of oestrogen to the beneficial 2-OH metabolite, supplement with a bio-available form of 3,3'-Diindolylmethane (DIM), or substantially increase intake of cruciferous vegetables (cauliflower, broccoli, cabbage, brussels sprouts).
- Include phytoestrogens in the diet for their many beneficial influences on oestrogen synthesis and metabolism. These include isoflavones and lignins. Isoflavones are found most commonly in soy products, but also include legumes, alfalfa, clover, licorice root, and kudzu root, and include genistein, daidzein, equol and puerarin. Lignins are an insoluble dietary fibre found in flaxseeds, whole grains, beans and seeds.
- Ensure adequate intake of magnesium and Vitamin E.
- Other beneficial micro and phyto-nutrients that impact oestrogen metabolism include calcium D-glucarate, curcumin, green tea polyphenols and D-limonene.

Notes for practitioners

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