PromicsEdge

Female Hormones Pathway

Test Female Other

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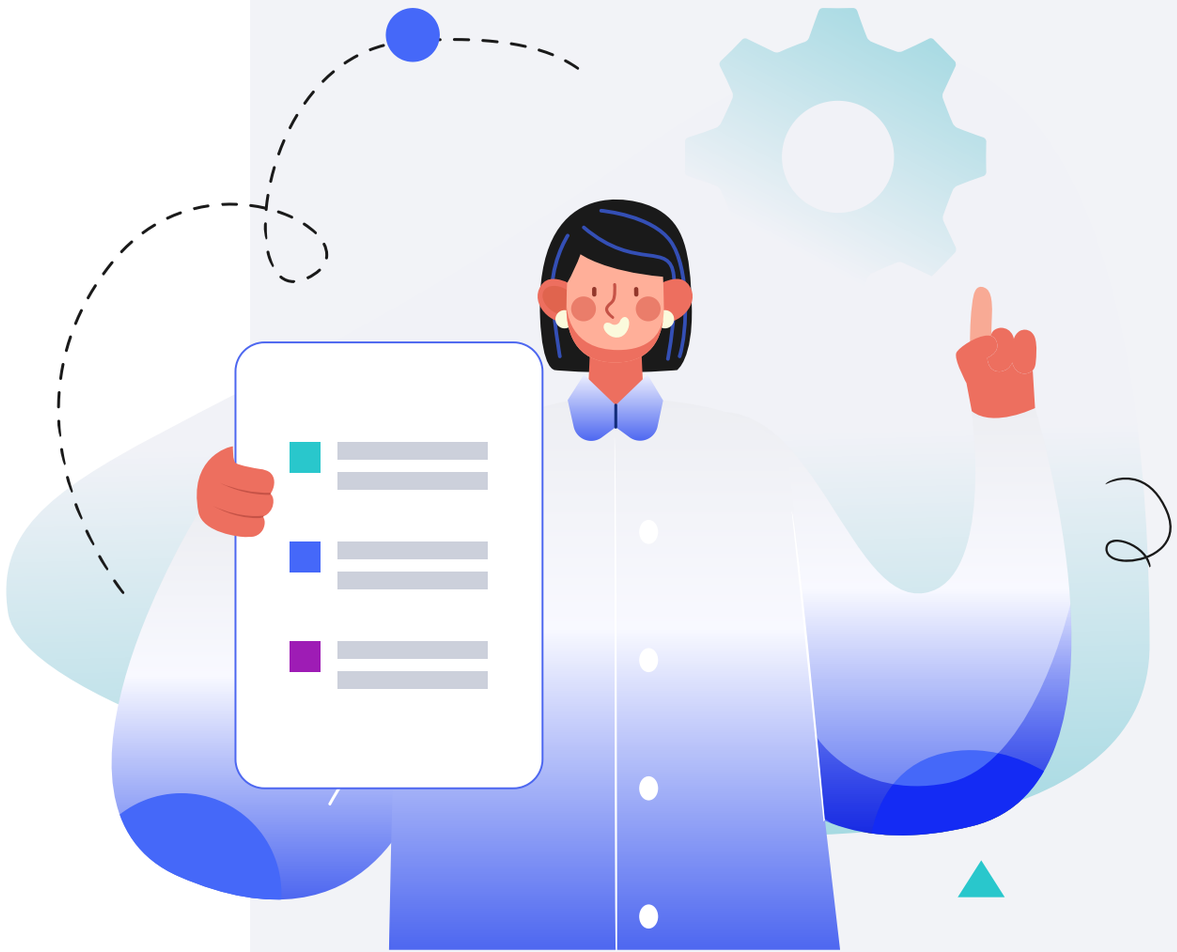
Personal information

NAME

Test Female Other

SEX AT BIRTH

Female



DISCLAIMER

This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

How this works

Female sex hormones form an intricate biochemical network that regulates reproductive health, metabolism, brain function, and many other essential processes throughout the body. Estrogen, progesterone, and androgens influence the menstrual cycle, fertility, bone density, fat distribution, mood, and cardiovascular health. Because these hormones interact closely with many physiological systems, disruptions in one part of the pathway can ripple across multiple aspects of health.

The pathway begins with cholesterol, the fundamental building block for all steroid hormones. Through a series of enzyme-driven reactions, cholesterol is first converted into pregnenolone and other precursor molecules, which are then transformed into progesterone, androgens, and estrogens. Each step is controlled by specialized enzymes encoded by genes such as **CYP11A1** and **CYP17A1**, which regulate the early stages of steroid hormone synthesis.

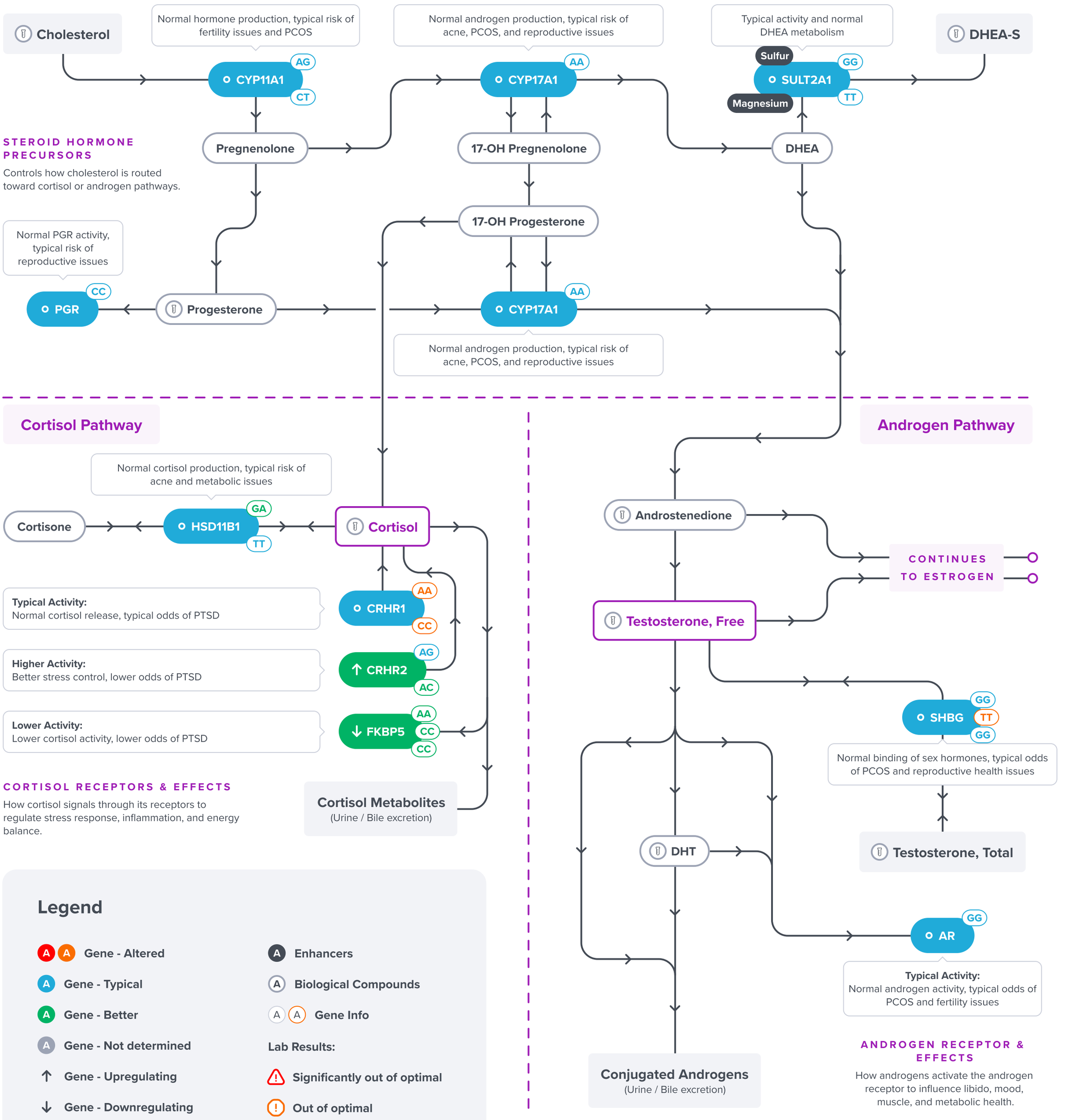
From these precursors, additional enzymes shape the final balance of hormones. Aromatase, encoded by **CYP19A1**, converts androgens into estrogens like estradiol, a hormone critical for reproductive function, bone strength, and brain signaling. Other enzymes, such as **HSD17B1**, fine-tune estrogen activity by converting weaker estrogens into more biologically active forms.

Once produced, hormones must be transported through the bloodstream and recognized by receptors in target tissues. Proteins such as **sex hormone-binding globulin (SHBG)** regulate how much hormone remains biologically active, while receptors including **ESR1**, **ESR2**, and **PGR** determine how cells respond to estrogen and progesterone signals. Genetic differences in these transport proteins and receptors can influence hormone sensitivity and may shape traits related to fertility, metabolic health, and reproductive conditions.

Finally, once hormones have carried out their functions, the body must break them down and eliminate them efficiently. Detoxification enzymes—including members of the **CYP** family, **COMT**, and sulfotransferases—modify hormone molecules and their metabolites so they can be safely cleared from the body. Variations in these detox pathways can affect how efficiently hormones such as estrogen are metabolized, potentially influencing long-term hormonal balance.

This report analyzes your genetic variants across the female hormone pathways, shedding light on how your body produces, transports, responds to, and clears key sex hormones. By examining the specific SNPs that influence each stage—from hormone synthesis to signaling and detoxification—you can better understand your unique hormonal tendencies and implement more personalized strategies to support reproductive health, metabolic balance, and long-term wellbeing.

