Fertility Health Report

myDNA | NutriPATH

Welcome to the future of health and human potential

ID:

Name:

DOB:

Barcode: NT4GH633

Date: 06/05/25

TEST METHODOLOGY AND LIMITATIONS

Recommendations in this report apply to all ages, however for any patient under 18 years, a guardian must purchase the test and be present for the report recommendations. The information in this report is not intended to treat, diagnose or cure any medical condition or disease.

Gene By Gene, a wholly owned subsidiary of myDNA, Inc., is a College of American Pathologists (CAP) accredited and Clinical Laboratory Improvement Amendments (CLIA) certified clinical laboratory qualified to perform high-complexity testing. This test was developed and its performance characteristics determined by Gene by Gene. It has not been cleared or approved by the FDA. FDA does not require this test to go through premarket FDA review. This test is used for clinical purposes. It should not be regarded as investigational or for research. Only the genomic regions listed below were tested; there is a possibility that the tested individual is a carrier for additional, undetected mutations. Although molecular tests are highly accurate, rare diagnostic errors may occur that interfere with analysis. Sources of these errors include sample mix-up, trace contamination, and other technical errors. The presence of additional variants nearby may interfere with mutation detection. Genetic counseling is recommended to properly review and explain these results to the tested individual.

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My Health Report

My Top Priorities

This is a summary of your entire report, highlighting only your highest impact results broken out by report section. Use this section to quickly identify your top priorities, understand what genes and genotypes are involved in each of our reports, and get context on how these genes impact your fertility.

Ovarian Reserve and Function

OMEGA-3 FATTY ACIDS

FADS2: GG

The FADS2 gene encodes for converting plant-based omega-3 fatty acid alpha-linolenic acid (ALA) to EPA and helps determine higher requirements of EPA and DHA. Scientific evidence reveals that SNPs in the FADS2 genes can reduce the function of the desaturase enzymes and influence the bioavailability of PUFAs omega-3 and omega-6 in various tissues.

ACTION PLAN

- Your FADS2 genotype combination is associated with a higher requirement of EPA and DHA
- A meta-analysis found that omega-3 intake significantly improves women's pregnancy and fertilization rates
- Omega-3 fatty acids support fertility by improving hormonal balance, oocyte quality, embryo implantation, and menstrual cycle function and mitigate inflammation that could interfere with the proper function of reproductive organs
- A ratio of high omega-6 fatty acids to low omega-3 fatty acids is associated with very poor reproductive success at an advanced maternal age
- Long-term and short-term diets rich in omega-3 fatty acids delay ovarian aging and improve oocyte quality in those at an advanced maternal age
- We recommend getting at least 400mg of EPA and 600mg of DHA

FERRITIN

TF: GG

Though dietary iron relates to individual iron status, individual variation may, in part, be controlled by genes that regulate iron absorption and transport in the body, specifically TMPRSS6, and TF genes. Variation in these genes can cause reduced functioning of the proteins they code for, which collectively can impact individual risk for low iron status.

ACTION PLAN

- You have the GG genotype for the TF gene that is associated with decreased ferritin levels, lower total iron-binding and unsaturated iron-binding capacities
- Iron supplementation is associated with decreased risk of ovulatory infertility
- Ferritin levels <30µg/L have been associated with unexplained infertility
- We recommend you have your ferritin levels tested to ensure a level over 30µg/L

ZINC AND SELENIUM

TP53: CC

The Tp53 gene is a tumor suppressor gene that has been studied in female infertility cases due to the effect variants have on LIF levels. LIF participates in many diverse biological processes in the uterus. Current data suggest that fluctuations in LIF levels in the endometrium could impair the establishment and maintenance of the pregnancy.

ACTION PLAN

- You have the homozygous Tp53 gene that increases zinc, selenium, niacin, and resveratrol requirements for Tp53 gene function and healthy LIF levels
- The Tp53 gene is indirectly improved by resveratrol and may significantly and positively impact reproductive outcomes, owing to its potential therapeutic effects improving ovarian function
- We recommend getting 15-30mg of zinc and 70-200mcg of selenium

CALCIUM

VDR FokI: GG

The vitamin D receptor (VDR) FokI polymorphism (rs2228570) is associated with vitamin D and calcium absorption. While vitamin D currently shows conflicting results for ovarian reserve, calcium plays a significant role in oocyte maturation.

ACTION PLAN

- You have the VDR FokI GG genotype that is associated with a poor response to vitamin D supplementation and reduced calcium absorption
- Calcium has been shown to be a more potent factor for controlling oocyte maturation than vitamin D
- Mice studies show vitamin D deficiency causes follicular developmental defects, and abnormal levels of FSH, LH, and estradiol, but were completely normalized by calcium and phosphorus supplementation alone
- We recommend testing vitamin D and getting 1,000mg of calcium daily

Assisted Reproductive Technology

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- Your FADS2 genotype combination is associated with a higher requirement of EPA and DHA
- A meta-analysis found that omega-3 intake significantly improves women's pregnancy and fertilization rates
- In women undergoing IVF, the intake of DHA and alpha-linoleic acid (ALA) has been positively associated with an increased number of follicles, E2 serum levels, and favorable embryo quality
- We recommend getting at least 400mg EPA and 600mg DHA

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ACTION PLAN

- The homozygous genotype for Tp53 is associated with diminished LIF levels
- Low LIF levels negatively affect fertility, but the chances for pregnancy are greater in harsh, cold climates than in the wild-type genotype
- A study looking at Tp53 genotypes in female Europeans undergoing IVF treatment found that the homozygous carriers had approximately 50% lower implantation rates and 30% lower clinical pregnancies compared to the wild-type
- Researchers hypothesize that homozygous carriers present diminished LIF levels that could negatively affect early embryo implantation
- In a study in Northern China, lower zinc concentrations were associated with a 66% increased risk of IVF failure
- We recommend getting 15-30mg of zinc and 70-200mcg of selenium

Estrogen Detoxification

PREBIOTIC FIBER AND BIFIDOBACTERIA

FUT2: AA

The FUT2 gene controls prebiotic production, B12 absorption, and how much bifidobacteria you carry in your digestive tract. The estrobolome involves the bacterial genes capable of metabolizing estrogens. Gut dysbiosis can lead to increased bacterial colonies that produce beta-glucuronidase, which deconjugates estrogen and is reabsorbed into circulation.

