

Male Hormones Pathway

Sample Client

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Personal information

NAME

Sample Client

SEX AT BIRTH

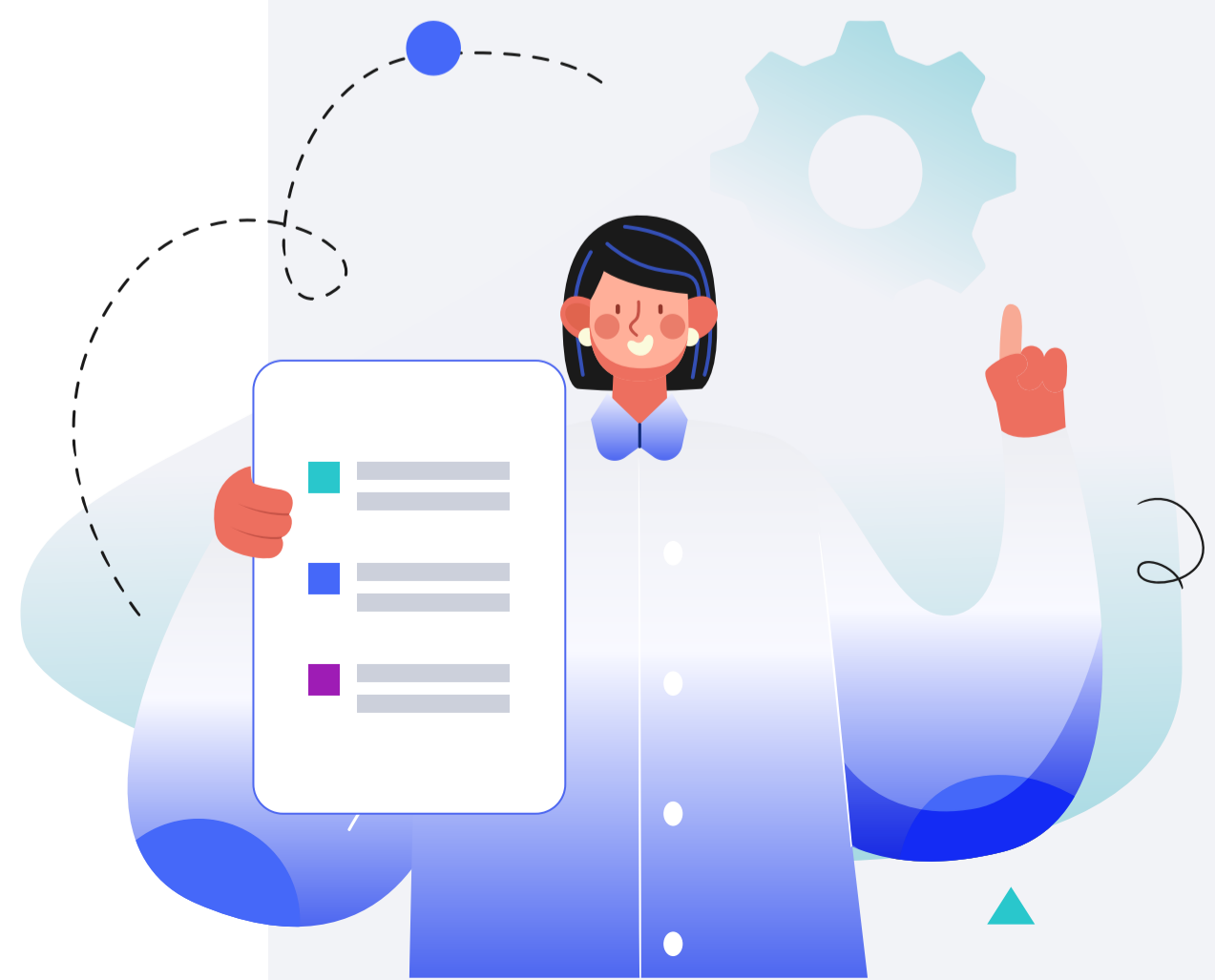
Male

HEIGHT

5ft 6" 167cm

WEIGHT

123lb 56kg



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

Male sex hormones form a dynamic biochemical network that regulates muscle growth, energy levels, mood, libido, fertility, and overall metabolic health. Testosterone and its more potent derivative, dihydrotestosterone (DHT), play central roles in these processes, influencing everything from physical performance and body composition to brain function and reproductive health. Because these hormones act across multiple systems, imbalances in their production, activation, or breakdown can have wide-ranging effects.

The pathway begins with precursor steroid hormones, which are gradually converted into androgens through a series of enzyme-driven steps. Enzymes such as **HSD3B1** help guide the early stages of androgen synthesis, ensuring the proper production of key intermediates that ultimately lead to testosterone. From there, testosterone serves as a central hub in the pathway, ready to be activated, transported, or further metabolized depending on the body's needs.

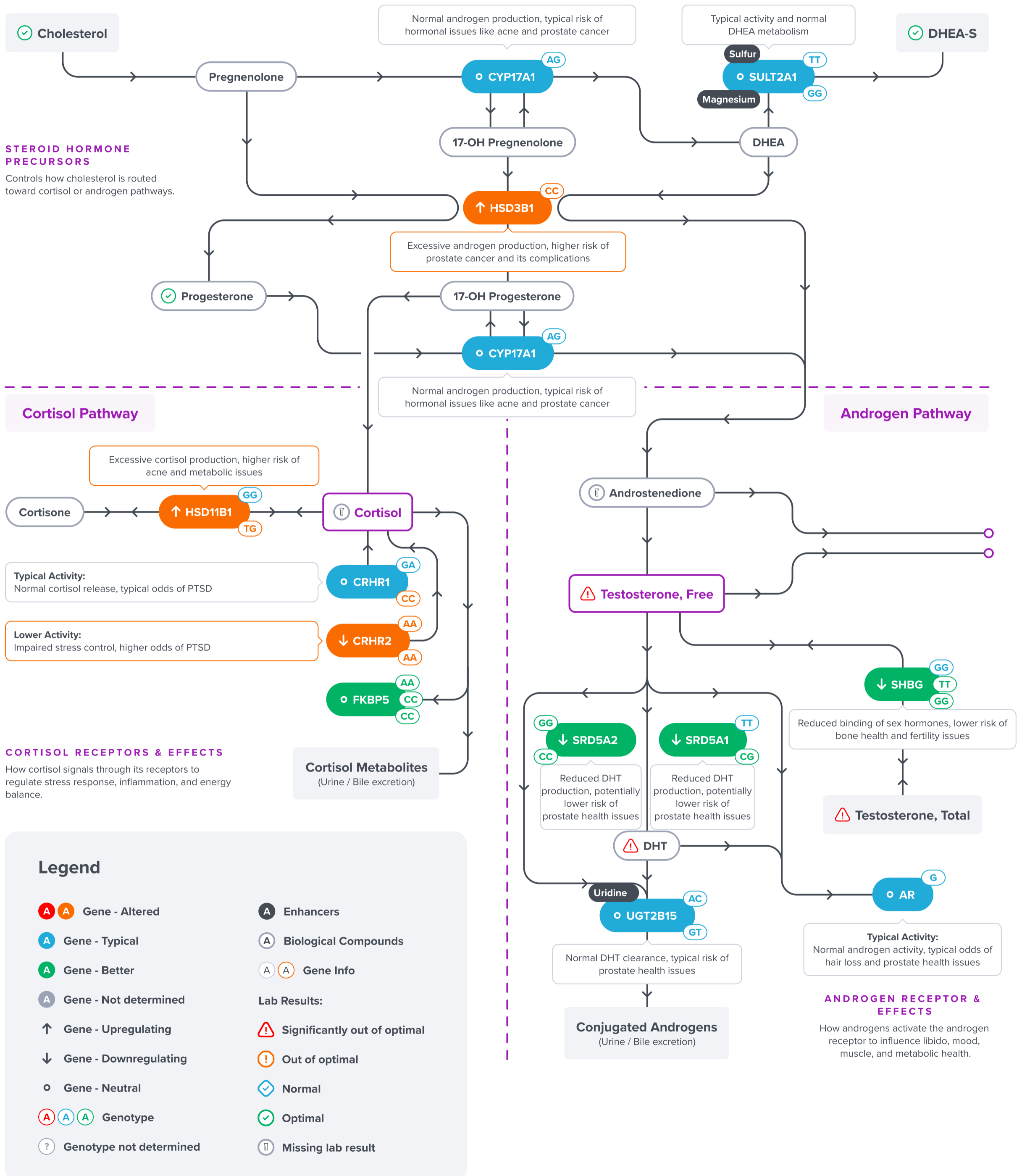
A critical step in androgen activity is the conversion of testosterone into dihydrotestosterone (DHT), a more potent hormone that strongly influences tissues such as the prostate, skin, and hair follicles. This conversion is carried out by enzymes encoded by **SRD5A1** and **SRD5A2**. Variations in these genes can significantly impact DHT levels, shaping traits such as hair growth patterns, prostate health, and overall androgen sensitivity.

Finally, the body must efficiently break down and eliminate excess hormones to maintain balance. Enzymes such as **UGT2B15** play a key role in androgen detoxification by converting active hormones into forms that can be excreted. Additional detoxification pathways further regulate hormone metabolites, ensuring that both androgens and estrogens are cleared appropriately. Differences in these pathways can affect how long hormones remain active in the body, contributing to variations in hormone levels and downstream health outcomes.

Although often associated with female biology, estrogens also play essential roles in male health. A portion of testosterone is converted into estradiol through the action of aromatase (**CYP19A1**), contributing to bone density, brain function, cardiovascular health, and hormonal feedback regulation. Estrogen activity is further shaped by enzymes and receptors such as **HSD17B1**, **ESR1**, and **ESR2**, which influence how estrogens are activated and how strongly cells respond to them. Imbalances in this androgen–estrogen interplay can affect everything from mood and fat distribution to fertility and long-term metabolic health.