Androgen & Cortisol Pathways



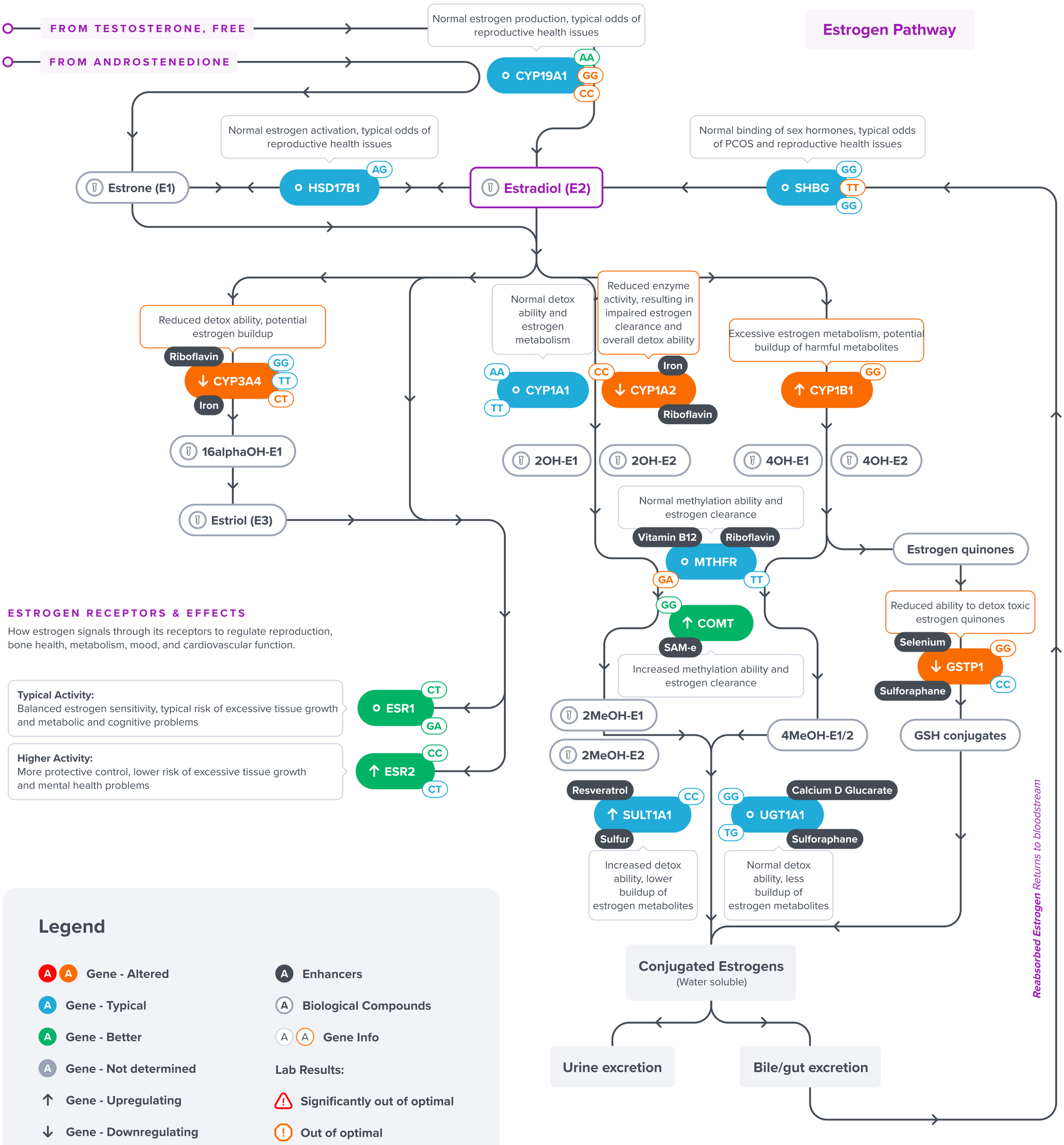
Legend

- Gene - Altered
- Gene - Typical
- Gene - Better
- Gene - Not determined
- Gene - Upregulating
- Gene - Downregulating
- Gene - Neutral
- Genotype
- Genotype not determined
- Enhancers
- Biological Compounds
- Gene Info

Lab Results:

- Significantly out of optimal
- Out of optimal
- Normal
- Optimal
- Missing lab result

Estrogen Pathway



Legend

- AA Gene - Altered
- A Gene - Typical
- A Gene - Better
- A Gene - Not determined
- ↑ Gene - Upregulating
- ↓ Gene - Downregulating
- ○ Gene - Neutral
- AAA Genotype
- ? Genotype not determined
- A Enhancers
- A Biological Compounds
- AA Gene Info

Lab Results:

- Significantly out of optimal
- Out of optimal
- Normal
- Optimal
- Missing lab result

Results Overview

Steroid Hormone Precursors

Gene - SNP Summary

CYP11A1	rs11632698	AG
	rs4077582	CT
CYP17A1	rs743572	AA
SULT2A1	rs2637125	GG
	rs182420	TT
PGR	rs10895068	CC

Androgen Pathway

Gene - SNP Summary

AR	rs6152	GG
SHBG	rs6259	GG
	rs1799941	GG
	rs727428	↓ TT

Labs Summary

Insulin, Fasting · SHBG · Testosterone, Free (Direct / Labcorp)

Cortisol Pathway

Gene - SNP Summary

CRHR1	rs12938031	↑ AA
	rs4792887	↑ CC
FKBP5	rs3800373	↓ AA
	rs1360780	↓ CC
	rs9470080	↓ CC
HSD11B1	rs846910	↓ GA
	rs12086634	TT
CRHR2	rs2267715	AG
	rs2190242	↑ AC

Labs Summary

Cortisol | DHEA-S, Saliva | hs-CRP

Estrogen Pathway

Gene - SNP Summary

CYP1A2	rs762551	↓ CC
GSTP1	rs1695	↓ GG
	rs1138272	○ CC
CYP1A1	rs4646903	○ AA
	rs1048943	○ TT
SULT1A1	rs1042028	↑ CC
UGT1A1	rs4148323	○ GG
	rs6742078	○ TG

CYP1B1	rs1056836	↑ GG
CYP19A1	rs700519	↓ AA
	rs4646	↑ CC
	rs10046	↑ GG
MTHFR	rs1801133	↓ GA
	rs1801131	○ TT
COMT	rs4680	↑ GG
ESR1	rs2234693	○ CT
	rs9340799	○ GA

CYP3A4	rs35599367	○ GG
	rs2242480	↓ CT
	rs2740574	○ TT
HSD17B1	rs605059	○ AG
SHBG	rs6259	○ GG
	rs1799941	○ GG
	rs727428	↓ TT
ESR2	rs1256049	↑ CC
	rs4986938	○ CT

Labs Summary

16-OH-E1 (DUTCH) | 2-OH-E1 (DUTCH) | 4-OH-E1 (DUTCH) | 4-OH-E2 (DUTCH) | 8-OHdG (Waking) (DUTCH) | Estradiol | Estriol | Estrone | GGT | Homocysteine | Insulin, Fasting | Malondialdehyde | SHBG | Testosterone, Free (Direct / Labcorp) | Total Glutathione

Your recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your lab results, along with the amount of scientific evidence supporting the recommendation.

You'll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

		DOSAGE
1	Cruciferous Vegetables	
2	Selenium Supplements	50 mcg
3	Sulforaphane	30 mg
4	DIM (Diindolylmethane)	100 mg
5	Eat Fiber-Rich Foods	
6	Limit Alcohol Intake (Up to 1 Drink a Day)	
7	Limit Caffeine Intake	
8	N-acetylcysteine (NAC)	1200 mg
9	Avoid Grapefruit Juice	
10	Avoid Sugary Foods & Drinks	
11	Green Tea	400 mg
12	Magnesium Glycinate	200 mg
13	Methylfolate	400 mcg
14	Morning Bright Light Therapy	20 minutes
15	Phosphatidylserine	300 mg
16	Riboflavin (Vitamin B2)	25 mg
17	SAM-e	400 mg

Cruciferous Vegetables

How to implement

Incorporate a serving of cruciferous vegetables, such as broccoli, cauliflower, Brussels sprouts, kale, or cabbage, into at least one meal each day. A serving size is about a half cup cooked or one cup raw. Try to maintain this habit consistently over time for the best health outcomes.

How it helps

Cruciferous vegetables such as broccoli, cauliflower, cabbage, and Brussels sprouts contain compounds that support detoxification pathways in the liver. The liver helps metabolize and clear excess hormones, including estrogen. Compounds such as glucosinolates and their derivatives can support phase II detoxification processes that help convert hormones into forms that can be safely eliminated from the body. Supporting these pathways may help maintain a healthy balance between estrogen production and estrogen clearance. Including cruciferous vegetables regularly in the diet helps maintain metabolic pathways that regulate hormone turnover and detoxification.

Personalized to Your Genes

↓ CYP1A2	Induce CYP1A2 activity and support estrogen metabolism.
↑ CYP1B1	Induce CYP1B1 activity and support estrogen metabolism.
○ CYP19A1	Support detoxification of excess estrogen.

Support detoxification of excess estrogen.

Selenium Supplements

How to implement

Take 50 mcg of selenium supplements once daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

50 mcg

How it helps

Selenium is a trace mineral essential for thyroid hormone metabolism and antioxidant defense. The thyroid gland relies on selenium dependent enzymes to convert thyroid hormones into their active forms and protect thyroid tissue from oxidative stress. Thyroid hormones influence many metabolic processes, including the production of sex hormone binding globulin (SHBG) in the liver. When thyroid function is impaired, SHBG levels often decrease, leading to higher levels of free circulating androgens. Adequate selenium intake supports healthy thyroid function, which indirectly helps regulate hormone transport and balance in the body.

Personalized to Your Genes

↑ CYP1B1	Supports glutathione enzyme activity, crucial for quinone detox.
↓ GSTP1	Supports glutathione enzyme activity.
○ SHBG	Supports thyroid function, which regulates SHBG production.

Sulforaphane

How to implement

Take a sulforaphane supplement, typically available in capsule form, with a dosage ranging from 30 to 60 milligrams per day. It is generally taken once daily, with or without food, according to the product's label instructions or a healthcare provider's advice. Continue this regimen daily for as long as you seek its benefits, but consult a healthcare provider for long-term use guidance.