ACTION PLAN

- You have the homozygous AA genotype for FUT2 that impacts the gut phase of estrogen detoxification
- Research has shown that careful regulation of estrogen levels is one of the crucial factors for improvement of female fertility in IVF and ET (embryo transfer) techniques
- The AA genotypes lacked or were rarely colonized by several strains of the probiotic Bifidobacteria (B. bifidum, B. adolescentis and B. catenulatum/pseudocatenulatum), while several other bacterial genotypes were more common and dominant
- Low levels of bifidobacteria could affect folate levels because the highest extracellular folate levels are produced by four strains of B. adolescentis and two of B. pseudocatenulatum
- The AA genotype may increase the sensitivity to depleted bifidobacteria from antibiotics, proton pump inhibitors, glyphosate, and sucralose
- If you have East Asian ancestry, this genotype does not affect you
- We recommend that you increase prebiotic fiber (garlic, onions, leeks, bananas, sauerkraut) and polyphenols (raspberries, blueberries, blackberries, grapes) to increase bifidobacteria and improve

estrogen detoxification

PCOS

CHOLINE

PEMT: TT

The PEMT gene controls the production of choline in the liver. Dietary choline requirements are determined by the PEMT genotypes and estrogen status. Choline is beneficial for various aspects of fertility and endocrine disorders like polycystic ovarian syndrome (PCOS).

ACTION PLAN

- You have a higher requirement for choline based on your PEMT genotypes
- Choline has been found to be beneficial for polycystic ovarian syndrome (PCOS)
- We recommend that you increase your dietary choline intake to a minimum of 550mg per day

CALCIUM

VDR FokI: GG

The vitamin D receptor (VDR) FokI polymorphism (rs2228570) is associated with vitamin D and calcium absorption. Calcium plays a significant role in oocyte maturation, while vitamin D deficiency causes insulin resistance and diabetes, which induces hyperandrogenism followed by menstrual irregularity.

ACTION PLAN

- You have the VDR FokI GG genotype that is associated with a poor response to vitamin D supplementation and reduced calcium absorption
- Research has shown that calcium and vitamin D treatment can reduce TNF-a and IL-6 levels and, therefore may be beneficial in improving pregnancy outcomes in patients with PCOS undergoing IVF or ICSI
- We recommend testing vitamin D and getting 1,000mg of calcium daily

Oxidative Stress

GLUTATHIONE

GSTM1: AA

Glutathione S-transferase (GSTM1) belongs to a family of detoxification enzymes and deficiency in enzyme activity is due to a deletion of the GSTM1 gene. Several studies reveal a possible correlation between female infertility and GSTM1 polymorphisms.

ACTION PLAN

- You have the deletion in GSTM1
- Those with the GSTM1 deletion should take extra precaution to avoid Bisphenol-A and phthalates, and increase selenium, glycine, cysteine, alpha lipoic acid, vitamin C, and cruciferous vegetables

FOXO3

FOXO3: TT

The FOXO3 gene protects against oxidative stress, increases the expression of SOD2 and catalase, influences the DNA damage and repair response, regulates genes involved in cell detoxification and survival, and boosts stress resistance. FOXO3 preserves ovarian reserve in mice.

ACTION PLAN

- You have the homozygous TT genotype for FOXO3 that is associated with reduced FOXO3, SOD2, and catalase expression that affects overall protection against oxidative stress
- FOXO3 gene expression is improved with astaxanthin, curcumin, green tea, grapes, honey, propolis, fermented soy, olive oil, garlic, cherries, blueberries, apples, pomegranate juice, strawberries, onions, capers, and phosphatidylcholine
- A systematic review found that astaxanthin supplementation may improve assisted reproductive technology outcomes by enhancing oocyte quality and reducing oxidative stress in female reproductive organs
- The dosage of astaxanthin used in studies ranged from 6 -12 mg per day, and the duration ranged from 6 to 12 weeks to improve fertility rates
- Avoid vegetable oils, refined sugar, high amounts of refined carbohydrates, and consider taking 6-12mg of astaxanthin daily

Sleep Support

SLEEP QUALITY

VDR FokI: GG

The vitamin D receptor (VDR) FokI polymorphism (rs2228570) is linked to vitamin D, sleep, and quality, and fertility. Poor sleep quality can lead to cytokine and immune inflammatory responses marked by TNF and IL-6, with elevated IL-6 levels found in those with unexplained infertility.