This report analyzes your genetic variants across the male hormone pathways, shedding light on how your body produces, activates, converts, responds to, and clears key sex hormones. By examining the specific SNPs that influence each stage—from androgen synthesis and DHT conversion to estrogen balance and detoxification—you can better understand your unique hormonal profile and implement more personalized strategies to support energy, performance, reproductive health, and long-term wellbeing.

Androgen & Cortisol Pathways



Results Overview

Steroid Hormone Precursors

Gene - SNP Summary

HSD3B1	rs1047303	↑ CC	CYP17A1	rs743572	○ AG	SULT2A1	rs182420	○ TT
							rs2637125	○ GG

Labs Summary

⚠ DHT	⚠ Testosterone, Total	⚠ PSA, Total
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Androgen Pathway

Gene - SNP Summary

AR	rs6152	○ G	UGT2B15	rs1902023	○ AC	SHBG	rs6259	○ GG
SRD5A1	rs1691053	○ TT		rs4148269	○ GT		rs1799941	↓ GG
	rs472402	↓ CG	SRD5A2	rs523349	↓ GG		rs727428	↓ TT
				rs9282858	↓ CC			

Cortisol Pathway

Gene - SNP Summary

CRHR2	rs2267715	↓ AA	HSD11B1	rs846910	○ GG	CRHR1	rs12938031	○ GA
	rs2190242	↓ AA		rs12086634	↑ TG		rs4792887	↑ CC
FKBP5	rs3800373	↓ AA						
	rs1360780	↓ CC						
	rs9470080	↓ CC						

Labs Summary

- Glucose, Fasting
- DHEA Sulfate
- Cortisol
- HOMA-IR
- HRV

Estrogen Pathway

Gene - SNP Summary

MTHFR	rs1801133	↓ AA	CYP19A1	rs700518	↓ CC	COMT	rs4680	○ AG
	rs1801131	○ TT		rs700519	○ GG		rs4646903	○ AA
CYP1B1	rs1056836	○ GG	CYP3A4	rs35599367	○ GG	CYP1A1	rs1048943	○ TT
ESR2	rs1256049	↑ CC		rs2740574	○ TT		SULT1A1	rs1042028
	rs4986938	↓ CC	UGT1A1	rs4148323	○ GG	CYP1A2	rs762551	↑ AA
ESR1	rs2234693	○ CT		rs6742078	○ GG	GSTP1	rs1695	↑ AA
HSD17B1	rs605059	↓ GG	SHBG	rs6259	○ GG		rs1138272	○ CC
				rs1799941	↓ GG			
				rs727428	↓ TT			

Labs Summary

- Estradiol
- Testosterone, Total
- Homocysteine
- Vitamin B12
- Folate, RBC

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		DOSAGE		
1	Curcumin	500 mg	2	Ashwagandha	120 mg
3	Avoid Low-Fat High-Carb Diets		4	Breathing Techniques	10 minutes
5	Cold Exposure	1 minutesute	6	Dietary Choline	
7	Intermittent Fasting		8	L-Theanine	100 mg
9	Limit Caffeine Intake		10	Magnesium Glycinate	200 mg
11	Methylfolate	400 mcg	12	Morning Bright Light Therapy	20 minutes
13	Omega-3 (Fish Oil)	2000 mg	14	Phosphatidylserine	300 mg
15	Plant Sterols & Stanols	300 mg	16	Regular Sleep Schedule	
17	Resveratrol	150 mg	18	Rhodiola	500 mg
19	Riboflavin (Vitamin B2)	25 mg	20	Saw Palmetto	320 mg
21	Sufficient Calorie Intake		22	Vitamin B12	100 mcg



Curcumin [↗](#)

How to implement

Take a 500 mg curcumin supplement daily with food. To enhance absorption, take it with a meal that contains fats or oils since curcumin is fat-soluble.

TYPICAL STARTING DOSE

500 mg

How it helps

Curcumin is the main bioactive compound found in turmeric. It has anti-inflammatory and antioxidant effects that may help support male hormone balance indirectly. Chronic inflammation can disrupt endocrine signaling by activating stress pathways, impairing insulin sensitivity, and increasing oxidative stress in tissues involved in hormone production. Elevated inflammation is also linked to obesity and metabolic dysfunction, which are major contributors to lower testosterone in men. Curcumin helps calm inflammatory pathways such as NF κB and may improve metabolic markers linked to hormone imbalance.

By lowering systemic inflammation and improving metabolic stability, curcumin can help create a more favorable internal environment for testosterone production and hormonal regulation, even if its effects are generally indirect rather than strongly hormone specific.

Personalized to Your Genes

↑ HSD11B1

Inhibits 11β-HSD1 activity

↑ HSD3B1

Modulates steroidogenic enzyme activity



Ashwagandha [↗](#)

How to implement

Take 250-600 mg of ashwagandha supplement daily. It can be consumed with water or a meal, depending on your preference or as advised by a healthcare provider.

TYPICAL STARTING DOSE

120 mg

How it helps

Ashwagandha is an adaptogenic herb traditionally used to support stress resilience and nervous system balance. Chronic stress activates the hypothalamic pituitary adrenal axis and increases cortisol levels. Elevated cortisol can suppress testosterone production by interfering with signaling between the brain and the testes and by shifting the body toward a more catabolic state. Some clinical studies in men suggest that ashwagandha may help reduce cortisol, improve stress markers, and increase testosterone levels, especially in men with chronic stress, subfertility, or reduced baseline androgen status. It may also support semen parameters and physical performance in some cases.

By helping regulate stress responses and reduce excessive cortisol burden, ashwagandha may indirectly and sometimes directly support healthier male reproductive hormone balance. Its effects vary between individuals, but compared with many other herbal interventions, it has relatively promising evidence in male populations.

Personalized to Your Genes

◦ CRHR1

Reduces CRH-driven cortisol



Avoid Low-Fat High-Carb Diets [↗](#)

How to implement

Opt for a diet that balances macronutrients rather than focusing on low fat and high carbohydrates. Include moderate to high amounts of healthy fats and proteins while choosing complex carbohydrates over simple ones. Aim to make this dietary adjustment a permanent part of your eating habits rather than a temporary diet.

How it helps

Testosterone and other steroid hormones are made from cholesterol, and adequate dietary fat intake is important for normal androgen production. When a diet is very low in fat and high in refined carbohydrates, it can shift the hormonal environment in an unfavorable direction. High carbohydrate intake, especially from sugar and refined grains, raises insulin levels and promotes insulin resistance over time. In men, chronic hyperinsulinemia is associated with lower sex hormone-binding globulin (SHBG), increased visceral fat accumulation, and a greater tendency to convert testosterone into estrogen through the aromatase enzyme found in fat tissue.

At the same time, very low fat intake may reduce the availability of key fatty acids and cholesterol needed for steroid hormone synthesis. A balanced diet that includes healthy fats, adequate protein, and moderate carbohydrate intake helps stabilize insulin, support healthy body composition, and provide the raw materials needed for normal testosterone production and

hormone balance.

Personalized to Your Genes

↑ CYP19A1

May further reduce hormone production



Breathing Techniques [↗](#)

How to implement

Practice deep breathing exercises for 10 minutes daily, preferably in a quiet space where you won't be disturbed. Sit or lie down in a comfortable position, slowly inhale through your nose, allowing your chest and lower belly to rise, hold the breath for a moment, and then exhale slowly through your mouth or nose. This can be done at any time of day to reduce stress and improve focus.

TYPICAL STARTING DOSE

10 minutes

How it helps

Structured breathing techniques, such as slow diaphragmatic breathing or resonance breathing, can help regulate the autonomic nervous system and reduce physiological stress responses. By shifting the body toward greater parasympathetic activity, breathing practices may lower heart rate, reduce perceived stress, and decrease excessive cortisol activation. In men, this is relevant because chronic stress and sympathetic overdrive can impair sleep, reduce recovery, and interfere with the hormonal signals that support testosterone production.

Breathing techniques do not directly change testosterone, but they can improve the physiological context in which hormones are regulated. They are especially useful for men whose stress is highly somatic, meaning it shows up as tension, poor sleep, restlessness, or poor recovery. As with mindfulness, their effect is indirect but practical and potentially meaningful when stress is an important contributor to hormonal imbalance.

Personalized to Your Genes

◦ CRHR1

Directly lowers HPA activation



Cold Exposure [↗](#)

How to implement

Gradually expose yourself to cold temperatures for short periods, starting with 1-2 minutes and increasing up to 5-10 minutes. This can be achieved through cold showers, outdoor exposure in cold weather, or ice baths. Aim to do this 2-3 times per week.

TYPICAL STARTING DOSE

1 minutesute

How it helps

Short controlled exposure to cold, such as cold showers or cold water immersion, activates the sympathetic nervous system and stimulates adaptive stress responses. Over time, repeated mild stress exposure may improve resilience of the autonomic nervous system and reduce exaggerated responses to everyday stressors. This can influence the hypothalamic pituitary adrenal axis, which regulates cortisol production and broader stress physiology. When cortisol regulation becomes more stable, downstream systems, including reproductive hormones, may also function more predictably.

Cold exposure may also improve aspects of metabolic health and subjective resilience in some individuals. However, most evidence comes from physiological, performance, or metabolic research rather than direct hormone studies in men. Its relevance to testosterone is therefore more theoretical and indirect, with likely modest effects unless used as part of a broader lifestyle strategy that improves stress and metabolic function.