TYPICAL STARTING DOSE

30 mg

How it helps

Sulforaphane is a bioactive compound formed when cruciferous vegetables such as broccoli or broccoli sprouts are digested. It activates a group of cellular pathways involved in detoxification and antioxidant defense. One of its key actions is stimulating the expression of detoxification enzymes in the liver that help process and eliminate hormones and other compounds. Sulforaphane also supports phase II detoxification pathways that convert hormone metabolites into forms that can be safely excreted. By supporting liver detoxification capacity and antioxidant defenses, sulforaphane helps maintain healthy hormone metabolism and prevents buildup of excess estrogen metabolites.

Personalized to Your Genes

↓ CYP1A2	Supports phase I and II detox balance.
↓ CYP3A4	Supports hepatic detox gene expression and estrogen clearance.
↓ GSTP1	Induces phase II detox genes, including GST.

DIM (Diindolylmethane)

How to implement

Take a DIM (diindolylmethane) supplement daily with water during a meal to aid absorption. Dosages typically range from 100 to 200 mg per day, but always start with the lower dose to assess your body's response before increasing.

TYPICAL STARTING DOSE

100 mg

How it helps

DIM is a compound produced when the body digests indole compounds found in cruciferous vegetables such as broccoli and cabbage. DIM influences how estrogen is metabolized in the liver. It can shift estrogen metabolism toward pathways that produce less biologically active estrogen metabolites. This may help maintain a healthier balance between different estrogen forms in the body. Some people use DIM supplements to support estrogen metabolism, particularly in conditions associated with estrogen dominance. However, evidence in humans is still developing, and responses can vary depending on individual hormone status.

Personalized to Your Genes

↓ CYP1A2	Supports the safer CYP1A2 detox route.
○ CYP19A1	Promotes favorable estrogen metabolism and may balance aromatase. Acts as a mild aromatase inhibitor and promotes safe estradiol detox. Promotes favorable estrogen metabolism and may balance aromatase.

Eat Fiber-Rich Foods

How to implement

Incorporate foods high in fiber, such as fruits, vegetables, whole grains, and legumes, into your daily meals. Aim for a total dietary fiber intake of 25 to 30 grams per day, spread out over all meals.

How it helps

Dietary fiber plays several important roles in supporting hormonal balance. First, fiber slows digestion and the absorption of carbohydrates, which helps stabilize blood sugar levels and reduce large insulin spikes. This is important because high insulin levels suppress the liver's production of sex hormone-binding globulin (SHBG). When SHBG is low, more testosterone circulates in its free, biologically active form, which can worsen symptoms such as acne, irregular cycles, or features of PCOS. Fiber also supports gut health and helps remove hormone metabolites from the body. Estrogen is partly eliminated through bile into the digestive tract, and adequate fiber helps prevent its reabsorption back into circulation. By supporting insulin balance, liver function, and hormone elimination pathways, a fiber-rich diet can help maintain healthier reproductive hormone regulation.

Personalized to Your Genes

CYP19A1	Enhances estrogen excretion via bile. Enhances estrogen excretion via bile.
SHBG	Improves insulin sensitivity and supports hepatic SHBG production.

Limit Alcohol Intake (Up to 1 Drink a Day)

How to implement

Consume no more than one standard drink per day. A standard drink is generally considered to be 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of distilled spirits. Ensure your daily intake does not exceed these amounts.

How it helps

Alcohol affects liver function, which plays a central role in hormone metabolism. Excess alcohol intake can impair the liver's ability to process estrogen and other hormones. It may also increase cortisol levels and disrupt sleep patterns. Chronic alcohol consumption is associated with hormonal imbalances and reproductive disruptions in both men and women. Limiting alcohol intake helps maintain normal liver function and supports the metabolic pathways responsible for hormone clearance and balance.

Personalized to Your Genes

↓ CYP3A4	Alcohol competes with hepatic detox capacity.
○ CYP19A1	Alcohol increases aromatase activity.

Limit Caffeine Intake

How to implement

Limit your caffeine consumption to less than 200 milligrams per day, equivalent to about two 6-ounce cups of coffee. Aim to avoid caffeine-containing foods and beverages such as tea, chocolate, and some soft drinks, especially in the late afternoon and evening to minimize sleep disturbances.

How it helps

Caffeine stimulates the nervous system and can increase the release of stress hormones such as cortisol. In sensitive individuals, excessive caffeine intake may amplify stress responses and disturb sleep. Because cortisol interacts with reproductive hormone signaling, chronically elevated stress hormones may disrupt hormonal balance. Moderating caffeine intake, especially later in the day, can help maintain stable stress hormone rhythms and support better sleep quality.

Personalized to Your Genes

↓ CYP1A2	Slow CYP1A2 variants metabolize caffeine poorly, increasing detox burden.
○ CRHR1	Caffeine stimulates CRH and cortisol release.

N-acetylcysteine (NAC)

How to implement

Take 600 mg of N-Acetylcysteine (NAC) supplement daily with water. It can be taken at any time of the day, but try to take it at the same time each day for best results.

TYPICAL STARTING DOSE

1200 mg

How it helps

N-acetylcysteine (NAC) is a precursor to glutathione, one of the body's main antioxidants and detoxification molecules. NAC supports cellular antioxidant defenses and may improve insulin sensitivity. In women with PCOS, several studies have shown that NAC supplementation may improve ovulation rates and metabolic markers. By supporting glutathione production, NAC helps protect ovarian cells from oxidative stress and supports metabolic pathways that influence hormone balance. NAC may also assist detoxification pathways involved in hormone metabolism. While it does not directly alter hormone levels, it improves the metabolic environment that supports healthy hormonal regulation.

Personalized to Your Genes

↑ CYP1B1	Increases glutathione needed to neutralize quinones.
↓ GSTP1	Increases glutathione needed to neutralize quinones.

Avoid Grapefruit Juice

How to implement

Do not consume grapefruit juice or any food products containing grapefruit juice. This includes avoiding grapefruit itself and checking the ingredients lists of beverages and processed foods to ensure they do not contain grapefruit or its derivatives.

How it helps

Grapefruit contains compounds called furanocoumarins that strongly inhibit the enzyme CYP3A4 in the liver and intestines. CYP3A4 is one of the body's major detoxification enzymes and plays an important role in metabolizing many hormones,

including estrogens. When grapefruit inhibits this enzyme, hormone breakdown and clearance may slow down. This can increase circulating levels of certain hormones or medications that rely on this pathway for metabolism. While occasional grapefruit consumption is usually not problematic for most people, frequent intake may interfere with normal detoxification processes in individuals who already have reduced CYP3A4 activity.

Personalized to Your Genes

↓ CYP3A4 Grapefruit inhibits CYP3A4 and worsens clearance.

Avoid Sugary Foods & Drinks

How to implement

To avoid sugary foods, eliminate or significantly reduce consumption of foods and beverages high in added sugars such as sodas, candies, baked goods, and sugary cereals from your diet. Instead, opt for natural sugar sources like fruits. Aim to do this daily for ongoing health benefits.

How it helps

Frequent intake of sugary foods leads to repeated spikes in blood glucose and insulin. High insulin levels can directly stimulate ovarian cells to produce more androgens, such as testosterone. Elevated androgens are a key feature of hormonal conditions like PCOS and may contribute to acne, irregular periods, and difficulty with ovulation. Excess insulin also promotes inflammation and metabolic stress, both of which can disrupt hormonal balance. Reducing added sugars and refined carbohydrates helps stabilize blood sugar and lowers insulin demand. Over time, this can help reduce androgen overproduction and support more regular reproductive hormone signaling. Choosing whole foods, fiber-rich carbohydrates, and balanced meals is one of the most effective dietary strategies for maintaining hormone balance.

Personalized to Your Genes

○ SHBG Insulin suppresses SHBG production in the liver.

Green Tea

How to implement

Consume 400 mg of green tea extract daily. This can be taken in the form of capsules or tablets available that specify the amount of green tea extract. Ensure the supplement is taken according to the product's specific instructions, usually once a day with water.

TYPICAL STARTING DOSE

400 mg

How it helps

Green tea contains bioactive compounds called catechins, especially epigallocatechin gallate (EGCG). These compounds have antioxidant and metabolic effects. Some studies suggest that green tea may modestly improve insulin sensitivity and reduce inflammation. Because insulin strongly influences androgen production and SHBG levels, improving insulin sensitivity can indirectly help balance reproductive hormones. Green tea may also slightly increase fat oxidation and support metabolic health. While its effects are generally mild, regular consumption may contribute to improved metabolic stability, which can support healthier hormone regulation.

Personalized to Your Genes

SHBG — May modestly improve insulin sensitivity and androgen balance.

Magnesium Glycinate

How to implement

Take 200-400 mg of magnesium glycinate daily, preferably in the evening or divided into two doses with meals to enhance absorption. Continue this supplementation routine daily for at least one month to evaluate its benefits on your health.

TYPICAL STARTING DOSE

200 mg

How it helps

Magnesium glycinate is a well-absorbed form of magnesium often used to support relaxation and sleep. Magnesium plays a role in nervous system regulation and helps calm stress responses. By supporting sleep quality and reducing nervous system overactivation, magnesium glycinate may help stabilize cortisol rhythms. Balanced cortisol levels are important for maintaining proper reproductive hormone signaling.

Personalized to Your Genes

CRHR1 — Calms stress reactivity and improves sleep quality.

Calms stress reactivity and improves sleep quality.

Methylfolate

How to implement

Take an L-methyl folate supplement (400-800 micrograms daily), ideally with a meal, to improve absorption. This dosage is recommended for adults, including pregnant women, to support overall health, especially to reduce the risk of neural tube defects in developing fetuses. Continue daily use as part of your regular supplement routine.

TYPICAL STARTING DOSE

400 mcg

How it helps

Methylfolate is the biologically active form of folate used directly in the body's methylation cycle. Methylation is an essential biochemical process that helps regulate gene activity, neurotransmitter production, and detoxification pathways. In hormone metabolism, methylation is particularly important for processing catechol estrogens, which are intermediate estrogen metabolites produced during normal estrogen breakdown. These compounds must be methylated to become less reactive and easier for the body to eliminate. Methylfolate provides the methyl groups needed for this reaction. In people with reduced activity of the MTHFR enzyme, the body may produce less active folate, which can reduce methylation efficiency. Providing methylfolate directly bypasses this step and supports normal estrogen metabolism and detoxification pathways.