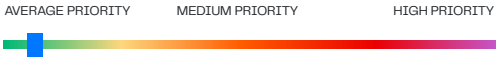
ACTION PLAN

- The VDR FokI GG genotype has been found to be associated with poor sleep quality
- In a systematic review and meta-analysis of 9,397 participants, individuals with vitamin D deficiency had a significantly increased chance for sleep disturbances, poor sleep quality and short sleep duration
- Poor sleep quality and sleep loss can lead to cytokine and immune inflammatory responses marked by TNF and IL-6, with elevated IL-6 levels found in those with unexplained infertility
- Vitamin D synthesizes serotonin and melatonin, and lowers IL6
- The G allele of this gene may decrease the sensitivity to vitamin D and its effects on serotonin and melatonin synthesis, which can result in serotoninergic overactivity during the day and melatoninergic hypoactivity at night
- Vitamin D deficiency may worsen this condition as it decreases the availability of vitamin D to bind to the VDR and regulate serotonin and melatonin synthesis
- We recommend that you test your vitamin D levels and supplement appropriately, include vitamin D co-factors including vitamin A, K2, magnesium, calcium, boron and zinc, and optimize your sleep hygiene

Ovarian Reserve and Function

Ovarian Reserve and Function

Folate

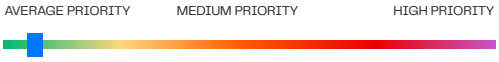


The MTHFR 677 gene encodes the MTHFR gene to convert folate into the active form, methylfolate. Variants in these genes slow down enzymatic function and increase the need for folinic acid and methylfolate.

- You have the wild-type MTHFR 677 genotype that is associated with an average need for folate
- In women, a higher folate intake was associated with higher ovarian reserve, higher rates of implantation, clinical pregnancy, and live birth in those undergoing IVF treatment
- Folate supplementation is associated with increased luteal progesterone levels and decreased risk of sporadic anovulation in premenopausal women

Ovarian Reserve and Function

B12

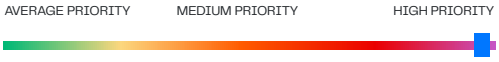


The FUT2 enzyme is regulated by the FUT2 gene and is responsible for vitamin B12 homeostasis and transport throughout the body. Variation in the FUT2 gene is associated with differing levels of circulating vitamin B12.

- You have the AA FUT2 genotype that is associated with a higher plasma level of B12
- You may need to avoid high doses of supplemental B12

Ovarian Reserve and Function

Calcium



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- Calcium has been shown to be a more potent factor for controlling oocyte maturation than vitamin D
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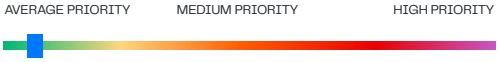
Ovarian Reserve and Function

Vitamin E

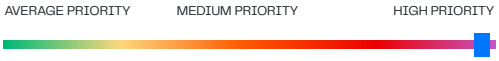


Vitamin E influences the inflammatory marker IL-6, which has been found to be elevated in women experiencing infertility. The ability of alpha-tocopherol to lower IL6 has been found to be dependent on the GSTP1 rs1695 genotype.

- Your genotype for GSTP1 rs1695 is not associated with a higher requirement for alpha-tocopherol to boost ovarian function and fertility
- People with the wild-type AA or heterozygous AG genotype in GSTP1 rs1695 had an increase in IL6 upon supplementing alpha-tocopherol

Ovarian Reserve and Function

Zinc and Selenium



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- You have the homozygous Tp53 gene that increases zinc, selenium, niacin, and resveratrol requirements for Tp53 gene function and healthy LIF levels
- The Tp53 gene is indirectly improved by resveratrol and may significantly and positively impact reproductive outcomes, owing to its potential therapeutic effects improving ovarian function
- We recommend getting 15–30mg of zinc and 70–200mcg of selenium

Ovarian Reserve and Function

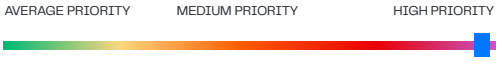
Iron Absorption

Though dietary iron relates to individual iron status, individual variation may, in part, be controlled by genes that regulate iron absorption and transport in the body, specifically TMPRSS6, and TF genes. Variation in these genes can cause reduced functioning of the proteins they code for, which collectively can impact individual risk for low iron status.

- You have the heterozygous AG TMPRSS6 genotype that is hypothesized to slightly affect iron absorption
- Iron supplementation is associated with a decreased risk of ovulatory infertility
- Approximately 40% of women enter pregnancy with insufficient iron reserves and unfavorable iron status, and 25% get iron deficiency anemia
- We recommend the oral iron absorption test (OIAT)

Ovarian Reserve and Function

Ferritin



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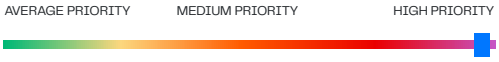
Ovarian Reserve and Function

Omega-3 Fatty Acids



The FADS2 gene encodes for converting plant-based omega-3 fatty acid alpha-linolenic acid (ALA) to EPA and helps determine higher requirements of EPA and DHA. Scientific evidence reveals that SNPs in the FADS2 genes can reduce the function of the desaturase enzymes and influence the bioavailability of PUFAs omega-3 and omega-6 in various tissues.

- Your FADS2 genotype combination is associated with a higher requirement of EPA and DHA
- A meta-analysis found that omega-3 intake significantly improves women's pregnancy and fertilization rates
- Omega-3 fatty acids support fertility by improving hormonal balance, oocyte quality, embryo implantation, and menstrual cycle function and mitigate inflammation that could interfere with the proper function of reproductive organs
- A ratio of high omega-6 fatty acids to low omega-3 fatty acids is associated with very poor reproductive success at an advanced maternal age
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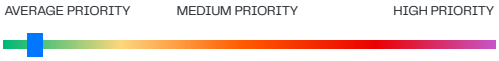
Folate



The MTHFR 677 gene encodes the MTHFR gene to convert folate into the active form, methylfolate. MTHFR 1298 converts 5-methylfolate (5MTHF) to tetrahydrofolate (THF). Unlike MTHFR 677, the 1298 variant does not lead to elevated homocysteine levels unless paired with a heterozygous MTHFR 677. Variants in these genes slow down enzymatic function and increase the need for folate.

