

HTR2A (Serotonin)

Gene Report

REPORT CATEGORY —



MENTAL HEALTH

Sample Client

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Table of Contents

03 How this works

- 04 Impact
- 05 Evidence
- 06 Some things to keep in mind

07 Introduction

08 Your genetics

09 Your recommendations

24 Next Steps

- 24 Your Lab Results

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.

Personal information

NAME

Sample Client

SEX AT BIRTH

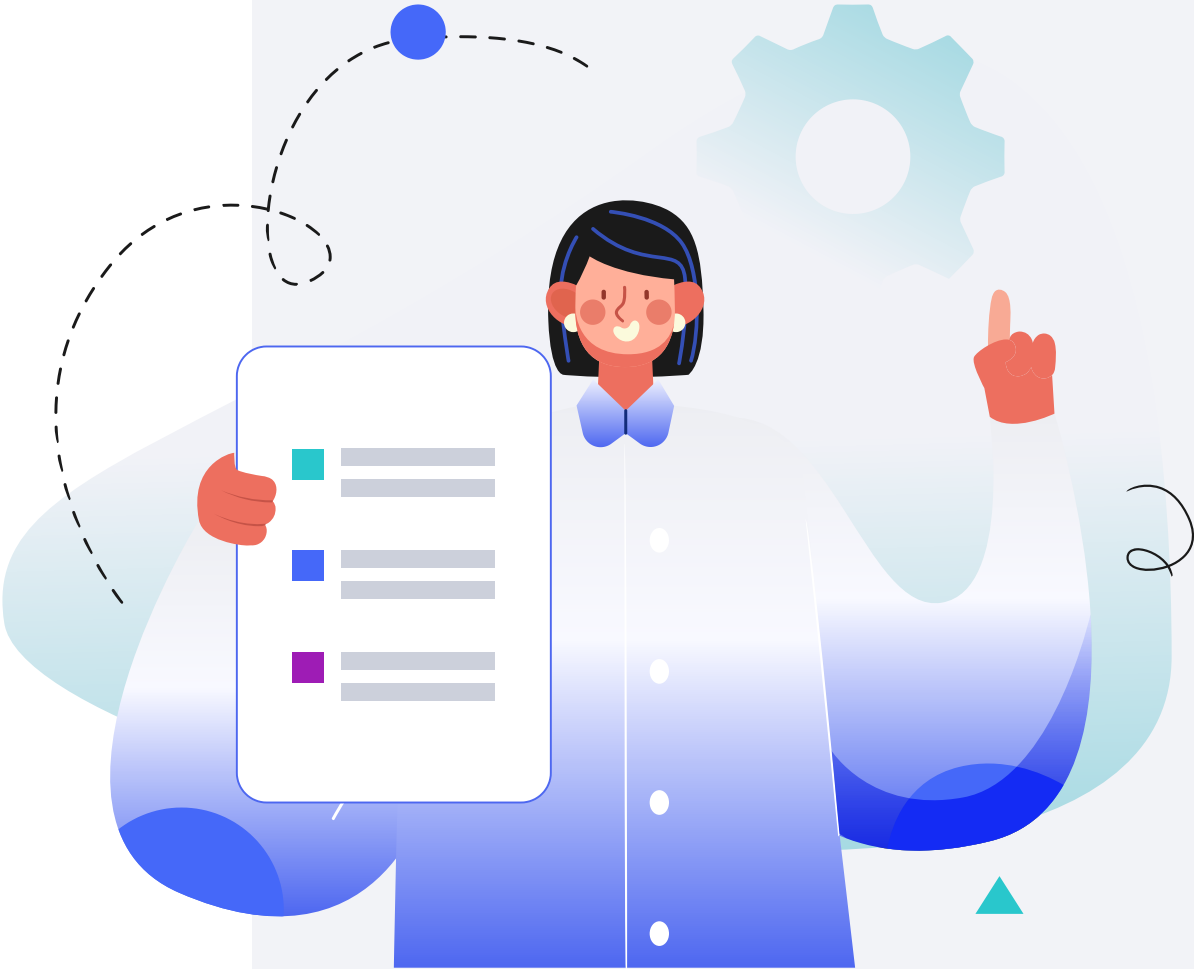
Male

HEIGHT

5ft 5" 165cm

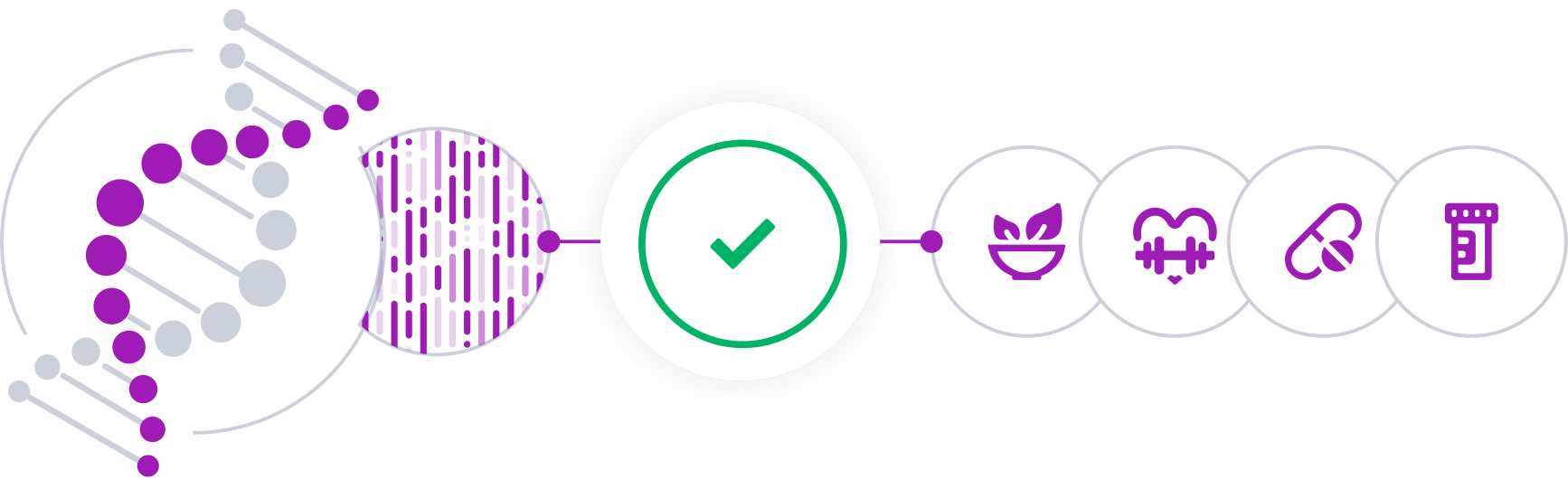
WEIGHT

137lb 62kg



How this works

Our Wellness Reports analyze how your DNA influences your health.
We then use this analysis to give you personalized risk estimates and recommendations.