Personalized to Your Genes

↑ CYP1B1 Catechol estrogens produced by CYP1A1 require methyl donors for safe clearance.

Morning Bright Light Therapy

How to implement

Expose yourself to a light therapy box, which mimics natural sunlight, for about 20-30 minutes each morning within the first hour of waking up. It's important to do this daily, especially during months with less natural sunlight, to help manage symptoms of Seasonal Affective Disorder (SAD) or other conditions influenced by light exposure.

TYPICAL STARTING DOSE

20 minutes

How it helps

Exposure to natural light in the morning helps synchronize the body's circadian rhythm. The circadian clock regulates many hormonal cycles, including cortisol release and sleep hormone production. When circadian rhythms are well aligned, hormone signaling throughout the body tends to be more stable. Morning light exposure helps anchor these rhythms and improves sleep quality, metabolic regulation, and stress hormone balance.

Personalized to Your Genes

CRHR1

Anchors the circadian rhythm and reduces HPA dysregulation.

Anchors the circadian rhythm and reduces HPA dysregulation.

Phosphatidylserine

How to implement

Take 100 mg of phosphatidylserine three times daily with meals. Continue this regimen for up to 6 months to evaluate its effectiveness.

TYPICAL STARTING DOSE

300 mg

How it helps

Phosphatidylserine is a phospholipid found in cell membranes, particularly in brain cells. It is sometimes used as a supplement to help regulate stress responses. Some studies suggest it may help reduce excessive cortisol responses to stress or intense exercise. Because cortisol interacts with reproductive hormone signaling, reducing excessive cortisol spikes may indirectly support hormonal balance. However, the evidence is limited and effects appear modest.

Personalized to Your Genes

CRHR1

Blunts excessive cortisol spikes.

Blunts excessive cortisol spikes.

Riboflavin (Vitamin B2)

How to implement

Take a riboflavin (vitamin B2) supplement daily, with a dose ranging from 5mg to 400mg, depending on the specific health concern or advice from a healthcare provider. Swallow the supplement with water, preferably with a meal to enhance absorption. This regimen can be continued long-term or as directed by a healthcare professional.

TYPICAL STARTING DOSE

25 mg

How it helps

Riboflavin is a B vitamin that plays a critical role in cellular energy production and enzyme activity. Many detoxification enzymes in the liver rely on riboflavin-dependent cofactors to function properly. These enzymes help metabolize hormones, drugs, and environmental compounds. Adequate riboflavin intake supports these enzymatic reactions and helps maintain efficient hormone clearance. Riboflavin is found in foods such as eggs, dairy, meat, almonds, and green vegetables. While deficiency is uncommon in well-balanced diets, insufficient intake may impair certain metabolic processes involved in detoxification and hormone metabolism.

Personalized to Your Genes

↓ CYP3A4

Riboflavin supports CYP3A4 enzyme activity.

SAM-e

How to implement

Take 400-1600 mg of SAM-e as a supplement daily, preferably on an empty stomach to enhance absorption. It is often recommended to start with low dosage and observe how your body responds over a few weeks, adjusting as necessary under the guidance of a healthcare provider.

TYPICAL STARTING DOSE

400 mg

How it helps

SAM-e is one of the body’s main methyl donor molecules. Methylation is a biochemical process used to modify and neutralize many compounds, including certain estrogen metabolites. Some estrogen molecules are first converted into catechol estrogens, which must then be methylated to become safer, less reactive compounds that can be eliminated. SAM-e provides

the methyl groups needed for this detoxification step. When methylation capacity is low, reactive estrogen intermediates may accumulate and contribute to oxidative stress. Supporting methylation with adequate nutrients such as SAM-e can help maintain efficient processing of these hormone metabolites. SAM-e also plays broader roles in liver detoxification, neurotransmitter metabolism, and cellular repair processes.

Personalized to Your Genes

↑ CYP1B1 Catechol estrogens produced by CYP1A1 require methyl donors for safe clearance.

CYP1A2

CYP1A2 Report

The CYP1A2 gene codes for a crucial liver enzyme. It detoxifies several common dietary and pollutant-based toxins, including [R, R]:

- **Caffeine** – from coffee, tea, and energy drinks
- **Aflatoxins** – found in moldy peanuts, corn, grains, and spices
- Heterocyclic Amines – from well-done meat and cigarette smoke

Higher enzyme activity supports **faster clearance of toxins** like caffeine and acrolein, though it might increase activation of certain carcinogens like heterocyclic amines in the absence of robust antioxidant defense [R, R].

CYP1A2 also plays a supportive role in **estrogen metabolism**, alongside CYP1A1 [R, R].

Enhancers:

Iron Riboflavin

SNP	Your Genotype
rs762551 CYP1A2*1F Alleles **A:** Increased CYP1A2 activity **C:** Reduced CYP1A2 activity	↓CC **Your genotype is linked to reduced CYP1A2 activity and detox ability**

Intro and Health Effects

The "slow metabolizer" CYP1A2 variant makes a less efficient enzyme. People who carry this variant may be **more sensitive to caffeine**. Accordingly, they may be more likely to experience negative effects when drinking coffee [R, R, R].
CYP1A2 also helps break down estrogen metabolites. In theory, people with reduced activity may have impaired estrogen clearance. However, this variant hasn't been linked to changes in estrogen levels or signaling.

CYP1B1

CYP1B1 Report

The CYP1B1 gene provides instructions for making an enzyme that belongs to the cytochrome P450 family. This enzyme breaks down but also activates a range of chemicals. They include hormones like **estrogen** and potentially harmful compounds found in the environment, such as those in cigarette smoke.

Increased estrogen clearance with CYP1B1 may cause the buildup of toxic metabolites like catecholes and quinones. This is especially true if phase II detox is slower.

SNP	Your Genotype
rs1056836 Leu432Val Alleles **G:** Increased CYP1B1 activity and altered detox ability **C:** Typical CYP1B1 activity and detox ability	↑ GG **Your genotype is linked to increased CYP1B1 activity and potential buildup of toxic estradiol metabolites.**

Intro and Health Effects

The main *CYP1B1* variant is **rs1056836** (Leu432Val). The **G (Val) allele** seems to **increase** the enzyme's activity. This may lead to increased production of toxic metabolites of hormones and toxins.

Increased estrogen clearance with CYP1B1 may cause the buildup of toxic metabolites like catecholes and quinones. This is especially true if phase II detox is slower.

CYP3A4

CYP3A4 Report

The CYP3A4 gene encodes cytochrome P450 3A4, a member of the cytochrome P450 monooxygenase superfamily of enzymes. These proteins eliminate most drugs from the body [R, R].

CYP3A4 in particular is responsible for processing approximately 45–60% of prescribed drugs, including opiods, immunosuppressants, antihypertensive medication, anticancer drugs, and statins [R, R, R, R, R, R, R, R, R, R, R, R].

CYP3A4 also:

- Detoxifies bile acids [R].
- Deactivates **estradiol and testosterone** to biologically less active metabolites [R].
- Partly degrades vitamin D [R].

This enzyme is mainly found in the liver (40% of the total liver CYP content) but also in the small intestine, prostate, breast, colon, and brain. CYP3A4 is the most active CYP enzyme in the gut, which explains why what we eat and drink has a great effect on the activity of this enzyme [R, R, R, R].

Enhancers:

Riboflavin | Iron | Quercetin | Vitamin D

SNP

rs35599367

Alleles

A: Reduced CYP3A4 activity

G: Typical CYP3A4 activity

Your Genotype

GG

Your genotype is linked to typical CYP3A4 activity and detox ability

Intro and Health Effects

The “A” allele of rs35599367, also known as CYP3A4*22, reduces CYP3A4 levels and activity by approximately half, resulting in slower drug metabolism [R, R, R, R].

SNP

rs2242480

Alleles

C: Typical CYP3A4 activity and detox ability

T: Reduced CYP3A4 activity and detox ability

Your Genotype

↓ CT

Your genotype is linked to reduced CYP3A4 activity and detox ability.

Intro and Health Effects

Another variant with decreased enzyme activity is ‘T’ at rs2242480 (CYP3A4*1G) [R, R].

SNP

rs2740574 CYP3A4*1B

Alleles

C: Reduced CYP3A4 activity

T: Typical CYP3A4 activity

Your Genotype

TT

Your genotype is linked to typical CYP3A4 activity and detox ability

Intro and Health Effects

Variants with decreased enzyme activity include ‘C’ at **rs2740574** (CYP3A4*1B) [R, R].

GSTP1

GSTP1 Report

The GSTP1 gene codes for glutathione S-transferase pi 1 (GSTP1). GSTP1 is a phase II detoxification enzyme. It helps eliminate foreign chemicals (xenobiotics) from our bodies using the “master antioxidant” glutathione [R, R].

GSTP1 neutralizes harmful substances and makes them more water-soluble, facilitating their excretion from the body. The effectiveness of this detoxification process is influenced by various factors, including genetic polymorphisms in the GSTP1 gene.

GSTP1 is predominantly expressed in the liver but is also found in other tissues like the lungs, kidneys, and intestines. It is the most abundant GST subtype in the lungs, where it helps metabolize **estrogen metabolites** and many carcinogenic compounds [R, R, R].

Enhancers:

Selenium Sulforaphane

SNP

rs1695 Ile105Val

Alleles

A: Increased GSTP1 activity and detox ability

G: Reduced GSTP1 activity and detox ability

Your Genotype

↓GG

Your genotype is linked to reduced GSTP1 activity and detox ability

Intro and Health Effects

The main GSTP1 gene variant is rs1695 or Ile105Val. The “G” allele of this variant changes the GSTP1 structure and reduces its activity. As a result, it may impact the body's ability to detoxify various substrates, including carcinogens, drugs, and products of oxidative stress.

Studies have linked it to:

- Increased drug toxicity (chemotherapy) [R]
- Increased mercury toxicity [R]
- Higher odds of asthma due to smoke exposure (“GG” genotype) [R]
- Higher odds of breast cancer [R]
- Allergic reactions in people exposed to air pollution [R]

However, some studies failed to confirm the link between this variant and asthma, mercury toxicity, or cancer [R, R, R, R].