- Your MTHFR 677 and 1298 genotypes are associated with a reduced requirement for folate

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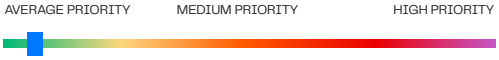
B12



The FUT2 enzyme is regulated by the FUT2 gene and is responsible for vitamin B12 homeostasis and transport throughout the body. Variation in the FUT2 gene is associated with differing levels of circulating vitamin B12.

- You have the AA FUT2 genotype that is associated with a higher plasma level of B12
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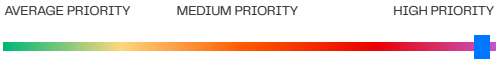
Zinc and Selenium



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- The homozygous genotype for Tp53 is associated with diminished LIF levels
- Low LIF levels negatively affect fertility, but the chances for pregnancy are greater in harsh, cold climates than in the wild-type genotype
- A study looking at Tp53 genotypes in female Europeans undergoing IVF treatment found that the homozygous carriers had approximately 50% lower implantation rates and 30% lower clinical pregnancies compared to the wild-type
- Researchers hypothesize that homozygous carriers present diminished LIF levels that could negatively affect early embryo implantation
- In a study in Northern China, lower zinc concentrations were associated with a 66% increased risk of IVF failure
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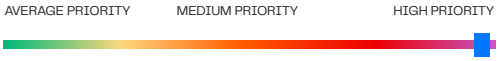
- You have the heterozygous AG TMPRSS6 genotype that is hypothesized to slightly affect iron absorption
- Iron deficiency impacts the quality of eggs and embryos and lowers the chances of pregnancy when undergoing IVF procedures
- We recommend the oral iron absorption test (OIAT)

Assisted Reproductive Technology

Ferritin



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Vitamin A

Vitamin A plays a vital role in female reproductive health. Vitamin A circulates in two main forms in the body: beta-carotene (inactivated) and vitamin A as retinol (activated). The BCMO1 gene converts plant-based beta carotene to vitamin A.

- Your genotype is associated with a 32% lower conversion rate of beta-carotene to vitamin A, making it essential to include more animal-based vitamin A to hit your daily target
- All-trans retinoic acid is the form of vitamin A that supports reproduction as well as embryonic development
- Severe vitamin A deficiency can lead to implantation failure
- We recommend that you get 900mcg of retinol or as recommended by your health practitioner

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Vitamin D

To exert its biological functions, dietary and endogenous vitamin D must be activated to 1,25-hydroxyvitamin D by the enzyme vitamin D 25-hydroxylase, which is regulated partly by the CYP2R1 gene. Activated vitamin D is transported throughout the body by the vitamin D binding protein (DBP) encoded by the GC gene.

- Your genotype combination of CYP2R1 and GC is associated with lower circulating vitamin D
- Vitamin D deficiency and high IL-6 concentration are risk factors for tubal factor infertility
- Women with tubal factor infertility have lower serum 25-hydroxyvitamin-D [25(OH)D] concentration and higher interleukin-6 (IL-6) concentration than other women
- Increasing vitamin D has been shown to lower IL6, which increases fertility rates
- High serum vitamin D is associated with high pregnancy and live birth rates in those undergoing ART
- We recommend that you test your vitamin D levels and supplement based on your practitioner's recommendation to achieve optimal levels

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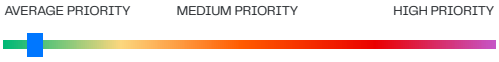
Vitamin E



Vitamin E influences the inflammatory marker IL-6, which has been found to be elevated in women experiencing infertility. The ability of alpha-tocopherol to lower IL6 has been found to be dependent on the GSTP1 rs1695 genotype.

- Your genotype for GSTP1 rs1695 is not associated with a higher requirement for alpha-tocopherol to increase antioxidant capacity and lower IL6
- Vitamin E may boost ovarian function and fertility in women who are trying to conceive
- People with the wild-type AA or heterozygous AG genotype in GSTP1 rs1695 had an increase in IL6 upon supplementing alpha-tocopherol

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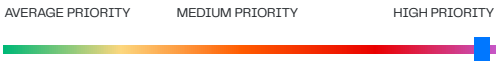
Omega-3 Fatty Acids



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- Your FADS2 genotype combination is associated with a higher requirement of EPA and DHA
- A meta-analysis found that omega-3 intake significantly improves women's pregnancy and fertilization rates
- In women undergoing IVF, the intake of DHA and alpha-linoleic acid (ALA) has been positively associated with an increased number of follicles, E2 serum levels, and favorable embryo quality
- We recommend getting at least 400mg EPA and 600mg DHA

Assisted Reproductive Technology

Endocannabinoids

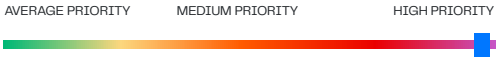
Endocannabinoids, and in particular anandamide, represent potential biomarkers of human fertility disturbances. The balance between the synthesis and degradation of endocannabinoids will result in local changes in their tone in human female and male reproductive tracts. The endocannabinoid system plays a vital role during the process of implantation. A delicate balance between anandamide synthesis and degradation (mainly by the FAAH gene) is necessary to ensure an appropriate “anandamide tone” during implantation.