Personalized to Your Genes

↓ CRHR2

Improves stress adaptation signaling



Dietary Choline [↗](#)

How to implement

Increase your intake of choline-rich foods such as eggs, beef liver, chicken liver, fish, peanuts, and dairy products. Aim for an adult intake of about 425 mg to 550 mg of choline per day through these food sources, as part of your regular diet.

How it helps

Choline is an essential nutrient involved in several metabolic processes, including liver function, fat metabolism, and methylation. The body can convert choline into betaine, which acts as a methyl donor used in many biochemical reactions. These methylation pathways help process various metabolites and support normal detoxification function. Choline is also important for maintaining healthy liver function, which matters because the liver plays a central role in hormone metabolism and the production of transport proteins such as sex hormone-binding globulin. Good dietary sources include eggs, liver, fish, and some legumes. Adequate intake helps maintain the metabolic pathways that support efficient processing of hormone-

related compounds and overall endocrine stability. In men, its role is indirect but relevant, particularly when liver health, methylation, or metabolic dysfunction are contributing to broader hormone imbalance.

Personalized to Your Genes

↓ MTHFR

Alternative methyl donor via the betaine pathway.



Intermittent Fasting [↗](#)

How to implement

Limit your daily eating to a specific window of time, typically within an 8-hour period such as from 12 pm to 8 pm, and fast for the remaining 16 hours of the day. Repeat this daily or for at least 3-4 days per week.

How it helps

Intermittent fasting affects male hormone balance mainly through changes in insulin sensitivity, body composition, and energy availability. In some men, especially those with excess body fat or insulin resistance, it may improve metabolic health and support weight loss, which can indirectly improve testosterone levels. However, fasting can also become a stressor if it leads to chronically low energy intake, poor sleep, irritability, or impaired recovery. In lean, highly active, or already stressed men, aggressive fasting patterns may lower testosterone by reducing energy availability and increasing physiological stress. Its effect is therefore highly context dependent.

Intermittent fasting is not inherently beneficial or harmful for male hormones. It may help when it improves metabolic health and body composition, but it may backfire when it functions as another layer of chronic stress or under-fueling.

Personalized to Your Genes

↑ HSD11B1

Improves cortisol rhythm



L-Theanine [↗](#)

How to implement

Take 100-400 mg of L-theanine supplement daily. It can be consumed at any time of the day, with or without food.

TYPICAL STARTING DOSE

100 mg

How it helps

L-theanine is an amino acid found naturally in tea that is known for its calming effects without causing strong sedation. It may help reduce subjective stress, improve focus, and promote a more relaxed mental state. In men, its relevance to hormone balance is indirect and mostly related to stress physiology. Chronic psychological stress raises cortisol and sympathetic nervous system activity, both of which can interfere with testosterone production and sleep quality. By helping reduce stress reactivity and support calmer nervous system tone, L-theanine may indirectly contribute to a more favorable endocrine environment. It may be especially useful in men whose sleep, focus, or recovery are being affected by stress or stimulant overuse. However, it does not directly raise testosterone, and its effects on reproductive hormones are likely modest. It is best viewed as a supportive nervous system tool rather than a primary hormonal intervention.

Personalized to Your Genes

◦ CRHR1

Blunts stress-induced cortisol spikes



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, particularly in sensitive individuals or when consumed in large amounts. In some men, excessive caffeine intake may amplify stress responses, worsen anxiety, and disrupt sleep quality, which can indirectly affect testosterone production and endocrine stability. Because sleep and cortisol rhythms are important for maintaining healthy testosterone levels, caffeine habits can matter even though caffeine does not directly suppress testosterone in most people. Moderating caffeine intake, especially later in the day, may help maintain more stable stress hormone patterns and improve sleep quality. In men who are particularly sensitive to stimulants or already experiencing stress-related hormonal disruption, reducing excessive caffeine may support a more favorable hormonal environment.

Personalized to Your Genes

◦ CRHR1

Caffeine amplifies CRH signaling

**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, sleep quality, and nervous system balance. Magnesium itself plays a role in energy metabolism, insulin sensitivity, muscle function, and stress regulation, all of which can influence testosterone levels. The glycinate form is commonly chosen because it is generally well tolerated and may have a calming effect. By supporting sleep quality and reducing nervous system overactivation, magnesium glycinate may help stabilize cortisol rhythms and improve recovery. Balanced cortisol and good sleep are both important for maintaining proper testosterone production in men.

Although magnesium glycinate does not act directly as a hormone, it may support the physiological systems that help preserve healthy endocrine rhythms, especially in men experiencing stress, poor sleep, or low magnesium intake.

Personalized to Your Genes

↑ HSD11B1

Supports HPA regulation

**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 involved in gene regulation, neurotransmitter production, detoxification, and cellular maintenance. Supporting methylation helps maintain efficient processing of a wide range of compounds and supports metabolic stability. In people with reduced activity of the MTHFR enzyme, the body may produce less active folate, which can lower methylation efficiency. Providing methylfolate directly bypasses this step. In men, methylfolate may indirectly support hormone health by improving methylation-dependent pathways related to detoxification, liver function, and overall metabolic resilience. It is not a major direct testosterone intervention, but it can support broader physiological systems that influence endocrine regulation, especially in people with methylation-related inefficiencies.

Personalized to Your Genes

↓ MTHFR

Bypasses reduced MTHFR activity and supports methylation.



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, melatonin suppression, sleep onset timing, and the broader endocrine rhythm that supports testosterone production. When circadian rhythms are well aligned, hormonal signaling throughout the body tends to be more stable. Morning light exposure helps anchor these rhythms, improves alertness during the day, supports better sleep at night, and contributes to more balanced stress hormone regulation.

Because testosterone and recovery are closely linked to sleep quality and circadian health, morning light can be a simple but meaningful indirect support strategy for male hormone balance. Its effects are not specific to testosterone alone, but they help improve the physiological context in which healthy androgen production occurs.

Personalized to Your Genes

◦ CRHR1

Stabilizes circadian cortisol rhythm

**Omega-3 (Fish Oil)** [↗](#)

How to implement

Take 1-2 g of omega-3 (fish oil) supplement daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

2000 mg

How it helps

Omega-3 fatty acids are anti-inflammatory fats found in fatty fish such as salmon, sardines, and mackerel. Chronic low-grade inflammation can disrupt hormonal balance by impairing insulin signaling, increasing oxidative stress, and negatively affecting testicular function. Omega-3s help reduce inflammatory signaling pathways and may improve metabolic markers that are closely tied to testosterone regulation. In men, better insulin sensitivity and lower inflammation create a more stable internal environment for androgen production. Some studies also suggest that omega-3 supplementation may improve sperm quality, membrane fluidity, and cardiovascular markers that indirectly support endocrine health.

By reducing inflammation and supporting metabolic function, omega-3 fatty acids help maintain conditions that are more favorable for healthy testosterone levels and reproductive function, even if their direct effect on testosterone itself is usually modest.

Personalized to Your Genes

↓ CRHR2

Improves stress resilience and hormone balance

**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, especially in the brain. It is sometimes used as a supplement to help regulate stress responses and support cognitive function. Some studies suggest that phosphatidylserine may help reduce excessive cortisol responses to physical or psychological stress. Because chronically elevated cortisol can suppress testosterone production and interfere with reproductive hormone signaling, reducing excessive stress hormone activation may indirectly support male hormonal balance.

However, its relevance is more indirect than direct, and it is likely most useful in individuals with high stress burden or those seeking support for stress-related physiological dysregulation rather than as a primary hormone-targeted intervention.

Personalized to Your Genes

↑ HSD11B1

Helps lower cortisol levels



Plant Sterols & Stanols [↗](#)

How to implement

Consume a total of 300 mg of plant sterols and stanols per day. This can be achieved by incorporating foods fortified with these compounds, such as certain margarines, orange juice, and yogurt drinks, into your daily diet or by taking a specific supplement that meets this dosage requirement.

TYPICAL STARTING DOSE

300 mg

How it helps

Plant sterols are naturally occurring compounds found in foods such as nuts, seeds, legumes, vegetable oils, and some fortified products. Beta-sitosterol is one of the best-known plant sterols, but the broader category includes several related compounds with similar biological properties. In men, plant sterols are most often discussed in relation to prostate and urinary health rather than direct testosterone support. They may help improve lower urinary tract symptoms and may modestly influence androgen-related activity within the prostate, which is why they are often included in formulations aimed at benign prostatic enlargement.

However, plant sterols do not appear to meaningfully raise testosterone, and their usefulness is usually more symptom-focused than hormone-optimizing. For that reason, they are better viewed as a prostate-support intervention rather than a broad male hormone support strategy. Their relevance depends mainly on whether the goal is urinary or prostate support rather than increasing androgen production.

Personalized to Your Genes

↑ HSD3B1

Reduce downstream androgen effects (DHT-related)



Regular Sleep Schedule [↗](#)

How to implement

Go to bed and wake up at the same time every day, even on weekends and holidays. This helps regulate your body's internal clock, leading to better sleep quality. Aim for 7-9 hours of sleep per night.

How it helps

Sleep is one of the strongest regulators of male hormonal rhythms. Testosterone production follows a circadian pattern and rises during sleep, especially during deeper stages. Irregular sleep schedules, poor sleep quality, or inadequate sleep duration can significantly reduce testosterone levels and disrupt the normal rhythm of cortisol and other hormones. Even short periods of sleep restriction have been shown to lower daytime testosterone in healthy men. Poor sleep is also associated with insulin resistance, increased inflammation, reduced recovery, and higher stress hormone levels, all of which can further impair hormonal balance.

Maintaining a consistent sleep schedule helps synchronize the body's circadian clock and supports balanced endocrine signaling throughout the system. Stable sleep patterns are especially important for maintaining healthy testosterone production, metabolic health, mood, energy, and sexual function in men.