The effects of rs1695-G on breast cancer may be more pronounced in women who **eat less cruciferous vegetables**. This finding makes sense given that cruciferous vegetables are rich in glutathione and other antioxidants [R].

SNP

rs1138272 Ala114Val

Alleles

C: Typical GSTP1 activity and detox ability

T: Reduced GSTP1 activity and detox ability

Your Genotype

CC

Your genotype is linked to typical GSTP1 activity and detox ability

Intro and Health Effects

Another important GSTP1 variant is rs1138272 or Ala114Val. Its minor “T” allele may be linked to:

- Stronger effects of smoking on Parkinson’s disease [R]
- Increased mercury toxicity [R]
- Nerve problems [R]

However, many studies didn’t find the negative effects of this variant on detox ability and cancer [R, R, R, R, R].

AR

AR Report

The ***AR*** **(androgen receptor)** gene encodes the receptor that mediates the effects of **testosterone** and **dihydrotestosterone (DHT)** in androgen-responsive tissues (e.g., hair follicles, prostate) [R, R].

Upon activation by androgens, the resulting androgen-receptor complex binds to DNA and turns specific genes involved in male sexual development “on” or “off”, as necessary. This helps regulate **hormone balance, hair growth, and sex drive in females** [R].

SNP	Your Genotype
rs6152 E211E or StuI Alleles **A:** Excessive AR activity **G:** Typical AR activity	GG **Your genotype is linked to typical AR activity and reproductive health**

Intro and Health Effects

The best-characterized *AR* variant is **rs6152**, also known as E211E or *StuI*. Its minor ‘A’ allele is associated with **higher** AR activity and lower estradiol levels [R, R].

This variant has been associated with an increased risk of:

- PCOS [R]
- Coronary artery disease (in women) [R]
- Recurrent miscarriage [R, R]

CRHR1

CRHR1 Report

The CRHR1 gene encodes a receptor for CRH, the first hormone of the HPA axis [R, R].

CRH is released from a region of the brain called the hypothalamus and can subsequently bind to its receptors in the pituitary gland to stimulate the release of ACTH. This hormone, in turn, mediates the release of the stress-related hormone cortisol from the adrenal glands [R].

Stress activates the HPA axis, resulting in cortisol release. Hence, CRH receptors play a significant role in stress response and related disorders. Contrary to CRHR2, this receptor promotes anxiety, arousal, and depression upon activation [R, R].

SNP

rs12938031

Alleles

A: Excessive CRHR1 activity

G: Normal CRHR1 activity

Your Genotype

↑ AA

Your genotype is linked to excessive CRHR1 activity and higher odds of PTSD

Intro and Health Effects

Two variants, 'A' at rs12938031 and 'C' at rs4792887, have been associated with increased odds and severity of PTSD. These variants may be linked to higher CRHR1 expression or activity [R, R].

SNP

rs4792887

Alleles

C: Excessive CRHR1 activity

T: Normal CRHR1 activity

Your Genotype

↑ CC

Your genotype is linked to excessive CRHR1 activity and higher odds of PTSD

Intro and Health Effects

Two variants, ‘A’ at rs12938031 and ‘C’ at rs4792887, have been associated with increased odds and severity of PTSD. These variants may be linked to higher CRHR1 expression or activity [R, R].

CYP11A1

CYP11A1 Report

About

The CYP11A1 gene encodes a member of the cytochrome P450 monooxygenase superfamily of enzymes. These proteins eliminate most drugs from the body. CYP11A1 catalyzes reactions involved in drug metabolism and the synthesis of cholesterol, steroids, and other lipids [R].

Importantly, the CYP11A1 enzyme is a key enzyme in steroid hormone production. It converts cholesterol to pregnenolone, from which all other steroid hormones are derived. This includes sex hormones such as estrogen, testosterone, progesterone, and DHEA, as well as other hormones such as aldosterone and cortisol [R, R, R, R].

Due to its role in sex hormone production, CYP11A1 controls testis development, pregnancy-related processes, and mating-related behavior [R].

SNP	Your Genotype
rs11632698 Alleles **A:** Normal CYP11A1 activity **G:** Altered CYP11A1 activity	AG **Your genotype is linked to normal CYP11A1 activity and typical odds of hormonal problems.**

Intro and Health Effects

The main CYP11A1 polymorphism is rs11632698. Its 'G' allele has been associated with an increased risk of:

- Recurrent pregnancy loss [R]
- PCOS [R, R]
- Bone loss in breast cancer patients treated with aromatase inhibitors [R]

SNP	Your Genotype
rs4077582 Alleles **C:** Normal CYP11A1 activity **T:** Altered CYP11A1 activity	CT **Your genotype is linked to normal CYP11A1 activity and typical odds of hormonal problems.**

Intro and Health Effects

Another variant, the ‘T’ allele of rs4077582, has also been associated with an increased risk of: recurrent pregnancy loss and PCOS [R, R, R, R, R, R].

CYP17A1

CYP17A1 Report

The CYP17A1 gene encodes an enzyme known as 17,20-lyase. It is one of the cytochrome P450 monooxygenases (CYPs). As opposed to most CYPs, CYP17A1 is not involved in detoxification but in steroid hormone production, Specifically, it helps produce male sex hormones or androgens [R].

CYP17A1 is very important in humans. It helps produce:

- Mineralocorticoids, which affect sodium and water balance in the kidney [R].
- Glucocorticoids, which control the body's response to stress [R].
- All androgens. It converts pregnenolone to dehydroepiandrosterone, which is converted to androstenedione, testosterone, and dihydrotestosterone [R, R].

CYP17A1 is also indirectly responsible for the levels of estrogens because these are produced from androgens.

SNP	Your Genotype
rs743572 Alleles **A:** Typical CYP17A1 activity **G:** Excessive CYP17A1 activity	AA **Your genotype is linked to typical CYP17A1 activity and androgen production.**

Intro and Health Effects

The main CYP17A1 polymorphism is rs743572. Its minor 'G' allele increases enzyme activity, resulting in higher sex hormone levels. This variant has been associated with an increased risk of [R]:

- Acne [R, R, R, R]
- PCOS [R]
- Breast cancer (in premenopausal but not postmenopausal women) [R, R, R, R, R, R, R]
- Prostate cancer (in Black but not Caucasian or Asian populations) [R, R]
- Ovarian cancer [R]
- Uterine fibroids [R]
- Endometriosis [R]

In contrast, it has been associated with a decreased risk of endometrial and pancreatic cancer [R, R].

CYP19A1

CYP19A1 Report

The *CYP19A1* gene provides instructions for making a cytochrome P450 monooxygenase called aromatase. While many of these enzymes eliminate toxins and drugs from the human body, aromatase converts androstenedione and testosterone to estrone and estradiol, respectively [R].

In cells, aromatase is found in a structure involved in protein production, processing, and transport (the *endoplasmic reticulum*). Aromatase is found in the ovaries, placenta, testis, fat tissue, brain, liver, muscles, and hair follicles [R, R, R].

By controlling estrogen production, *CYP19A1* affects a variety of processes in the body, such as:

- Sexual development [R]
- Fat production and distribution [R]
- Bone density [R]
- Female fertility [R]
- Brain function and development [R]

About 1-2% of the variation in estrogen levels is determined by *CYP19A1* variation [R].

SNP

rs700519

Alleles

A: Reduced CYP19A1 activity

G: Typical CYP19A1 activity

Your Genotype

↓ AA

Your genotype is linked to reduced CYP19A1 activity and better reproductive health

Intro and Health Effects

One of the best-characterized *CYP19A1* variants is **rs700519**, also known as Arg264Cys. Its minor 'A' allele may decrease aromatase activity [R].

This variant has been associated with a **decreased risk** of:

- Breast cancer [R, R, R]
- Endometriosis [R]
- Endometrial cancer (in normal-weight women) [R]

SNP	Your Genotype
rs4646 Alleles **A:** Reduced CYP19A1 activity **C:** Increased CYP19A1 activity	↑CC **Your genotype is linked to increased CYP19A1 activity and worse reproductive health**

Intro and Health Effects

Another well-researched variant is **rs4646**, whose minor 'A' allele may also reduce aromatase activity, resulting in higher estrogen levels [R, R].

This variant has been associated with a better response to aromatase inhibitors in breast cancer patients, including longer time-to-progression, fewer adverse effects, and better blood lipid profile in carriers [R, R, R, R, R, R, R, R, R].

In addition, the variant has been associated with a decreased risk of:

- Stroke [R]
- Migraines [R]

SNP	Your Genotype
rs10046 Alleles **A:** Reduced CYP19A1 activity **G:** Increased CYP19A1 activity	↑GG **Your genotype is linked to increased CYP19A1 activity and worse reproductive health**

Intro and Health Effects

Finally, the minor 'A' allele of **rs10046**, presumably **reducing** aromatase activity, has been associated with higher estradiol levels [R, R].

This variant has also been associated with a **decreased risk** of:

- Breast cancer [R, R]
- Heart disease (ASCVD) [R]
- Miscarriage [R]

In contrast, this allele has been associated with an increased risk of endometrial cancer [R].

CYP1A1

CYP1A1 Report

The CYP1A1 gene encodes cytochrome P450 1A1, a member of the cytochrome P450 monooxygenase superfamily of enzymes. These proteins eliminate most drugs from the body [R, R, R].

This enzyme helps clear toxins that are released from burning coal, oil, gasoline, trash, tobacco, wood, and charcoal-broiled meat. However, it may “activate” some of these compounds, such as polycyclic aromatic hydrocarbons (PAHs), N-nitrosamines, and aflatoxin B1, and turn them into cancer-causing chemicals [R, R].

CYP1A1 also metabolizes **estrogen** outside the liver [R].