- You have the heterozygous AC genotype that encodes for the reduced activity of FAAH that is associated with average or slightly higher levels of anandamide
- High levels of anandamide are correlated with low levels of progesterone, which is associated with implantation failure
- Progesterone increases FAAH activity and has been shown to play a crucial role during human embryo implantation
- Progesterone and estrogen are shown to regulate the anandamide levels by modulating the uterine expression of FAAH
- Increased anandamide levels are found in the peripheral blood of women with ectopic pregnancy together with reduced FAAH activity in peripheral lymphocytes
- Women undergoing IVF or intracytoplasmic sperm injection (ICSI) and becoming pregnant show low levels of serum anandamide at the time of implantation in comparison with those who did not
- Plasma anandamide levels fluctuate with the natural menstrual cycle, with the highest levels during the follicular phase
- Leptin increases FAAH activity, and too much or too little leptin has been shown to affect fertility
- Lipopolysaccharide (LPS), the main component of Gram-negative bacteria frequently associated with maternal infection and pregnancy loss, reduces FAAH activity, increases the production of anandamide, and causes a drop in serum progesterone
- We recommend that you optimize progesterone and leptin levels, and test for LPS if it is suspected as an issue affecting fertility

Estrogen Detoxification

Estrogen Detoxification

Prebiotic Fiber and Bifidobacteria



The FUT2 gene controls prebiotic production, B12 absorption, and how much bifidobacteria you carry in your digestive tract. The estrobolome involves the bacterial genes capable of metabolizing estrogens. Gut dysbiosis can lead to increased bacterial colonies that produce beta-glucuronidase, which deconjugates estrogen and is reabsorbed into circulation.

- You have the homozygous AA genotype for FUT2 that impacts the gut phase of estrogen detoxification
- Research has shown that careful regulation of estrogen levels is one of the crucial factors for improvement of female fertility in IVF and ET (embryo transfer) techniques
- The AA genotypes lacked or were rarely colonized by several strains of the probiotic Bifidobacteria (B. bifidum, B. adolescentis and B. catenulatum/pseudocatenulatum), while several other bacterial genotypes were more common and dominant
- Low levels of bifidobacteria could affect folate levels because the highest extracellular folate levels are produced by four strains of B. adolescentis and two of B. pseudocatenulatum
- The AA genotype may increase the sensitivity to depleted bifidobacteria from antibiotics, proton pump inhibitors, glyphosate, and sucralose
- If you have East Asian ancestry, this genotype does not affect you
- We recommend that you increase prebiotic fiber (garlic, onions, leeks, bananas, sauerkraut) and polyphenols (raspberries, blueberries, blackberries, grapes) to increase bifidobacteria and improve estrogen detoxification

Estrogen Detoxification

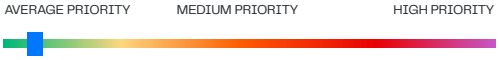
Soluble Fiber and Magnesium

COMT is involved in catecholamine, dopamine, adrenaline, and estrogen metabolism by inactivating catechol estrogens.

- You have the heterozygous AG COMT genotype that decreases enzymatic activity and consequently increases the accumulation of estrogen metabolites
- Research has shown that careful regulation of estrogen levels is one of the crucial factors for improvement of female fertility in IVF and ET (embryo transfer) techniques
- We recommend increasing soluble fiber (beans, oats, apples, psyllium husk, carrots, avocados, nuts, seeds, sweet potatoes, and berries) reduce catecholamine intake (coffee, chocolate, alcohol), and add 300-400mg of magnesium citrate

Estrogen Detoxification

Liver Detox



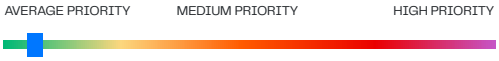
Genetic variability impacts the expression and activity of the liver enzyme CYP2C19 and, therefore, can influence drug metabolism and catabolism of estrogens.

- Individuals with the T allele for CYP2C19*17 are considered the ultra-rapid metabolizer phenotype
- Women with CYP2C19*17 T allele were associated with a decreased risk of breast cancer due to the increased metabolism of estrogen, thereby decreasing the level of harmful estrogen metabolites
- Women with CYP2C19*17 T allele were also associated with a decreased risk of endometriosis

PCOS

PCOS

B1 and Refined Carbohydrates

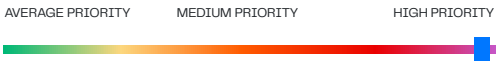


PCOS is known to be a common disorder causing infertility, which affects 7–10% of reproductive-aged women. Variants in genes encoding several proinflammatory cytokines, which are associated with obesity, insulin resistance, and diabetes, have been found to be associated with PCOS.

- You have the wild-type CC genotype for TCF7L2 that improves pancreatic beta-cell function
- In a triple-blinded, randomized, placebo-controlled clinical trial performed on 64 infertile women with PCOS, four weeks using 300mg of vitamin B1 daily resulted in a higher number of positive pregnancy tests

PCOS

Choline



The PEMT gene controls the production of choline in the liver. Dietary choline requirements are determined by the PEMT genotypes and estrogen status. Choline is beneficial for various aspects of fertility and endocrine disorders like polycystic ovarian syndrome (PCOS).

- You have a higher requirement for choline based on your PEMT genotypes
- Choline has been found to be beneficial for polycystic ovarian syndrome (PCOS)
- We recommend that you increase your dietary choline intake to a minimum of 550mg per day

PCOS

Vitamin D

To exert its biological functions, both dietary and endogenous vitamin D must be activated to 1,25-hydroxyvitamin D by the enzyme vitamin D 25-hydroxylase, which is regulated partly by the CYP2R1 gene. Activated vitamin D is transported throughout the body by the vitamin D binding protein (DBP), which is encoded by the GC gene.