Personalized to Your Genes

↓ CRHR2

Crucial for stress control and hormone balance



Resveratrol [↗](#)

How to implement

Take 150-500 mg of resveratrol as a supplement daily, preferably with meals to enhance absorption. This dosage range is based on studies for various health benefits, and it's advised to not exceed 500 mg per day without medical supervision.

TYPICAL STARTING DOSE

150 mg

How it helps

Resveratrol is a polyphenol found in grapes, berries, and red wine that has antioxidant and anti-inflammatory properties. It has been studied for potential effects on metabolic health, aging-related pathways, and hormone metabolism. In theory, resveratrol may help support male hormone balance by reducing oxidative stress, improving insulin sensitivity, and influencing enzymes involved in steroid metabolism or aromatase activity. However, most of the stronger mechanistic data comes from cell and animal studies, while human evidence remains limited and inconsistent.

In men, its hormonal effects appear indirect and likely modest. Resveratrol may be more useful as a metabolic and cellular resilience compound than as a direct testosterone-support strategy. While it has plausible mechanisms, the clinical evidence for meaningful improvement in male androgen status is not strong enough to consider it a core intervention.

Personalized to Your Genes

↑ HSD3B1

Helps balance androgen signaling



Rhodiola [↗](#)

How to implement

Take 500 mg of rhodiola supplement daily, preferably in the morning to avoid potential interference with sleep.

TYPICAL STARTING DOSE

500 mg

How it helps

Rhodiola is another adaptogenic herb used to support stress resilience, energy, and fatigue resistance. Some studies suggest that it may reduce fatigue and improve tolerance to physical and psychological stress by influencing stress response pathways. Because chronic stress can suppress testosterone production and disturb hormonal balance, improving stress resilience may indirectly support healthier male endocrine function.

However, evidence specifically examining testosterone or reproductive hormone effects in men remains limited, and the observed benefits are usually more related to energy, mood, and stress perception than to direct androgen changes. Rhodiola may still be helpful in some individuals whose hormonal issues are strongly tied to chronic stress and fatigue, but its direct endocrine relevance appears modest compared with stronger lifestyle interventions such as sleep, calorie sufficiency, and strength training.

Personalized to Your Genes

↓ CRHR2

Enhances stress tolerance



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 other compounds that need to be processed efficiently by the body. Adequate riboflavin intake therefore supports metabolic pathways involved in hormone clearance and cellular energy production. 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 relevant to endocrine function. In the context of male hormones, riboflavin is more of a background support nutrient than a direct hormone intervention, but it still contributes to the metabolic systems that help maintain hormonal stability.

Personalized to Your Genes

↓ MTHFR

Supports MTHFR function and methylation.



Saw Palmetto [↗](#)

How to implement

Take a saw palmetto supplement of 160 mg twice daily or 320 mg once a day. This dosage is typically taken in capsule form. Continue this regimen for at least two to six months to assess its effectiveness for conditions like benign prostatic hyperplasia.

TYPICAL STARTING DOSE

320 mg

How it helps

Saw palmetto is a botanical extract commonly used to support prostate health. It is thought to reduce the conversion of testosterone into dihydrotestosterone, or DHT, by inhibiting 5 alpha reductase activity to some degree. In men, this can be helpful in certain contexts such as benign prostatic enlargement or androgen-driven hair loss, but it is not generally a strategy for optimizing androgenic function overall. DHT is an important androgen involved in male sexual development and certain aspects of androgen signaling, so reducing it is not always desirable.

Saw palmetto is therefore more of a hormone-modulating or anti-androgenic intervention than a testosterone-support intervention. It may be useful when the goal is specifically to reduce excessive DHT activity, but for a general male hormone optimization framework, its role is narrower and context dependent.

Personalized to Your Genes

↑ HSD3B1

Reduces downstream androgen effects (DHT-related)



Sufficient Calorie Intake [↗](#)

How to implement

Consume a daily amount of calories that meets your body's energy needs based on your age, sex, weight, height, and physical activity level. Use an online calorie calculator or consult a dietitian to determine your specific caloric needs. Aim to distribute your calorie intake evenly across meals throughout the day.

How it helps

The male reproductive system is highly sensitive to energy availability. When calorie intake drops too low for an extended period, the body interprets this as a state of stress or energy shortage. In response, the brain reduces signals from the hypothalamus and pituitary that normally stimulate the testes to produce testosterone. This can lower testosterone levels, reduce libido, impair recovery, and negatively affect mood, muscle mass, and fertility. Men who are under chronic energy restriction, aggressive dieting, or very high training loads often experience hormonal suppression for this reason.

Adequate calorie intake signals to the body that sufficient energy resources are available to support reproduction, metabolic function, and physical maintenance. Ensuring enough calories, especially from balanced macronutrients, helps maintain the hormonal signals that regulate testosterone production, testicular function, and overall endocrine stability.

Personalized to Your Genes

↑ CYP19A1

Chronic caloric deficit may further reduce hormone production



Vitamin B12 [↗](#)

How to implement

Take a 50 mcg vitamin B12 supplement daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

100 mcg

How it helps

Vitamin B12 plays a central role in the body's methylation cycle, nervous system function, and red blood cell formation. Methylation is a biochemical process used to regulate and process many molecules throughout the body, including compounds involved in detoxification and cellular repair. Vitamin B12 helps recycle homocysteine into methionine, which allows the body to regenerate SAM-e, one of the main methyl donors used in these reactions. Low B12 can impair methylation capacity, increase homocysteine, and contribute to broader metabolic inefficiency. In the context of male hormones, B12 is not a direct testosterone nutrient, but it supports several foundational systems that influence endocrine health, including energy production, neurological function, and metabolic resilience. Adequate B12 intake helps maintain the physiological background needed for normal hormone regulation and overall reproductive health.

Personalized to Your Genes

↓ MTHFR

Supports homocysteine recycling and methylation.

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

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

However, **according to experts, *MTHFR* variants don't seem to greatly affect people's health** [\[R\]](#), [\[R\]](#). They have a small impact on folate levels, which likely doesn't affect people who get enough of this vitamin [\[R\]](#).

Some studies linked *MTHFR* variants with higher homocysteine levels. These studies also found links between *MTHFR* variants, higher homocysteine, and:

- Heart disease and stroke [\[R\]](#), [\[R\]](#)
- Fertility and pregnancy issues [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Mental health issues [\[R\]](#)
- Migraines with aura [\[R\]](#), [\[R\]](#)

However, larger studies found no evidence for these links. Some even found the opposite results. In one study, *MTHFR* variants were linked to a lower risk of death from heart disease [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

It's always a good practice to get plenty of folate by eating lots of fresh fruits and vegetables. In the US, cereal grains are fortified with folic acid, a form of folate. The Center for Disease Control and Prevention (CDC) recommends folic acid supplements (400 micrograms) to all women trying to get pregnant [\[R\]](#), [\[R\]](#), [\[R\]](#).

Enhancers:

[Riboflavin](#)[Vitamin B12](#)

<p>SNP</p> <p>rs1801133 C677T</p> <p>Alleles</p> <p>A: Reduced MTHFR activity and methylation ability</p> <p>G: Normal MTHFR activity and methylation ability</p>	<p>Your Genotype</p> <p>↓ AA</p> <p>Your genotype is linked to significantly reduced MTHFR activity and methylation ability.</p>
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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](#)

<p>SNP</p> <p>rs1801131 A1298C</p> <p>Alleles</p> <p>G: Slightly reduced MTHFR activity and methylation ability</p> <p>T: Normal MTHFR activity and methylation</p>	<p>Your Genotype</p> <p>◦ TT</p> <p>Your genotype is linked to normal MTHFR activity and methylation ability</p>
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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].

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](#)].

<p>SNP</p> <p>rs2267715</p> <p>Alleles</p> <p>A: Lower CRHR2 activity</p> <p>G: Higher CRHR2 activity</p>	<p>Your Genotype</p> <p>↓ AA</p> <p>Your genotype is linked to lower CRHR2 activity and impaired stress control.</p>
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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](#)].

<p>SNP</p> <p>rs2190242</p> <p>Alleles</p> <p>A: Lower CRHR2 activity</p> <p>C: Higher CRHR2 activity</p>	<p>Your Genotype</p> <p>↓ AA</p> <p>Your genotype is linked to lower CRHR2 activity and impaired stress control.</p>
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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 [\[R\]](#).

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 [\[R\]](#).

<p>SNP</p> <p>rs700518</p> <p>Alleles</p> <p>C: Reduced CYP19A1 activity</p> <p>T: Increased CYP19A1 activity</p>	<p>Your Genotype</p> <p>↓ CC</p> <p>Your genotype is linked to reduced CYP19A1 activity and mixed effects on reproductive and metabolic health.</p>
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Intro and Health Effects

One of the main *CYP19A1* variants is [rs700518](#). Its minor 'C' allele has been associated with higher testosterone and lower estradiol levels, suggesting **decreased** aromatase activity [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

This variant has been associated with an **increased risk** of:

- Prostate cancer [\[R\]](#)
- Acne [\[R\]](#)
- Hypertension [\[R\]](#)
- Low BMD [\[R\]](#)

However, it has been linked to a decreased risk of:

- Metabolic syndrome [\[R\]](#)

- Prostate enlargement (BPH) [\[R\]](#)
- Late-onset hypogonadism [\[R\]](#)

<p>SNP</p> <p>rs700519 Arg264Cys</p> <p>Alleles</p> <p>A: Reduced CYP19A1 activity</p> <p>G: Typical CYP19A1 activity</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical CYP19A1 activity and reproductive health.</p>
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Intro and Health Effects

Another important *CYP19A1* variant is [rs700519](#), also known as Arg264Cys. Its minor 'A' allele may **decrease** aromatase activity [\[R\]](#).