SNP	Your Genotype
rs4646903 CYP1A1*4 Alleles **A:** typical CYP1A1 activity and detox ability **G:** increased CYP1A1 activity and altered detox ability	**AA** **Your genotype is linked to typical CYP1A1 activity and detox ability**

Intro and Health Effects

The ‘G’ allele of rs4646903 is linked to higher CYP1A1 levels. It may increase the conversion of **PAHs, pesticides, and xenoestrogens** into **more toxic** metabolites. Studies have linked this variant to:

- Leukemia [R, R]
- Cervical cancer [R]
- Head and neck cancer [R]
- Laryngeal cancer [R]
- Liver cancer [R]
- Lung cancer [R, R]
- Prostate cancer [R]
- Breast cancer [R, R]
- PCOS [R]
- Recurrent pregnancy loss [R]
- Male infertility [R]

However, this variant has also been associated with a decreased risk of colorectal cancer [R, R].

SNP

rs1048943 CYP1A1*2A

Alleles

C: increased CYP1A1 activity and production of toxic metabolites

T: typical CYP1A1 activity and production of toxic metabolites

Your Genotype

TT

Your genotype is linked to typical CYP1A1 activity and detox ability

Intro and Health Effects

The ‘C’ allele of rs1048943 is linked to higher CYP1A1 levels. It may increase the conversion of **PAHs, pesticides, and xenoestrogens** into **more toxic** metabolites. Studies have linked this variant to:

- Lung cancer (especially in smokers) [R, R, R]
- Leukemia [R]
- Oral cancer [R]
- Laryngeal cancer [R]
- Liver cancer [R]
- Colorectal cancer [R]
- Cervical cancer [R]
- Prostate cancer [R]

HSD11B1

HSD11B1 Report

The *HSD11B1* gene encodes **11β-hydroxysteroid dehydrogenase type 1 (11β-HSD1)**, an enzyme that **regenerates active cortisol from inactive cortisone inside tissues** (notably liver and adipose) [R].

Besides controlling the stress response, cortisol can affect glucose and fat metabolism. High cortisol levels are associated with abdominal obesity and insulin resistance, the key features of metabolic syndrome [R, R].

In turn, metabolic syndrome contributes to acne development. Elevated insulin and excess fat tissue can stimulate sebum production and worsen skin inflammation [R, R, R].

Steroid acne is caused by high cortisol and other corticosteroids. People with acne tend to have higher cortisol blood levels [R, R].

SNP	Your Genotype
rs846910 Alleles **A:** Lower HSD11B1 activity **G:** Typical HSD11B1 activity	↓GA **Your genotype is linked to lower HSD11B1 activity and cortisol levels**

Intro and Health Effects

The best-characterized *HSD11B1* variant is **rs846910**. It's rare 'A' allele may decrease *HSD11B1* expression in the fatty tissue, although the evidence is mixed. This variant has been associated with [R, R, R]:

- Decreased risk of insulin resistance [R, R]
- Lower BMI [R, R]
- Lower cortisol levels [R]
- Higher HDL and lower LDL levels [R, R]

SNP	Your Genotype
rs12086634 Alleles **G:** Excessive HSD11B1 activity **T:** Normal HSD11B1 activity	TT **Your genotype is linked to typical HSD11B1 activity and cortisol levels.**

Intro and Health Effects

Another well-researched variant is **rs12086634**. Its minor ‘G’ allele has been associated with:

- Increased risk of acne [R]
- Increased risk of metabolic syndrome and type 2 diabetes [R, R, R]
- Higher blood glucose levels [R]
- Higher BMI [R]
- Higher total and LDL but lower HDL cholesterol levels [R]
- Higher cortisol levels [R]

HSD17B1

HSD17B1 Report

The HSD17B1 gene encodes the enzyme 17β-hydroxysteroid dehydrogenase 1 (17β-HSD1), which catalyzes the conversion of the weak estrogen estrone (E1) into the potent estrogen estradiol (E2) and interconverts androgens and estrogens [R, R].

This conversion is a key step in local and systemic estrogen metabolism, especially in reproductive tissues such as the ovaries, endometrium, breast, and placenta. Changes in HSD17B1 activity may influence estrogen exposure and estrogen-dependent traits and conditions [R].

SNP	Your Genotype
rs605059 Ser312Gly Alleles **A:** Increased HSD17B1 activity **G:** Reduced HSD17B1 activity	AG **Your genotype is linked to typical HSD17B1 activity and reproductive health.**

Intro and Health Effects

The main HSD17B1 variant is rs605059 (also called Ser312Gly). Its minor 'G' allele encodes a protein with **decreased activity,** resulting in lower estradiol levels (especially in men) and higher testosterone levels (especially in women). This variant has been associated with a **decreased risk** of [R, R]:

- Breast cancer [R]
- Endometriosis [R]
- Cervical cancer [R]
- Uterine fibroids [R]
- Alzheimer's disease (in women with Down's syndrome) [R]

However, some of the effects of this variant are mixed or contradictory. For example, it has been associated with an increased risk of [R, R].

- Miscarriage [R]
- Colorectal cancer [R]

MTHFR

MTHFR Report

The MTHFR gene helps make an enzyme called methylenetetrahydrofolate reductase (MTHFR) [R].

MTHFR helps process folate (vitamin B9). Folate plays a role in [R, R, R, R]:

- DNA production
- Red blood cell production
- Normal fetal development
- Brain and heart health
- Clearing homocysteine, a protein breakdown product
- Supporting **estrogen metabolism** through methylation

Variants in the MTHFR gene can change how the enzyme functions. Two of the most widely studied variants reduce MTHFR enzyme activity [R, R, R, R].

SNP

rs1801133 C677T

Alleles

A: Reduced MTHFR activity and methylation ability

G: Normal MTHFR activity and methylation ability

Your Genotype

↓GA

Your genotype is linked to slightly reduced MTHFR activity and methylation ability.

Intro and Health Effects

The most common MTHFR SNP is rs1801133 (C677T). The 'A' variant of this SNP decreases the activity of the MTHFR enzyme. People with two 'A' variants may have about 16% lower blood folate levels ('A' equals 'T' on the opposite DNA strand) [R]. Studies found links between this variant, higher homocysteine, and [R, R, R, R, R, R]:

- Cognitive problems
- Heart disease and stroke
- Asthma and allergies
- Fertility and pregnancy issues
- Birth defects
- Mental health issues
- Migraines

SNP

rs1801131 A1298C

Alleles

G: Slightly reduced MTHFR activity and methylation ability

T: Normal MTHFR activity and methylation

Your Genotype

TT

Your genotype is linked to normal MTHFR activity and methylation ability

Intro and Health Effects

MTHFR **rs1801131 or A1298C** variant causes Glu429-to-Ala substitution.

It also decreases MTHFR enzyme activity, but less so than rs1801133. The effects of this variant may only be meaningful in people who also have the “AA” genotype at rs1801133 [R, R, R, R, R].

However, according to some authors, the GG genotype results in 30-40% reduction in MTHFR enzyme activity, regardless of the other MTHFR variant [R].

PGR

PGR Report

The *PGR* gene encodes a member of the steroid receptor superfamily that mediates the effects of the hormone progesterone [R].

In women, progesterone helps regulate the menstrual cycle and helps prepare the body for pregnancy. In men, progesterone is involved in the development of sperm [R, R].

The gene encodes two isoforms of the receptor, PR-A and PR-B, with largely non-overlapping functions. For instance, PR-A inhibits epithelial cell proliferation in response to estrogen or estrogen plus progesterone, while PR-B promotes it [R, R, R].

SNP	Your Genotype
rs10895068 Alleles **C:** Normal PGR activity **T:** Excessive PGR activity	CC **Your genotype is linked to normal PGR activity and typical risk of reproductive issues.**

Intro and Health Effects

The main *PGR* gene variant is **rs10895068**, commonly referred to as +331G/A. Its minor 'T' allele selectively increases the expression of the PR-B isoform. This variant has been associated with an increased risk of [R]:

- Ovarian cancer [R]
- Endometrial cancer [R]
- Uterine fibroids [R]
- Implantation failure during in vitro fertilization [R]
- Preeclampsia [R]

On the bright side, this allele has been associated with a reduced risk of ovarian hyperstimulation syndrome and endometriosis [R, R].

SHBG

SHBG Report

The SHBG gene encodes SHBG (sex hormone-binding globulin), a protein made in the liver that binds to the steroid sex hormones androgens and estrogens, and helps transport them in the blood. Hence, SHBG controls the levels of sex hormones [R, R, R, R].

Variants in this gene have been associated with:

- PCOS [R, R]
- Type 2 diabetes [R, R]
- Breast cancer [R]

SNP	Your Genotype
rs6259 Asp327Asn Alleles **A:** Higher SHBG activity **G:** Typical SHBG activity	GG **Your genotype is linked to typical SHBG activity and reproductive health**

Intro and Health Effects

One of the best-characterized SHBG polymorphisms is rs6259, commonly referred to as Asp327Asn. Its minor 'A' allele encodes an alternative version of the protein, resulting in **higher** SHBG levels [R, R, R].

This variant has been associated with a **decreased risk** of:

- Breast cancer in postmenopausal Asian women (but lower protective effects of soy isoflavones) [R, R, R]
- Type 2 diabetes (especially in those consuming at least 2 cups of coffee per day) [R, R, R]
- Metabolic syndrome [R]
- Liver cancer [R]
- Endometrial cancer (but lower protective effect of tea and soy isoflavones) [R]

On the other hand, it may be linked to lower BMD and biliary tract issues [R, R].

SNP	Your Genotype
rs1799941 Alleles **A:** Higher SHBG activity **G:** Typical SHBG activity	GG **Your genotype is linked to typical SHBG activity and reproductive health**

Intro and Health Effects

Another well-researched polymorphism is rs1799941. Its minor 'A' allele has been associated with **higher** SHBG levels, as well as with [R, R, R, R, R]:

- Decreased risk of metabolic syndrome [R]
- Decreased risk of type 2 diabetes [R, R]

On the other hand, it may be linked to Lower BMD [R].

SNP	Your Genotype
rs727428 Alleles **C:** Typical SHBG activity **T:** Lower SHBG activity	↓TT **Your genotype is linked to lower SHBG activity and worse reproductive health**

Intro and Health Effects

The minor 'T' allele of rs727428 may **decrease** SHBG levels and has been associated with [R, R, R]:

- Increased risk of PCOS [R, R]
- Higher testosterone levels [R, R, R]
- Lower estradiol levels [R, R]

SULT1A1

SULT1A1 Report

The SULT1A1 gene encodes an enzyme known as sulfotransferase 1A1. SULT1A1 plays a crucial role in the phase II metabolism of drugs, foreign substances, hormones, and more [R].