- Your genotype combination of CYP2R1 and GC is associated with lower circulating vitamin D
- Vitamin D supplementation may have a beneficial effect on folliculogenesis in women with PCOS by attenuating AGE-mediated inflammation
- It is recommended that you test your vitamin D levels and supplement based on your practitioner's recommendation to achieve optimal levels

PCOS

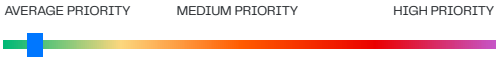
Calcium

The vitamin D receptor (VDR) FokI polymorphism (rs2228570) is associated with vitamin D and calcium absorption. Calcium plays a significant role in oocyte maturation, while vitamin D deficiency causes insulin resistance and diabetes, which induces hyperandrogenism followed by menstrual irregularity.

- You have the VDR FokI GG genotype that is associated with a poor response to vitamin D supplementation and reduced calcium absorption
- Research has shown that calcium and vitamin D treatment can reduce TNF-a and IL-6 levels and, therefore may be beneficial in improving pregnancy outcomes in patients with PCOS undergoing IVF or ICSI
- We recommend testing vitamin D and getting 1,000mg of calcium daily

PCOS

Vitamin E



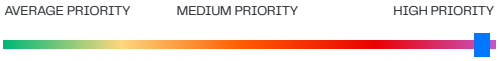
PCOS is known to be a common disorder causing infertility, which affects 7–10% of reproductive-aged women. Variants in genes encoding several proinflammatory cytokines, which are associated with obesity, insulin resistance, and diabetes, are associated with PCOS. Interleukin 6 (IL-6) is a proinflammatory and immunomodulatory pleiotropic cytokine that is influential in reproductive physiology, including fertilization and implantation. The ability of alpha-tocopherol to lower IL6 is dependent on the GSTP1 rs1695 genotype.

- Your genotype for GSTP1 rs1695 is not associated with a higher requirement for alpha-tocopherol to lower IL6

Oxidative Stress

Oxidative Stress

Glutathione



Glutathione S-transferase (GSTM1) belongs to a family of detoxification enzymes and deficiency in enzyme activity is due to a deletion of the GSTM1 gene. Several studies reveal a possible correlation between female infertility and GSTM1 polymorphisms.

- You have the deletion in GSTM1
- Those with the GSTM1 deletion should take extra precaution to avoid Bisphenol-A and phthalates, and increase selenium, glycine, cysteine, alpha lipoic acid, vitamin C, and cruciferous vegetables

Oxidative Stress

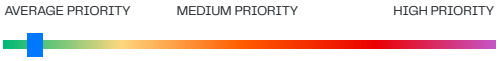
Superoxide Dismutase

Superoxide dismutase (SOD2) is manganese dependent and protects against superoxide for the mitochondria of the cell. Variants in SOD2 are associated with reduced pregnancy rates with IVF.

- You have the heterozygous AG genotype for SOD2 that is associated with reduced SOD2 activity and mitochondrial production
- The heterozygous genotype is associated with lower pregnancy rates with IVF compared to the wild-type genotype
- Visceral obesity has been shown to reduce plasma levels of superoxide dismutase and glutathione peroxidase
- Variants in SOD2 increase the need for manganese and intracellular antioxidant protection
- Avoid vegetable oils, high-fat diets, and high amounts of refined carbohydrates, get 2-5mg of manganese per day, review your requirements for vitamin A, C, E, and omega-3 fatty acids, and consider adding maitake, oyster, shiitake, and porcini mushrooms to your diet

Oxidative Stress

Catalase



The CAT enzyme, encoded by the CAT gene, plays a role in maintaining normal levels of ROS by converting H2O2 to H2O. Research has suggested that polymorphisms in GPX1 and CAT are both associated with the incidence of symptomatic endometriosis and infertility.

- You have the wild-type CC genotype for the CAT gene that is associated with improved catalase levels

Oxidative Stress

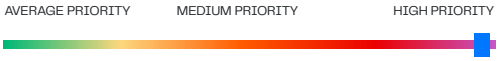
Glutathione Peroxidase

The GPX1 (Glutathione peroxidase 1) gene encodes a protein responsible for the modulation and detoxification of hydroperoxides and hydrogen peroxide to protect the mitochondria and cytoplasm of cells against oxidative damage. Research has suggested that polymorphisms in GPX1 and CAT are both associated with the incidence of symptomatic endometriosis and infertility.

- You have the wild-type GG genotype for the GPX1 gene that is associated with improved glutathione peroxidase levels

Oxidative Stress

FOXO3



The FOXO3 gene protects against oxidative stress, increases the expression of SOD2 and catalase, influences the DNA damage and repair response, regulates genes involved in cell detoxification and survival, and boosts stress resistance. FOXO3 preserves ovarian reserve in mice.

- You have the homozygous TT genotype for FOXO3 that is associated with reduced FOXO3, SOD2, and catalase expression that affects overall protection against oxidative stress
- FOXO3 gene expression is improved with astaxanthin, curcumin, green tea, grapes, honey, propolis, fermented soy, olive oil, garlic, cherries, blueberries, apples, pomegranate juice, strawberries, onions, capers, and phosphatidylcholine
- A systematic review found that astaxanthin supplementation may improve assisted reproductive technology outcomes by enhancing oocyte quality and reducing oxidative stress in female reproductive organs
- The dosage of astaxanthin used in studies ranged from 6 -12 mg per day, and the duration ranged from 6 to 12 weeks to improve fertility rates
- Avoid vegetable oils, refined sugar, high amounts of refined carbohydrates, and consider taking 6-12mg of astaxanthin daily

Oxidative Stress

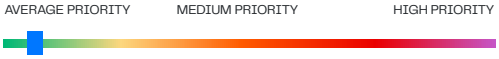
Lead

Lead is a female reproductive toxin. Exposure to lead has been associated with disturbances in the menstrual cycle, folliculogenesis, and luteal function. Elevated blood lead levels have been found in infertile women and have been linked to prolonged time to pregnancy. The deletion in GSTM1 and variants in the GPX1 gene are associated with reduced protection against the oxidative stress of lead.