It has been associated with an **increased risk of prostate cancer** in some cases and worse survival in patients treated with docetaxel [\[R, R\]](#).

HSD11B1

[HSD11B1 Report](#)

The [HSD11B1](#) gene encodes **11 β -hydroxysteroid dehydrogenase type 1 (11 β -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 [\[R, R\]](#).

<p>SNP</p> <p>rs846910</p> <p>Alleles</p> <p>A: Lower HSD11B1 activity</p> <p>G: Typical HSD11B1 activity</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical HSD11B1 activity and cortisol levels.</p>
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Intro and Health Effects

The main *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 [\[R, R, R\]](#):

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

<p>SNP</p> <p>rs12086634</p> <p>Alleles</p> <p>G: Excessive HSD11B1 activity</p> <p>T: Normal HSD11B1 activity</p>	<p>Your Genotype</p> <p>↑ TG</p> <p>Your genotype is linked to excessive HSD11B1 activity and cortisol levels.</p>
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Intro and Health Effects

Another well-researched variant is [rs12086634](#). Its minor 'G' allele has been associated with:

- Higher cortisol levels [\[R\]](#)
- 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 [\[R\]](#)

HSD3B1

[HSD3B1 Report](#)

The [HSD3B1](#) gene encodes an enzyme called ‘hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1’ that is involved in the production of all classes of steroid hormones by converting delta-5-3-beta-hydroxysteroid precursors into delta-4-ketosteroids [\[R\]](#).

While it can carry out the same function as [HSD3B2](#), it localizes to different tissues, such as the placenta and prostate, instead of the adrenal glands and gonads [\[R, R\]](#).

<p>SNP</p> <p>rs1047303 1245C</p> <p>Alleles</p> <p>A: Typical HSD3B1 activity</p> <p>C: Excessive HSD3B1 activity</p>	<p>Your Genotype</p> <p>↑ CC</p> <p>Your genotype is linked to excessive HSD3B1 activity and worse prostate health.</p>
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Intro and Health Effects

The main HSD3B1 polymorphism is [rs1047303](#), commonly referred to as 1245C. Its **minor ‘C’ allele** encodes a version of the protein that is resistant to breakdown, resulting in its buildup. This variant has mostly been investigated in the context of prostate cancer and is associated with several **negative outcomes**, such as [\[R\]](#):

- Worse response to androgen deprivation therapy [\[R, R, R\]](#)
- Increased risk of progression [\[R\]](#)
- Greater mortality [\[R, R\]](#)

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** [\[R\]](#).

rs6152 (E211E or *Stul*)

The best-characterized *AR* variant is [rs6152](#), also known as E211E or *Stul*. 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 [\[R\]](#), [\[R\]](#)

<p>SNP</p> <p>rs6152 E211E or <i>Stul</i></p> <p>Alleles</p> <p>A: Increased AR activity</p> <p>G: Typical AR activity</p>	<p style="text-align: center;">Your Genotype</p> <p style="text-align: center;">o G</p> <p style="text-align: center;">Your genotype is linked to typical AR activity and typical odds of hair loss and prostate health issues</p>
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Intro and Health Effects

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

In men, this variant has been associated with a **reduced risk** of:

- Male pattern baldness [\[R\]](#), [\[R\]](#)
- Metastatic prostate cancer [\[R\]](#)

It has also been linked to elevated PSA levels in patients with BPH, but these elevated PSA levels didn’t correlate with an increased prostate cancer risk [\[R\]](#).

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

◦ **AG**

Your genotype is linked to intermediate COMT activity and 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.

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].

<p>SNP</p> <p>rs12938031</p> <p>Alleles</p> <p>A: Excessive CRHR1 activity</p> <p>G: Normal CRHR1 activity</p>	<p>Your Genotype</p> <p>o GA</p> <p>Your genotype is linked to normal CRHR1 activity and typical odds of PTSD</p>
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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].

<p>SNP</p> <p>rs4792887</p> <p>Alleles</p> <p>C: Excessive CRHR1 activity</p> <p>T: Normal CRHR1 activity</p>	<p>Your Genotype</p> <p>↑ CC</p> <p>Your genotype is linked to excessive CRHR1 activity and higher odds of PTSD.</p>
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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].

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.

<p>SNP</p> <p>rs743572</p> <p>Alleles</p> <p>A: Typical CYP17A1 activity.</p> <p>G: Excessive CYP17A1 activity.</p>	<p>Your Genotype</p> <p>o AG</p> <p>Your genotype is linked to typical CYP17A1 activity and androgen production.</p>
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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 [\[R, R, R, R\]](#)
- Prostate cancer (in Black but not Caucasian or Asian populations) [\[R, R\]](#)

In contrast, it has been associated with a decreased risk of pancreatic cancer [\[R, R\]](#).

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. While most CYP enzymes are found in the liver, CYP1A1 is mainly found in the lungs [\[R, R, R\]](#).

In line with its location in the lungs, 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 [\[R, R\]](#).

In addition, there are studies that suggest that CYP1A1 may also protect against oxidative stress, by neutralizing reactive oxygen species (ROS) in the lungs [\[R\]](#).

CYP1A1 also metabolizes estrogen outside the liver [\[R\]](#).

Certain *CYP1A1* variants are linked to [\[R, R, R\]](#):

- Cancer
- PCOS
- Diabetes

The following natural substances may increase CYP1A1 activity:

- Indole-3-carbinol, found in cruciferous vegetables [\[R\]](#)
- [Resveratrol](#) [\[R\]](#)
- [Andrographolide](#), from the [Andrographis paniculata](#) plant [\[R\]](#)
- [Astaxanthin](#) [\[R\]](#)
- [Fish oil](#) and [garlic](#) oil [\[R\]](#)
- Green and [black tea](#) [\[R\]](#)

In contrast, CYP1A1 activity may be decreased by:

- Berries and their component ellagic acid [\[R\]](#)
- [Green tea](#) extracts [\[R\]](#)
- [Sulforaphane](#) found in broccoli [\[R\]](#)
- [St. John's Wort](#) [\[R\]](#)
- [Lycopene](#) found in tomatoes, carrots, and watermelon [\[R\]](#)
- Naringenin and 6',7'-dihydroxybergamottin from [grapefruit](#) juice) [\[R\]](#)
- Galangin and [propolis](#) [\[R\]](#)
- Zyflamend, a widely used herbal formulation produced from the extracts of ten common herbs ([rosemary](#), turmeric, [ginger](#), [holy basil](#), [green tea](#), hu zhang, Chinese goldthread, barberry, [oregano](#), and Baikal skullcap) [\[R\]](#)

<p>SNP</p> <p>rs4646903 CYP1A1*4</p> <p>Alleles</p> <p>A: typical CYP1A1 activity and detox ability</p> <p>G: increased CYP1A1 activity and altered detox ability</p>	<p>Your Genotype</p> <p>◦ AA</p> <p>Your genotype is linked to typical CYP1A1 activity and detox ability</p>
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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 [\[R, R\]](#).

<p>SNP</p> <p>rs1048943 CYP1A1*2A</p> <p>Alleles</p> <p>C: increased CYP1A1 activity and production of toxic metabolites</p> <p>T: typical CYP1A1 activity and production of toxic metabolites</p>	<p>Your Genotype</p> <p>◦ TT</p> <p>Your genotype is linked to typical CYP1A1 activity and detox ability</p>
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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 [\[R\]](#)

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.

<p>SNP</p> <p>rs1056836 Leu432Val</p> <p>Alleles</p> <p>G: Increased CYP1B1 activity and altered detox ability</p> <p>C: Typical CYP1B1 activity and detox ability</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical CYP1B1 activity and estradiol clearance.</p>
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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 opioids, immunosuppressants, antihypertensive medication, anticancer drugs, and statins [\[R, R, R, R, R, R, R, R, R, R, R, R\]](#).

CYP3A4 also:

- Metabolizes many internal compounds such as cholesterol, fatty acids, [prostaglandins](#), [leukotrienes](#), retinoids, and biogenic amines [\[R\]](#).
- Detoxifies [bile](#) acids [\[R\]](#).
- Deactivates [testosterone](#) to biologically less active metabolites [\[R\]](#).
- Partly degrades [vitamin D](#) [\[R\]](#).

CYP3A4 also metabolizes the two main chemicals found in cannabis: THC and CBD. As opposed to CYP2C19 and CYP2C9, which oxidize CBD to 7-hydroxy-CBD (7-OH-CBD), CYP3A4 breaks it down through different pathways [\[R, R\]](#).

CYP3A4 can also metabolize the psychoactive cannabinoid THC. It converts THC into inactive metabolites such as 11-hydroxy-THC (a metabolite that still has psychoactive properties but is less potent than THC) and 11-nor-9-carboxy-THC (the non-psychoactive metabolite often used in drug testing) [\[R, R\]](#).

Alternatively, CBD, THC, and their metabolites can inhibit this enzyme and reduce its effectiveness at metabolizing drugs [\[R, R, R, R\]](#).

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 [\[R, R, R, R\]](#).