This enzyme is primarily involved in sulfation, an important detoxification pathway. It helps eliminate certain toxins and metabolites, including estrogen metabolites, by making them water-soluble. On the other hand, it may turn some toxins into even more harmful metabolites [R].

Enhancers:

Sulforaphane Resveratrol

SNP	Your Genotype
rs1042028 SULT1A1*2 Alleles **C:** Increased SULT1A1 activity **T:** Reduced SULT1A1 activity	↑CC **Your genotype is linked to increased SULT1A1 activity and altered detox ability**

Intro and Health Effects

A variant in this gene, known as SULT1A1*2, may reduce its activity. People with the “T” allele at rs1042028 (previously named rs9282861) carry this variant [R].

SULT1A1 is a double-edged sword when it comes to detox.

In theory, lower SULT1A1 activity may increase the toxicity of some compounds present in smoke, like polycyclic aromatic hydrocarbons (PAHs). On the other hand, it should be protective against some other toxins, like heterocyclic amines (HAs) [R, R].

In line with this, some studies have linked the lower-activity variant, SULT1A1*2 (rs1042028-T), to:

- Higher odds of stomach, lung, and colon cancers in smokers [R, R, R]
- Higher odds of breast cancer in those who eat more smoked meat [R]

However, other studies have linked this variant to lower odds of prostate, bladder, colon, and oral cancers in smokers [R, R, R, R].

SULT2A1

SULT2A1 Report

The *SULT2A1* gene encodes the sulfotransferase 2A1. Sulfotransferases play a crucial role in the phase II metabolism of drugs, foreign substances, hormones, and more, through a specific detox pathway called **sulfation**. It helps eliminate certain toxins and metabolites by making them water-soluble. On the other hand, sulfation may turn some toxins into even more toxic metabolites [R].

Importantly, SULT2A1 helps convert steroid hormones (especially **DHEA**) into **DHEA-S (DHEAS)**, a more water-soluble "storage/transport" form that circulates at high levels in blood [R, R].

Enhancers:

Sulforaphane Magnesium

SNP	Your Genotype
rs2637125 Alleles **A:** Reduced SULT2A1 activity **G:** Typical SULT2A1 activity	GG **Your genotype is linked to typical SULT2A1 activity and DHEA metabolism**

Intro and Health Effects

Another variant that presumably decreases SULT2A1 activity is the minor 'A' allele of **rs2637125**. This allele has also been associated with lower DHEA-S levels in specific populations such as adolescent boys and rheumatoid arthritis patients [R, R, R].

SNP	Your Genotype
rs182420 Alleles **C:** Reduced SULT2A1 activity **T:** Typical SULT2A1 activity	TT **Your genotype is linked to typical SULT2A1 activity and DHEA metabolism**

Intro and Health Effects

One of the main *SULT2A1* variants is **rs182420**. Its minor 'C' allele has been associated with lower DHEA-S (in adolescent boys and women with PCOS) and androsterone sulfate levels, suggesting decreased SULT2A1 activity [R, R, R].

This variant has also been associated with higher SHBG levels [R].

UGT1A1

UGT1A1 Report

The UGT1A1 gene encodes an enzyme called UGT (short for UDP-glucuronosyltransferase). This enzyme is responsible for performing a chemical reaction called glucuronidation, which is an important step in the body's detox process [R].

Some important targets of UGT include:

- Bilirubin, a waste product from the breakdown of red blood cells [R]
- BPA plastics [R]
- **Estrogen** and other steroid hormones [R]
- Medications: up to 15% of all FDA-approved drugs, according to some estimates [R]

Enhancers:

Sulforaphane

SNP

rs4148323 UGT1A1*6

Alleles

A: Reduced UGT1A1 activity and detox ability

G: Typical UGT1A1 activity and detox ability

Your Genotype

GG

Your genotype is linked to typical UGT1A1 activity and detox ability

Intro and Health Effects

The ***UGT1A1*6*** (rs4148323-A) variant reduces enzyme activity and detox ability. Studies have linked it to [R]:

- High **bilirubin** in adults and bilirubin toxicity in infants [R, R, R, R, R]
- Adverse congenital effects of **PAHs** exposure [R]
- Adverse reactions to certain drugs [R]

SNP

rs6742078 UGT1A1*27

Alleles

G: Typical UGT1A1 activity

T: Reduced UGT1A1 activity

Your Genotype

TG

Your genotype is linked to typical UGT1A1 activity and detox ability.

Intro and Health Effects

Other variants include ***UGT1A1*27*** (rs6742078), which also lowers enzyme activity, leading to a reduced ability to detox. All of these variations in *UGT1A1* can lead to toxicity disorders and potentially impair estrogen clearance. The minor variants of UGT1A1*27 and UGT1A1*28 are usually inherited together [R].

The minor ‘T’ variant of UGT1A1*27 has been linked to:

- High bilirubin in adults [R, R]
- Increased risk of gallstones [R, R]

COMT

COMT Report

The COMT gene helps make an enzyme called catechol-O-methyltransferase (COMT). The COMT enzyme helps break down chemical messengers in the body. These include [R, R, R]:

- Dopamine
- Norepinephrine (noradrenaline)
- Epinephrine (adrenaline)

Dopamine triggers feelings of pleasure and reward. It is also important for many cognitive functions, such as memory and attention. Norepinephrine and epinephrine support the “fight or flight” stress response [R, R, R, R, R].

In addition, COMT helps break down other compounds such as **estrogen byproducts** [R, R].

The activity of the COMT enzyme may influence [R, R, R, R, R]:

- Stress response
- Mental health and cognition
- Hormone balance

Enhancers:

EGCG (green tea) SAMe

SNP

rs4680

Alleles

A: Lower COMT activity

G: Higher COMT activity

Your Genotype

↑ GG

Your genotype is linked to higher COMT activity and potentially faster estrogen clearance.

Intro and Health Effects

One common variant of the COMT gene, rs4680, may affect COMT enzyme activity. Some people call rs4680 the “worrier or warrior” variant [R, R].
People with two copies of the “A” allele (AA) may have lower COMT enzyme activity. They have been nicknamed the “worriers.” They break down stress-related chemical messengers more slowly in the brain. For this reason, they may be more vulnerable to stress [R, R, R, R].
Given the key role of COMT in estrogen metabolism, this variant may also slow down the clearance of estradiol metabolites.

CRHR2

CRHR2 Report

The CRHR2 gene encodes a receptor for CRH, the first hormone of the HPA axis. Stress activates the HPA axis, resulting in cortisol release [R, R].

CRH receptors play a significant role in stress response and related disorders. Contrary to CRHR1, the activation of CRHR2 receptors reduces anxiety, arousal, and depression [R, R, R].

People with stress-related conditions such as PTSD tend to have excess CRHR1 and lower CRHR2 activity, resulting in HPA axis dysfunction [R, R].

SNP	Your Genotype
rs2267715 Alleles **A:** Lower CRHR2 activity **G:** Higher CRHR2 activity	○ AG **Your genotype is linked to typical CRHR2 activity and stress control.**

Intro and Health Effects

A study of 491 veterans exposed to trauma and their partners associated the 'A' allele of rs2267715 and rs2190242 with an increased risk of PTSD in women. The study speculated that both variants may decrease CRHR2 activity, thereby stimulating the stress response [R].

The rs2267715 variant was associated with PTSD symptom severity in a study of 1132 earthquake survivors [R].

SNP	Your Genotype
rs2190242 Alleles **A:** Lower CRHR2 activity **C:** Higher CRHR2 activity	↑ AC **Your genotype is linked to typical CRHR2 activity and stress control.**

Intro and Health Effects

A study of 491 veterans exposed to trauma and their partners associated the ‘A’ allele of rs2267715 and rs2190242 with an increased risk of PTSD in women. The study speculated that both variants may decrease CRHR2 activity, thereby stimulating the stress response [R].

ESR1

ESR1 Report

The ESR1 gene encodes ERα, a nuclear hormone receptor that regulates the expression of genes involved in various physiological processes, including reproductive health, bone density, cardiovascular function, and cancer development [R, R].

Estrogen binding to ERα influences gene expression, impacting cell growth, differentiation, and metabolism [R, R].

Variations in the ESR1 gene can affect receptor function and estrogen signalling, leading to differences in health outcomes [R].

SNP	Your Genotype
rs2234693 -397T>C or PvuII Alleles **C:** Increased ESR1 activity **T:** Reduced ESR1 activity	CT **Your genotype is linked to balanced ESR1 activity and reproductive health**

Intro and Health Effects

The two main ESR1 variants are rs2234693 (-397T>C or PvuII) and rs9340799 (-351A>G or XbaI). They are often inherited together, meaning you will likely carry either none or both.

Their “C” and “G” alleles, respectively, may be linked to the following **negative** health outcomes:

- Endometriosis [R]
- Breast cancer [R, R]
- Depression [R]

On the other hand, they may be linked to the following positive health outcomes:

- Stronger bones (higher BMD) [R, R, R]
- Slower cognitive decline (only in European ancestry) [R]
- Lower odds of anxiety (phobia) [R]
- Better cardiovascular health [R]

Expectedly, the effects of these variants are more pronounced in women. According to most of the above associations and some lab experiments, they **increase** ESR1 expression, leading to more pronounced effects of estrogen [R].

However, some studies have found no links – or even opposite links – of these variants with most of the above health outcomes. They may be partly explained by different results in people of Asian vs European ancestry [R, R, R, R, R, R, R].

SNP

rs9340799 -351A>G or Xbal

Alleles

A: Reduced ESR1 activity

G: Increased ESR1 activity

Your Genotype

GA

Your genotype is linked to balanced ESR1 activity and reproductive health

Intro and Health Effects

The two main ESR1 variants are rs2234693 (-397T>C or Pvull) and rs9340799 (-351A>G or Xbal). They are often inherited together, meaning you will likely carry either none or both.