- Your genotype combination for GSTM1 and GPX1 is associated with reduced protection against lead exposure
- Research has found there to be a significant association between even low blood lead levels and infertility
- Avoid lead-containing cookware, check if your home has lead pipes, optimize iron levels, and get 1,000mg of calcium and 750mg of vitamin C daily to help block the update of lead and reduce blood lead levels

Oxidative Stress

Cadmium

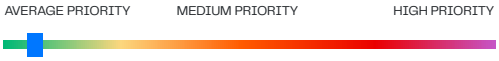


Elevated cadmium levels are associated with female infertility and variants in GSTP1 increase the sensitivity to the oxidative stress from cadmium.

- You have the wild-type CC genotype for GSTP1 that is associated with average detoxification of cadmium

Oxidative Stress

Pesticides



Genetic variants in the PON1 gene can influence oxidative stress from organophosphate pesticides, therefore, female infertility susceptibility. PON1 Q192R rs662 is an antioxidant gene especially significant for female infertility in numerous populations. The C allele is also known as the “R” allele in research studies.

- You have the wild-type TT genotype for PON1 that is associated with lower oxidative stress from organophosphate pesticides

Oxidative Stress

Glyphosate

Researchers have postulated that chronic exposure to food containing glyphosate-based herbicides could be related to unexplained fertility issues. Experimental research found that glyphosate affected ovarian health by increasing nitric oxide and malondialdehyde, while decreasing in catalase and superoxide dismutase.

- Your genotype combination for SOD2 and CAT is associated with more cellular damage from exposure to the herbicide glyphosate
- One study found that in utero and lactational exposure to glyphosate impairs female fertility by reducing the number of implanted embryos and increasing the rate of pre-implantation embryo losses
- The highest glyphosate levels have been found in non-organic wheat and non-organic pulses like beans, lentils, and peas
- Avoid non-organic wheat, beans, lentils, peas, wine, and beer, and optimize vitamin E intake to protect against glyphosate-induced oxidative stress

Oxidative Stress

Aspartame

Aspartame is an artificial sweetener that has been found to affect female fertility. suppressing catalase and superoxide dismutase and negatively impact the function of ovaries and feedback mechanism of reproductive hormones by affecting the hypothalamic–pituitary–gonadal axis.

- Your genotype combination for SOD2 and CAT is associated with reduced protection against aspartame
- Aspartame suppresses CAT and SOD2 antioxidative activities, resulting in higher oxidative stress in the ovaries and granulosa cells, and a decline in mitochondrial function
- Aspartame negatively impact the function of ovaries and feedback mechanism of reproductive hormones by affecting the hypothalamic–pituitary–gonadal axis
- Frequent consumption of diet drinks was associated with oocyte dysmorphism, decreased embryo quality, and an adverse effect on pregnancy rate
- Avoid foods and drinks that contain aspartame

Oxidative Stress

Hemochromatosis

The HFE C282Y gene is tested to determine hemochromatosis risk. Iron overload and ferroptosis is associated with female infertility, and play a dual role in PCOS and endometriosis.

- You have the wild-type HFE C282Y genotype that is not associated with genetically linked hemochromatosis

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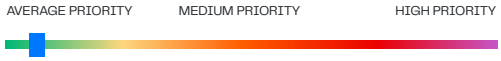
TSH, T3, and T4

TSH, T3, and T4

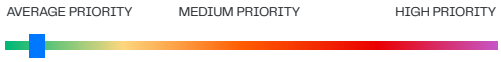


TSH

The PDE8B gene encodes an enzyme that regulates cyclic adenosine monophosphate (cAMP) levels within the thyroid gland, thereby impacting the production and release of thyroid hormones and influencing TSH levels. Both hypothyroidism and hyperthyroidism can cause infertility by affecting ovulation. The G allele for rs2046045 and the A allele for rs4704397 correlates with elevated serum TSH levels.

- Your genotype combination for the PDE8B genes is associated with normal TSH levels

TSH, T3, and T4



T3 and T4

T3 and T4 level variations have been associated with variants in the DIO1 gene.

- You have the C variant for DIO1 that is associated with normal T3 and T4 levels
- T3 and T4 can still be out of range based on other epigenetic factors

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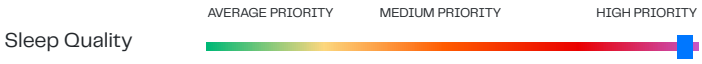
Sleep Support

Sleep Support



The vitamin D receptor (VDR) FokI polymorphism (rs2228570) is linked to vitamin D, sleep, and quality, and fertility. Poor sleep quality can lead to cytokine and immune inflammatory responses marked by TNF and IL-6, with elevated IL-6 levels found in those with unexplained infertility.