The following supplements, chemicals, and factors may increase CYP3A4 activity:

- [St. John's wort](#) [\[R, R, R\]](#)
- [Capsaicin](#) [\[R, R\]](#)
- Common valerian [\[R\]](#)
- [Echinacea purpurea](#) [\[R\]](#)
- Kaempferol [\[R\]](#)
- Quercetin [\[R\]](#)
- Vitamin D and [UV](#) exposure [\[R\]](#)
- Being female [\[R\]](#)
- Diabetes [\[R\]](#)
- Fatty acids [\[R\]](#)
- Polycyclic aromatic hydrocarbons (PAH) found in cigarettes [\[R\]](#)
- Aflatoxin [B1](#) [\[R\]](#)

- Some drugs such as carbamazepine and dexamethasone [\[R\]](#), [\[R\]](#)

In contrast, CYP3A4 activity may be decreased by:

- Grapefruit juice [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Starfruit juice [\[R\]](#)
- [Aloe vera](#) [\[R\]](#)
- Mixed vegetable juices [\[R\]](#)
- Kale [\[R\]](#)
- Garden cress [\[R\]](#), [\[R\]](#)
- [Fennel](#) [\[R\]](#)
- [Green tea](#) [\[R\]](#), [\[R\]](#)
- [Black pepper](#) [\[R\]](#), [\[R\]](#)
- Goldenseal [\[R\]](#)
- Raspberry leaf [\[R\]](#)
- [Milk thistle](#) [\[R\]](#)
- [Quercetin](#) [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Kaempferol [\[R\]](#)
- [Berberine](#) [\[R\]](#), [\[R\]](#)
- [Piperine](#) [\[R\]](#), [\[R\]](#)
- [Licorice](#) [\[R\]](#)
- [Oleuropein](#), derived from [olive oil](#) [\[R\]](#)
- Sesamin, found in sesame seeds [\[R\]](#)
- [Resveratrol](#) [\[R\]](#), [\[R\]](#), [\[R\]](#)
- [Sulforaphane](#) [\[R\]](#)
- [Apigenin](#) [\[R\]](#)
- Coumestrol [\[R\]](#)
- Caffeic acid [\[R\]](#), [\[R\]](#)
- Tannic acid [\[R\]](#)
- Gallic acid [\[R\]](#), [\[R\]](#)
- Allyl isothiocyanate [\[R\]](#)
- [Ginseng](#) [\[R\]](#)
- [Schisandra chinensis](#) [\[R\]](#)
- Ritonavir, itraconazole [\[R\]](#)
- Miconazole, ketoconazole [\[R\]](#)
- Verapamil [\[R\]](#)
- Sertraline [\[R\]](#)
- [Metformin](#) [\[R\]](#)
- Nefazodone [\[R\]](#)
- Clarithromycin [\[R\]](#)

[Curcumin](#) has a paradoxical effect, since it may both increase and decrease the activity of CYP3A4 [\[R\]](#), [\[R\]](#), [\[R\]](#).

Enhancers:

Riboflavin

Iron

<p>SNP</p> <p>rs35599367</p> <p>Alleles</p> <p>A: Reduced CYP3A4 activity</p> <p>G: Typical CYP3A4 activity</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical CYP3A4 activity and detox ability</p>
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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](#)].

<p>SNP</p> <p>rs2740574 CYP3A4*1B</p> <p>Alleles</p> <p>C: Reduced CYP3A4 activity</p> <p>T: Typical CYP3A4 activity</p>	<p>Your Genotype</p> <p>o TT</p> <p>Your genotype is linked to typical CYP3A4 activity and detox ability</p>
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Intro and Health Effects

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

ESR2

[ESR2 Report](#)

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

ER β 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 [\[R\]](#).

<p>SNP</p> <p>rs1256049</p> <p>Alleles</p> <p>C: Typical ESR2 activity</p> <p>T: Reduced ESR2 activity</p>	<p>Your Genotype</p> <p>↑ CC</p> <p>Your genotype is linked to higher ESR2 activity and better reproductive health.</p>
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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:

- Increased risk of prostate cancer in Europeans (but a lower risk in Asians) [\[R, R, R, R, R\]](#).
- Male infertility [\[R\]](#)
- Osteoporosis [\[R\]](#)
- Precocious puberty [\[R\]](#)

<p>SNP</p> <p>rs4986938</p> <p>Alleles</p> <p>C: Reduced ESR2 activity</p> <p>T: Increased ESR2 activity</p>	<p>Your Genotype</p> <p>↓ CC</p> <p>Your genotype is linked to reduced ESR2 activity and worse cognitive health.</p>
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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 [\[R\]](#):

- Dementia [\[R\]](#)

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 by making them water-soluble. On the other hand, it may turn some toxins into even more harmful metabolites [\[R\]](#).

SULT1A1 is also involved in the metabolism of numerous medications, influencing their efficacy and toxicity. One example is minoxidil, a substance that promotes hair growth. SULT1A1 helps activate minoxidil and increase its effectiveness [\[R\]](#).

<p>SNP</p> <p>rs1042028 SULT1A1*2</p> <p>Alleles</p> <p>C: Increased SULT1A1 activity</p> <p>T: Reduced SULT1A1 activity</p>	<p>Your Genotype</p> <p>↑ CC</p> <p>Your genotype is linked to increased SULT1A1 activity and altered detox ability</p>
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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 [\[R\]](#), [\[R\]](#).

rs182420

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 [\[R\]](#).

Enhancers:

Magnesium

Sulforaphane

SNP

rs182420

Alleles

C: Reduced SULT2A1 activity

T: Typical SULT2A1 activity

Your Genotype

• **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 [\[R\]](#).

<p>SNP</p> <p>rs2637125</p> <p>Alleles</p> <p>A: Reduced SULT2A1 activity</p> <p>G: Typical SULT2A1 activity</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical SULT2A1 activity and DHEA metabolism.</p>
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Intro and Health Effects

Another variant that presumably decreases SULT2A1 activity is the '**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](#)].

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]
- Steroid hormones [R]
- Medications: up to 15% of all FDA-approved drugs, according to some estimates [R]

BPA, short for bisphenol-A, is a chemical compound found in many types of plastic. A buildup of BPA in the body is linked to several disorders, including cancer, heart disease, and thyroid dysfunction [R].

Bilirubin is a waste product that your body naturally produces during the breakdown of old red blood cells. Failure to excrete bilirubin through urine or feces can lead to disorders like Gilbert's syndrome or Crigler–Najjar syndrome, which can cause yellowing of the skin, **fatigue**, loss of appetite, and even more serious symptoms in children [R].

The most researched drug interaction with *UGT1A1* is irinotecan, a drug used to treat colon and lung cancer. Studies show that people with a low-activity *UGT1A1* variant who take this drug are much more likely to experience neutropenia, a dangerous reduction in **white blood cell** count. The FDA recommends that people with this variant should start at a lower dose to reduce toxicity [R, R].

Enhancers:

Sulforaphane

<p>SNP</p> <p>rs4148323 UGT1A1*6</p> <p>Alleles</p> <p>A: Reduced UGT1A1 activity and detox ability</p> <p>G: Typical UGT1A1 activity and detox ability</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical UGT1A1 activity and detox ability</p>
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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](#)]

<p>SNP</p> <p>rs6742078 UGT1A1*27</p> <p>Alleles</p> <p>G: Typical UGT1A1 activity</p> <p>T: Reduced UGT1A1 activity</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical UGT1A1 activity and detox ability.</p>
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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](#)]

UGT2B15

[UGT2B15 Report](#)

UDP-glucuronosyltransferase (UGT) is an enzyme 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]
- **Steroid hormones** [R]

The [UGT2B15](#) gene encodes the UDP glucuronosyltransferase family 2 member B15, which is particularly involved in the metabolism of steroid hormones, BPA, parabens, and drugs such as oxazepam or sipoglitazar [R, R, R, R, R, R, R, R].

<p>SNP</p> <p>rs1902023 UGT2B15*2</p> <p>Alleles</p> <p>A: Better DHT clearance</p> <p>C: Impaired DHT clearance</p>	<p>Your Genotype</p> <p>◦ AC</p> <p>Your genotype is linked to typical DHT clearance and typical odds of prostate cancer.</p>
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Intro and Health Effects

The best-characterized UGT2B15 variant is UGT2B15*2 ([rs1902023](#)), commonly referred to as Y85D or G253T. The enzyme encoded by the **"A" allele** may be more efficient at breaking down sex hormones such as androstenediol and DHT [R, R].

In line with the association of DHT with prostate cancer, the 'A' allele has been associated with a **decreased risk** of this disease [R].

On the other hand, this variant is linked to poorer clearance of some toxins, suggesting that UGT2B15 activity is substrate-specific.

<p>SNP</p> <p>rs4148269 UGT2B15*5</p> <p>Alleles</p> <p>G: Improved DHT clearance</p> <p>T: Impaired DHT clearance</p>	<p>Your Genotype</p> <p>o GT</p> <p>Your genotype is linked to typical DHT clearance and typical odds of prostate cancer.</p>
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Intro and Health Effects

Another well-researched variant is UGT2B15*5 ([rs4148269](#)), commonly referred to as K523T. Its '**G**' allele has been associated with a **decreased risk** of prostate cancer and colorectal cancer, but slower bisphenol A metabolism [[R](#), [R](#), [R](#), [R](#)].

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
- Acrolein – from cigarette smoke, vehicle exhaust, and fried foods
- Aldehydes – from alcohol, frying oils, and cigarette smoke
- Food Dyes – present in snacks, candies, and beverages

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 [\[R, R\]](#).

Enhancers:

Iron

Riboflavin

SNP

rs762551 CYP1A2*1F

Alleles

A: Increased CYP1A2 activity

C: Reduced CYP1A2 activity

Your Genotype

↑ AA

Your genotype is linked to increased 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.

ESR1

[ESR1 Report](#)

The [ESR1](#) gene encodes ER α , 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 ER α 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 [\[R\]](#).

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

- Prostate 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 [\[R\]](#)
- Increased fertility in men [\[R\]](#)

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 [\[R, R, R, R, R, R, R\]](#).