Their “C” and “G” alleles, respectively, may be linked to the following **negative** health outcomes:

- Endometriosis [R]
- Breast cancer [R, R]
- Depression [R]

On the other hand, they may be linked to the following positive health outcomes:

- Stronger bones (higher BMD) [R, R, R]
- Slower cognitive decline (only in European ancestry) [R]
- Lower odds of anxiety (phobia) [R]
- Better cardiovascular health [R]

Expectedly, the effects of these variants are more pronounced in women. According to most of the above associations and some lab experiments, they **increase** ESR1 expression, leading to more pronounced effects of estrogen [R].

However, some studies have found no links – or even opposite links – of these variants with most of the above health outcomes. They may be partly explained by different results in people of Asian vs European ancestry [R, R, R, R, R, R, R].

ESR2

ESR2 Report

The **ESR2** gene encodes estrogen receptor β (ERβ), one of the two main nuclear receptors that mediate estrogen signaling in tissues such as the prostate, ovary, bone, and cardiovascular system [R, R, R].

ERβ plays roles in regulating cell growth, differentiation, and apoptosis in estrogen-responsive tissues. Genetic variation in ESR2 may influence how cells respond to estrogen, potentially modifying risk for hormone-related traits such as cancer susceptibility, bone density, and cardiovascular health [R].

SNP

rs1256049

Alleles

C: Typical ESR2 activity

T: Reduced ESR2 activity

Your Genotype

↑ CC

Your genotype is linked to higher ESR2 activity and better reproductive health.

Intro and Health Effects

The best-characterized *ESR2* variant is **rs1256049**. Its minor **'T' allele** does not change the amino acid sequence of the protein, but may alter transcript regulation and **decrease** estrogen receptor β production. This variant has been associated with:

- Generalized anxiety disorder [R]
- Osteoporosis [R]
- Precocious puberty [R]

SNP

rs4986938

Alleles

C: Reduced ESR2 activity

T: Increased ESR2 activity

Your Genotype

○ CT

Your genotype is linked to typical ESR2 activity and reproductive and mental health

Intro and Health Effects

Another well-researched variant is **rs4986938**. Its minor ‘T’ allele also encodes a protein with the same sequence, but the change in the DNA sequence may **increase** *ESR2* expression. This allele has been associated with **a decreased risk** of [R]:

- Breast cancer [R, R]
- Dementia [R]

FKBP5

FKBP5 Report

The FKBP5 gene encodes FK506 binding protein 5, or FKBP prolyl isomerase 5, an immune system protein that helps regulate many basic cellular processes and also plays key roles in the stress response. It regulates the sensitivity of glucocorticoid receptors, meaning that it may alter the way that stress hormones affect the body [R, R, R].

Excess FKBP5 activity may reduce your ability to recover from stressful events. It's been associated with stress-related psychiatric disorders like [R, R, R]:

- PTSD
- Depression
- Bipolar disorder

SNP	Your Genotype
rs3800373 Alleles **A:** Lower FKBP activity **C:** Excessive FKBP5 activity	↓ AA **Your genotype is linked to lower FKBP5 activity and better stress control.**

Intro and Health Effects

Some variants increase FKBP5 expression and impair stress response. People carrying the risk alleles have a harder time recovering from childhood or early life traumas, leading to increased severity of PTSD. They include [R, R, R]:

- 'C' at rs3800373

SNP	Your Genotype
rs1360780 Alleles **C:** Lower FKBP activity **T:** Excessive FKBP5 activity	↓ CC **Your genotype is linked to lower FKBP5 activity and better stress control.**

Intro and Health Effects

Some variants increase FKBP5 expression and impair stress response. People carrying the risk alleles have a harder time recovering from childhood or early life traumas, leading to increased severity of PTSD. They include [R, R, R]:

- ‘T’ at rs1360780

SNP	Your Genotype
rs9470080	↓CC
Alleles **C:** Lower FKBP activity **T:** Excessive FKBP5 activity	**Your genotype is linked to lower FKBP5 activity and better stress control.**

Intro and Health Effects

Some variants increase FKBP5 expression and impair stress response. People carrying the risk alleles have a harder time recovering from childhood or early life traumas, leading to increased severity of PTSD. They include [R, R, R]:
‘T’ at rs9470080

Lab markers to check

16-OH-E1 (DUTCH)

Personalized to Your Genes

↓ CYP3A4

The main product of CYP3A4 clearance.

2-Methoxy-E1 (DUTCH)

2-Methoxy-E2 (DUTCH)

2-OH-E1 (DUTCH)

Personalized to Your Genes

↓ CYP1A2

Reflects phase I metabolism status.

4-OH-E1 (DUTCH)

Personalized to Your Genes

↑ CYP1B1

Reflects CYP1B1 metabolism status.

4-OH-E2 (DUTCH)

Personalized to Your Genes

↑ CYP1B1 Reflects CYP1B1 metabolism status.

8-OHdG (Waking) (DUTCH)

Personalized to Your Genes

↓ GSTP1 Marker of oxidative DNA damage.

Bilirubin, Total

Cholesterol, Total

Cortisol

Personalized to Your Genes

CRHR1 Maps daily HPA rhythm.

DHEA Sulfate

DHEA-S, Saliva

Personalized to Your Genes

CRHR1 — Assesses adrenal reserve.

DHT

Estradiol

Personalized to Your Genes

↓ CYP1A2 — May accumulate if clearance is impaired.

↑ CYP1B1 — May be lower if clearance is enhanced.

↓ CYP3A4 — May accumulate if clearance is impaired.

CYP19A1 — Measures estrogen levels.

Estriol

Personalized to Your Genes

↓ CYP3A4 — The main product of CYP3A4 clearance.

Estrone

Personalized to Your Genes

CYP19A1

Reflects aromatization activity.

Reflects aromatization activity.

Folate, RBC

GGT

Personalized to Your Genes

↓ GSTP1

Surrogate marker of glutathione status.

Hemoglobin A1c

HOMA-IR

Homocysteine

Personalized to Your Genes

↑ CYP1B1

Indicates methylation efficiency.

hs-CRP

Personalized to Your Genes

CRHR1

Chronic stress often elevates inflammation.

Insulin, Fasting

Personalized to Your Genes

SHBG

Insulin suppresses SHBG production.

Magnesium, RBC

Malondialdehyde

Personalized to Your Genes

↓ GSTP1

A marker of oxidative stress.

Pregnenolone

Progesterone

SHBG

Personalized to Your Genes

CYP19A1 — Indicates estrogen bioavailability.

SHBG — Direct measure of binding capacity.

Testosterone, Free (Direct / Labcorp)

Personalized to Your Genes

SHBG — Reflects androgen exposure when SHBG is low.

Testosterone, Total

Total Glutathione

Personalized to Your Genes

↓ GSTP1 — Direct marker of glutathione status.

Vitamin B12

Vitamin D, 25-Hydroxy, Total

Glossary

16alphaOH-E1
A metabolite of estrone formed through the 16α-hydroxylation pathway. Often associated with stronger estrogenic effects in tissues.

17-OH Pregnenolone
A hydroxylated form of pregnenolone that serves as a key intermediate directing hormone production toward cortisol or androgens.

17-OH Progesterone
An intermediate steroid formed from progesterone, used in cortisol and androgen synthesis.

2MeOH-E1
A methylated estrogen metabolite derived from 2OH-estrone. Generally considered a less reactive, safer estrogen form.

2MeOH-E2
A methylated metabolite of 2OH-estradiol, produced to support estrogen detoxification and clearance.

2OH-E1
A metabolite of estrone formed via the 2-hydroxylation pathway. Often considered a less potent estrogen.

2OH-E2
A metabolite of estradiol produced through the 2-hydroxylation pathway, typically associated with reduced estrogen activity.

4MeOH-E1/2
Methylated metabolites of 4-hydroxy estrogens that help reduce the reactivity of potentially harmful estrogen intermediates.

4OH-E1
A reactive estrogen metabolite of estrone that can form estrogen quinones if not properly detoxified.

4OH-E2
A reactive metabolite of estradiol that may contribute to oxidative stress if not cleared efficiently.

Androgen
A class of hormones that includes testosterone and DHT, supporting muscle mass, libido, energy, and motivation.

Androstenedione
An androgen precursor that can be converted into testosterone or estrone.

Conjugated Androgens
Androgens that have been chemically modified (e.g., glucuronidated or sulfated) to support detoxification and excretion.

Conjugated Estrogens
Estrogens that have been bound to sulfate or glucuronic acid, making them easier to eliminate from the body.

Cortisol
A primary stress hormone that regulates metabolism, inflammation, blood sugar, and immune response.

Cortisone
An inactive form of cortisol that can be converted back into active cortisol as needed.

DHEA (Dehydroepiandrosterone)
A steroid hormone produced by the adrenal glands that serves as a precursor to androgens and estrogens.

DHEA-S
A sulfated storage form of DHEA that circulates in the blood and can be converted back into active DHEA.

DHT (Dihydrotestosterone)
A potent androgen derived from testosterone that strongly activates androgen receptors in certain tissues.

Estrogen Quinones
Highly reactive estrogen metabolites that can damage DNA if not neutralized by detoxification pathways.

Estradiol (E2)
The most biologically active estrogen, influencing reproductive function, bone health, mood, and cardiovascular health.

Estriol (E3)
A weaker estrogen mainly produced during pregnancy and through estrogen metabolism pathways.

Estrone (E1)
A primary estrogen produced after menopause and from peripheral conversion of androgens.

GSH Conjugates
Detoxified estrogen metabolites bound to glutathione, allowing safe elimination and reducing oxidative stress.

Pregnenolone
The first steroid hormone made from cholesterol and the starting point for cortisol, androgen, and estrogen synthesis.

Progesterone
A steroid hormone involved in reproductive health, stress balance, and serving as a precursor to cortisol and androgens.

Steroid
A class of hormones derived from cholesterol that regulate stress response, reproduction, metabolism, and immune function.

Testosterone, Free
The unbound, biologically active form of testosterone available to enter tissues and activate receptors.

Testosterone, Total
The total amount of testosterone in circulation, including both free and protein-bound forms.