- The VDR FokI GG genotype has been found to be associated with poor sleep quality
- In a systematic review and meta-analysis of 9,397 participants, individuals with vitamin D deficiency had a significantly increased chance for sleep disturbances, poor sleep quality and short sleep duration
- Poor sleep quality and sleep loss can lead to cytokine and immune inflammatory responses marked by TNF and IL-6, with elevated IL-6 levels found in those with unexplained infertility
- Vitamin D synthesizes serotonin and melatonin, and lowers IL6
- The G allele of this gene may decrease the sensitivity to vitamin D and its effects on serotonin and melatonin synthesis, which can result in serotoninergic overactivity during the day and melatoninergic hypoactivity at night
- Vitamin D deficiency may worsen this condition as it decreases the availability of vitamin D to bind to the VDR and regulate serotonin and melatonin synthesis
- We recommend that you test your vitamin D levels and supplement appropriately, include vitamin D co-factors including vitamin A, K2, magnesium, calcium, boron and zinc, and optimize your sleep hygiene

Stress Management

Stress Management

Stress Perception

Your perception of stress is unique to your genotypes and life experience. Variants in 5-HT2A are associated with perceived stress, low vagal tone, anxiety, depression, OCD, and IBS.

- You have the heterozygous CT genotype for 5-HT2A rs6311 that is associated with an increased perception of stress
- Studies show a link between high stress levels and increased difficulty in conceiving, potentially due to disruptions in the hormonal balance regulated by the hypothalamic-pituitary-gonadal (HPG) axis
- To reduce stress perception, we recommend moderate intensity aerobic exercise, meditation, yoga, tryptophan, green or black tea, prebiotics, probiotics, B2, B6, B12, and folate

Stress Management

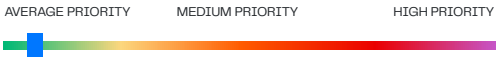
Pressure Response

COMT (catecholamine methyltransferase) is the gene for dopamine, estrogen, adrenaline and catecholamine metabolism. Studies have found that the A allele in COMT V158M (rs4680) results in a 40% decrease in COMT enzyme activity, leading to naturally higher dopamine and adrenaline levels.

- You have the heterozygous AG genotype that is associated with a decreased breakdown of dopamine levels and a reduced clearance of adrenaline in response to stress
- Weight lifting helps speed up the pathway responsible for clearing excess dopamine and adrenaline, and therefore is a useful tool for you to use for chronic stress
- We recommend weight lifting 3x a week, 300-400mg of magnesium daily, and minimizing catecholamine intake (coffee, green tea, chocolate, red wine)

Stress Management

Brain-Derived Neurotrophic Factor



Researchers have found that stress levels in hard-working women may contribute to infertility since symptoms related to anxiety and depression are described as more frequent in infertile than in fertile females. Variants in BDNF are associated with lower baseline BDNF levels.

- You have the wild-type CC genotype for BDNF that is associated with higher baseline BDNF levels

Infertility affects 20–30% of women of reproductive age globally. Common causes include polycystic ovary syndrome (PCOS), uterine fibroids, and endometriosis. Research shows that nutritional patterns, body weight, oxidative stress, psychological and emotional stress, and inflammation play a monumental role in many female infertility cases.

Many women fail to meet optimal nutrient needs, particularly folate, calcium, iodine, iron, selenium, vitamin D, and vitamin B12. Key nutrients for women include folate, vitamin B6, vitamin C, vitamin D, vitamin E, iodine, selenium, iron, and DHA. Genetic variations affect nutrient requirements, meaning optimal intake for fertility enhancement varies between individuals.

Dietary factors significantly contribute to infertility. Diets high in sugar, processed red meat, refined carbohydrates, saturated fatty acids, and alternative sweeteners negatively impact fertility. Conversely, diets low in omega-3 fatty acids, monounsaturated fatty acids, antioxidants, fruits, and vegetables increase oxidative stress levels and reduce reproductive success.

Clinical research has shown that the Mediterranean diet with fish, legumes, and vegetables increases the chance of pregnancy by IVF by 40%. For women with MTHFR variants, methylfolate or folinic acid is preferred over synthetic folic acid. Studies have found that lower zinc is associated with a 66% increased risk of IVF failure, while ferritin levels below 30µg/L are associated with unexplained infertility.

Environmental toxin exposure has accelerated over the past 50 years and is hypothesized to be a leading cause of infertility. PCBs, phthalates, and BPA plastic have been associated with extended periods trying to conceive, worse fertilization rates in IVF, ovarian cysts, uterine polyps, vaginal adenosis, and hormone metabolism and transport abnormalities that contribute to conditions like hypothyroidism.

Research has also shown that iron supplementation decreases the risk of ovulatory infertility, and approximately 40% of women enter pregnancy with insufficient iron reserves. For women with PCOS, calcium and vitamin D supplementation can improve fertility outcomes. Studies have also confirmed that an organic diet significantly reduces urinary glyphosate levels, which may improve reproductive health.

Women's Fertility Panel Modules and SNPs

The Women's Fertility Panel has been designed to analyze SNPs that influence the most significant factors affecting female fertility including ovarian function, hormone balance, oxidative stress protection, and reproductive health.

Modules

- Ovarian Reserve and Function

- Assisted Reproductive Technology
- Estrogen Detoxification
- PCOS
- Oxidative Stress
- TSH
- Sleep Support
- Stress Management

Key Nutrients & Factors

- Folate
- Vitamin B12
- Vitamin B1
- Vitamin A
- Vitamin D
- Vitamin E
- Calcium
- Iron
- Ferritin
- Zinc
- Selenium
- Choline
- Prebiotic Fiber
- Omega-3 Fatty Acids
- Glutathione
- Fasting Insulin
- Thyroid Function (TSH, T3, T4)
- Sleep Quality

Key Genes

- MTHFR 677
- Tp53
- TMPRSS6 and TF
- PDE8B
- VDR (Vitamin D Receptor)
- GSTM1
- PON1

Environmental Factors

- PCBs (Polychlorinated biphenyls)

- Phthalates
- BPA (Bisphenol A)
- Pesticides
- Glyphosate
- Lead
- Cadmium
- Aspartame