FKBP5

[FKBP5 Report](#)

The [FKBP5](#) 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

<p>SNP</p> <p>rs3800373</p> <p>Alleles</p> <p>A: Lower FKBP5 activity</p> <p>C: Excessive FKBP5 activity</p>	<p>Your Genotype</p> <p>↓ AA</p> <p>Your genotype is linked to lower FKBP5 activity and better stress control.</p>
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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](#)

<p>SNP</p> <p>rs1360780</p> <p>Alleles</p> <p>C: Lower FKBP5 activity</p> <p>T: Excessive FKBP5 activity</p>	<p>Your Genotype</p> <p>↓ CC</p> <p>Your genotype is linked to lower FKBP5 activity and better stress control.</p>
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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](#)

<p>SNP</p> <p>rs9470080</p> <p>Alleles</p> <p>C: Lower FKBP activity</p> <p>T: Excessive FKBP5 activity</p>	<p>Your Genotype</p> <p>↓ CC</p> <p>Your genotype is linked to lower FKBP5 activity and better stress control.</p>
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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](#)

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

↑ AA

Your genotype is linked to increased 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].

<p>SNP</p> <p>rs1138272 Ala114Val</p> <p>Alleles</p> <p>C: Typical GSTP1 activity and detox ability</p> <p>T: Reduced GSTP1 activity and detox ability</p>	<p>Your Genotype</p> <p>o CC</p> <p>Your genotype is linked to typical GSTP1 activity and detox ability</p>
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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].

HSD17B1

[HSD17B1 Report](#)

The [HSD17B1](#) gene encodes the enzyme 17 β -hydroxysteroid dehydrogenase 1 (17 β -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].

<p>SNP</p> <p>rs605059 Ser312Gly</p> <p>Alleles</p> <p>A: Increased HSD17B1 activity</p> <p>G: Reduced HSD17B1 activity</p>	<p>Your Genotype</p> <p>↓ GG</p> <p>Your genotype is linked to reduced HSD17B1 activity and better sex hormone balance.</p>
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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) [R, R].

However, some studies didn't confirm these findings. They also found the lack of association between this variant and reproductive cancers in men [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 [\[R\]](#)

<p>SNP</p> <p>rs6259 Asp327Asn</p> <p>Alleles</p> <p>A: Increased SHBG activity</p> <p>G: Typical SHBG activity</p>	<p>Your Genotype</p> <p>o GG</p> <p>Your genotype is linked to typical SHBG activity, bone health, and fertility.</p>
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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 with **higher** SHBG levels [\[R, R, R\]](#).

This variant has been associated with an **increased risk** of:

- Male infertility [\[R, R\]](#)
- Low BMD [\[R\]](#)
- Poor prognosis in prostate cancer [\[R\]](#)
- Biliary tract cancer and stones [\[R\]](#)

However, this variant has been associated with a decreased risk of:

- Type 2 diabetes and metabolic syndrome [\[R, R, R, R\]](#)
- Liver cancer [\[R\]](#)

<p>SNP</p> <p>rs1799941</p> <p>Alleles</p> <p>A: Increased SHBG activity</p> <p>G: Reduced SHBG activity</p>	<p>Your Genotype</p> <p>↓ GG</p> <p>Your genotype is linked to lower SHBG activity and better bone health and fertility.</p>
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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 [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Lower BMD [\[R\]](#)
- Increased risk of male hypogonadism [\[R\]](#)

This variant may be linked to lower odds of metabolic syndrome and type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

<p>SNP</p> <p>rs727428</p> <p>Alleles</p> <p>C: Increased SHBG activity</p> <p>T: Reduced SHBG activity</p>	<p>Your Genotype</p> <p>↓ TT</p> <p>Your genotype is linked to lower SHBG activity and better fertility.</p>
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Intro and Health Effects

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

- Decreased risk of male infertility [\[R\]](#)
- Higher testosterone levels [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Lower estradiol levels [\[R\]](#), [\[R\]](#)

SRD5A1

[SRD5A1 Report](#)

The [SRD5A1](#) gene encodes **5 α -reductase type 1**, an enzyme that converts [testosterone \(T\)](#) into the more potent androgen **dihydrotestosterone (DHT)** and also participates in the synthesis of other 5 α -reduced steroid metabolites [[R](#), [R](#)].

Because DHT is a stronger androgen signal than testosterone, variants affecting *SRD5A1* activity can influence **androgen balance** (e.g., DHT/T ratio) and androgen-related traits [[R](#)].

<p>SNP</p> <p>rs1691053</p> <p>Alleles</p> <p>C: Increased SRD5A1 activity</p> <p>T: Typical SRD5A1 activity</p>	<p>Your Genotype</p> <p>◦ TT</p> <p>Your genotype is linked to typical SRD5A1 activity and prostate health.</p>
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Intro and Health Effects

One of the main *SRD5A1* variants is [rs1691053](#). Its minor 'C' allele may **increase the conversion** of testosterone to DHT, and has been associated with an **increased risk of prostate cancer and higher PSA levels**. This variant has also been associated with impaired fasting glucose regulation [[R](#), [R](#), [R](#)].

<p>SNP</p> <p>rs472402</p> <p>Alleles</p> <p>G: Increased SRD5A1 activity</p> <p>C: Reduced SRD5A1 activity</p>	<p>Your Genotype</p> <p>↓ CG</p> <p>Your genotype is linked to lower SRD5A1 activity and better prostate health.</p>
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Intro and Health Effects

Another variant linked to an increased risk of high-grade prostate cancer is the 'G' allele of [rs472402](#). However, taking finasteride may be more effective at preventing this disease in men with the 'GG' genotype [[R](#), [R](#)].

SRD5A2

[SRD5A2 Report](#)

The [SRD5A2](#) gene encodes **5 α -reductase type 2**, an enzyme that converts [testosterone \(T\)](#) into the more potent androgen **dihydrotestosterone (DHT)** in androgen-sensitive tissues such as the prostate and skin. DHT strongly activates the androgen receptor, influencing male sexual development, hair growth patterns, and prostate growth [\[R, R\]](#).

Rare, high-impact mutations in *SRD5A2* cause **5 α -reductase type 2 deficiency**, a disorder characterized by undervirilized external genitalia due to **reduced DHT formation** during fetal development in genetically male individuals [\[R\]](#).

Common polymorphisms in *SRD5A2* have been studied for impacts on **enzyme activity**, androgen-related traits, and disease risk, particularly **benign prostatic hyperplasia (BPH)** and **prostate cancer** [\[R, R\]](#).

<p>SNP</p> <p>rs523349 V89L</p> <p>Alleles</p> <p>G: Increased SRD5A2 activity</p> <p>C: Reduced SRD5A2 activity</p>	<p>Your Genotype</p> <p>↓ GG</p> <p>Your genotype may be linked to reduced SRD5A2 activity and better prostate health, but the evidence is mixed.</p>
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Intro and Health Effects

The best-characterized *SRD5A2* polymorphism is [rs523349](#), commonly known as V89L. Its minor 'G' allele encodes a 5 α -reductase protein with **~40% decreased activity**, potentially resulting in a reduced T to DHT conversion. The latest systematic review associated this allele with a **decreased risk** of prostate cancer, but the evidence is mixed [\[R, R, R, R, R, R, R, R\]](#).

This variant has also been associated with a reduced risk of prostate enlargement (BPH) in some ethnicities such as Caucasians and Hispanics [\[R, R, R\]](#).

Importantly, **many studies haven't observed a link between this variant and DHT levels, prostate health issues, or male-pattern baldness**. This variant may have mild and complex effects that depend on ethnicity [\[R, R, R\]](#).

<p>SNP</p> <p>rs9282858 A49T</p> <p>Alleles</p> <p>C: Reduced SRD5A2 activity</p> <p>T: Increased SRD5A2 activity</p>	<p>Your Genotype</p> <p>↓ CC</p> <p>Your genotype is linked to lower SRD5A2 activity and better prostate health.</p>
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Intro and Health Effects

Another well-researched variant is [rs9282858](#), also known as A49T. Its minor 'T' allele encodes a protein with **5-fold higher activity**, potentially increasing DHT levels. This variant has been associated with an **increased risk** of prostate cancer and prostate enlargement, although with mixed evidence [[R](#), [R](#), [R](#), [R](#)].

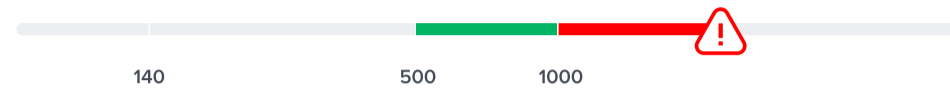
Interestingly, this variant has been associated with a decreased risk of male-pattern baldness [[R](#), [R](#), [R](#), [R](#), [R](#)].

Lab markers to check



DHT

1200 pg/mL



9 Nov 2025

Personalized to Your Genes

↑ HSD3B1

Indicates downstream androgen activity



Estradiol

101.46 pg/mL



9 Nov 2025

Personalized to Your Genes

↑ CYP19A1

Checks aromatization efficiency



Testosterone, Free (Direct / Labcorp)

150 pg/mL



9 Nov 2025



Testosterone, Total

1500 ng/dL



9 Nov 2025

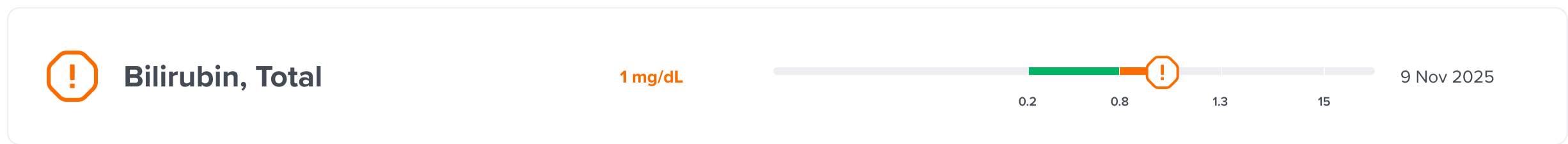
Personalized to Your Genes

↑ CYP19A1

Checks substrate availability

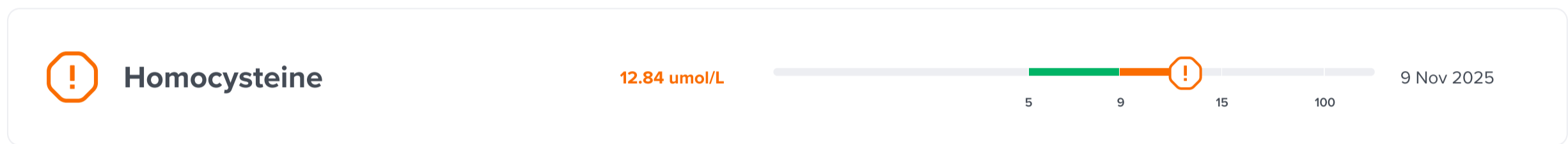
↑ HSD3B1

Indicates androgen production levels



Personalized to Your Genes

↑ HSD11B1 Checks cortisol-driven metabolic effects



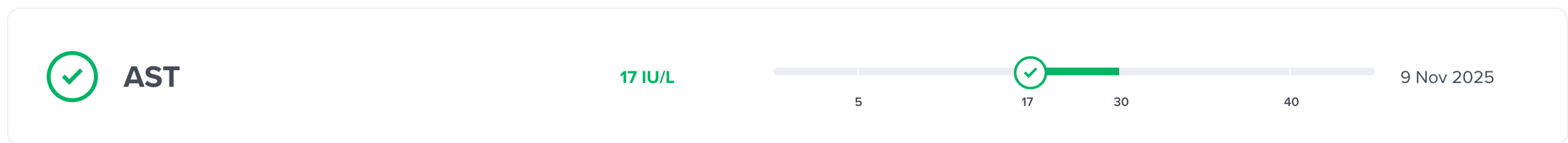
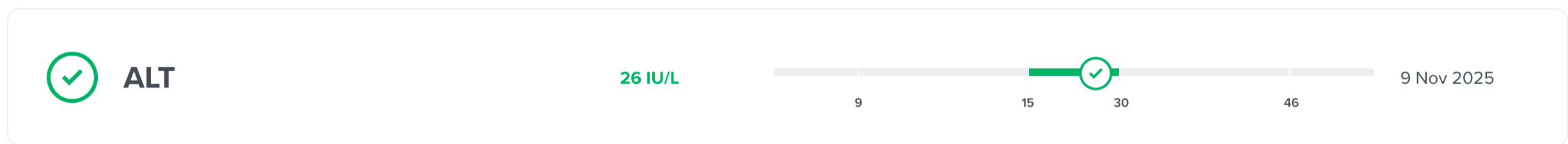
Personalized to Your Genes

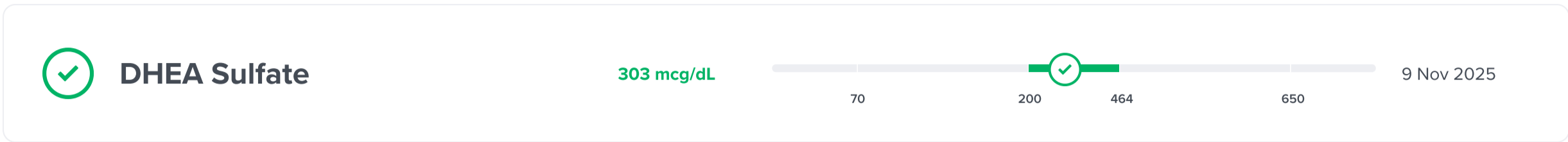
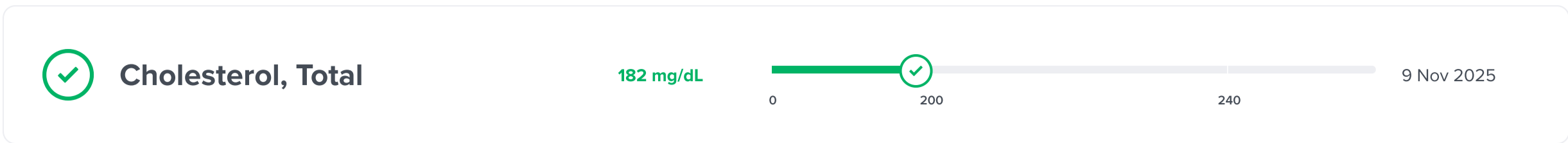
↓ MTHFR A sensitive marker of impaired methylation.



Personalized to Your Genes

↑ HSD3B1 Prostate health marker

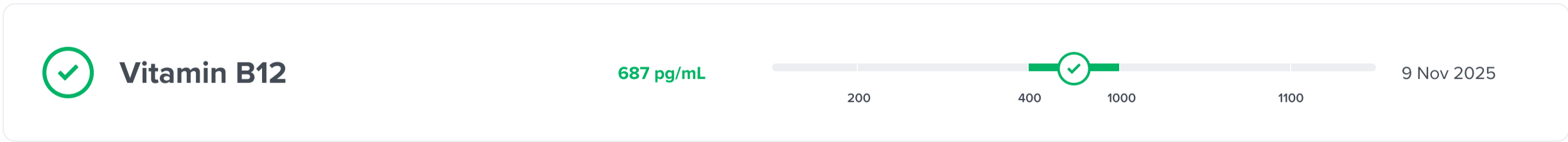
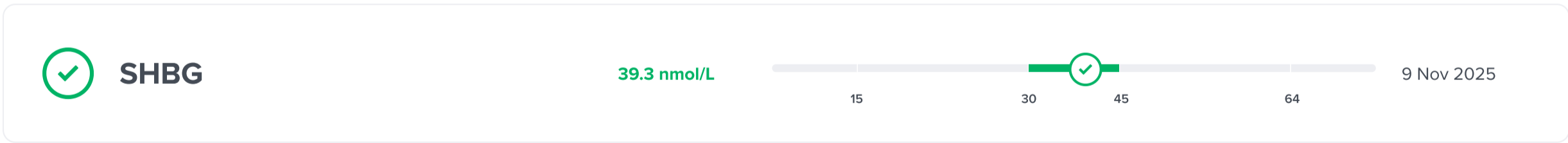
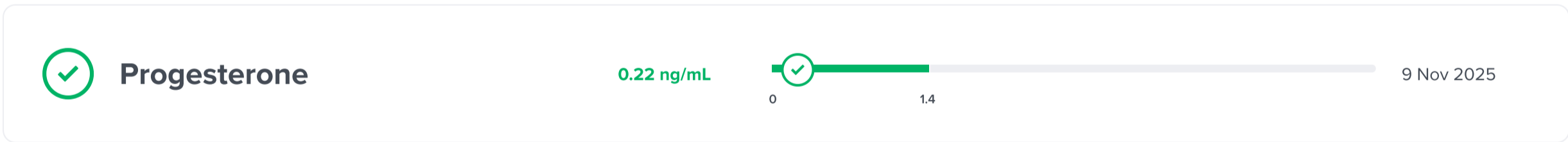
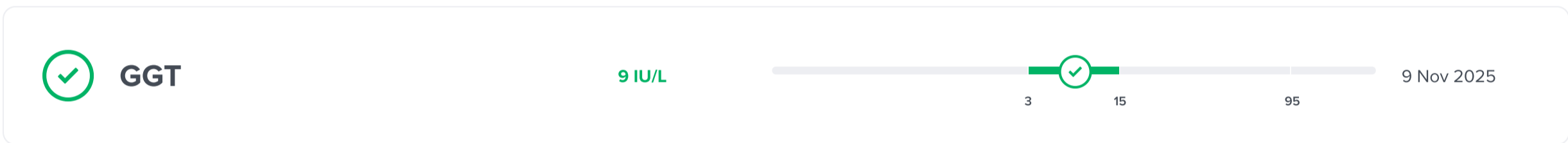




Personalized to Your Genes

↓ CRHR2 Adrenal reserve marker related to CRHR2 activity

◦ CRHR1 Counterbalance to cortisol



Personalized to Your Genes

↓ MTHFR Ensures adequate cofactor support.

 **16-OH-E1 (DUTCH)**

 **2-Methoxy-E1 (DUTCH)**

 **2-Methoxy-E2 (DUTCH)**

 **2-OH-E1 (DUTCH)**

 **2-OH-E2 (DUTCH)**

 **4-OH-E1 (DUTCH)**

 **4-OH-E2 (DUTCH)**

 **8-OHdG (Waking) (DUTCH)**

 **Androstenedione**

 **C-Reactive Protein (CRP)**

 **Cortisol**

Personalized to Your Genes

↓ CRHR2 Checks baseline cortisol levels, affected by CRHR2

↑ HSD11B1 Checks baseline cortisol output

◦ CRHR1 Checks baseline cortisol levels

 **Estriol** **Estrone** **Folate, RBC**

Personalized to Your Genes

↓ MTHFR Assesses folate status.

 **HOMA-IR**

Personalized to Your Genes

↑ HSD11B1 Detects cortisol-related insulin resistance

 **HRV**

Personalized to Your Genes

 CRHR1

Functional stress resilience marker

 **Malondialdehyde**

 **Testosterone, Free (Calculated / Quest)**

 **Total Glutathione**

Glossary

16alphaOH-E1

A metabolite of estrone formed through the 16 α -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.