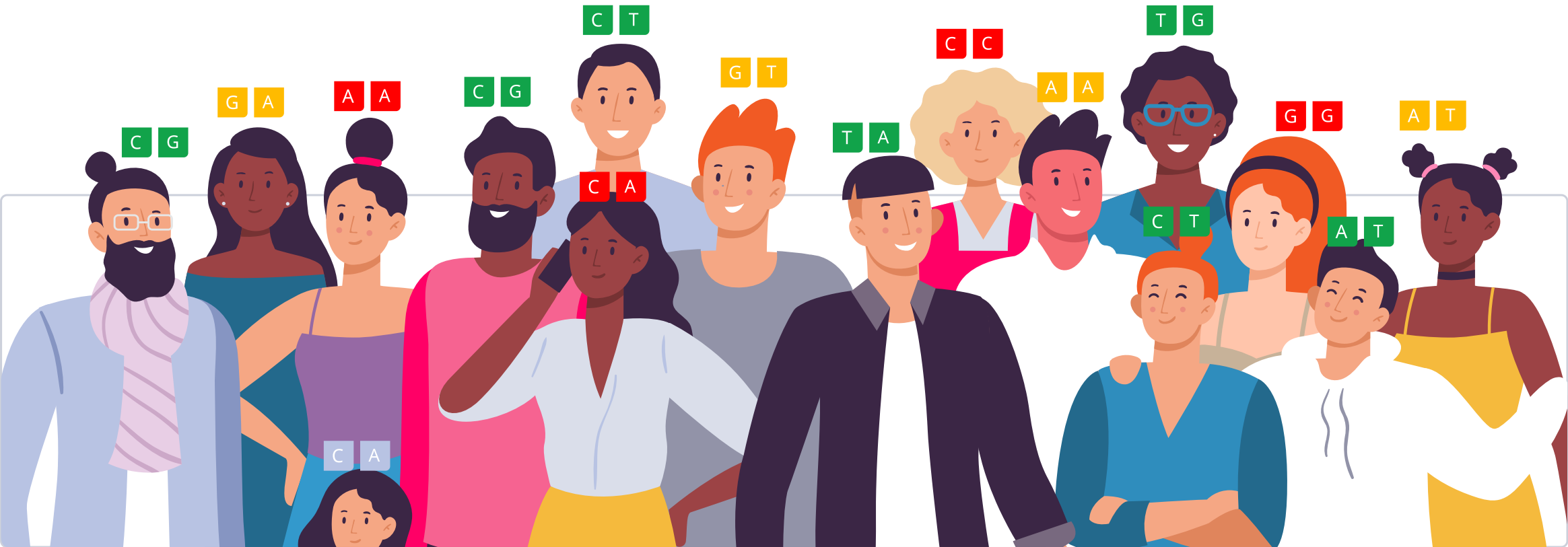


Similarly, our Trait Reports look at how your DNA influences your traits.



Your DNA is like an instruction manual — it contains a lot of information.
You can think of it as a blueprint for your body.

Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.



We use artificial intelligence and machine learning to analyze all this information.
We then summarize your results as a risk score or display it on a gauge.

In total, we analyze up to 83 million genetic variants.

When we give a risk score, the risk icon tells you if you are at a higher or lower risk compared to other people:



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

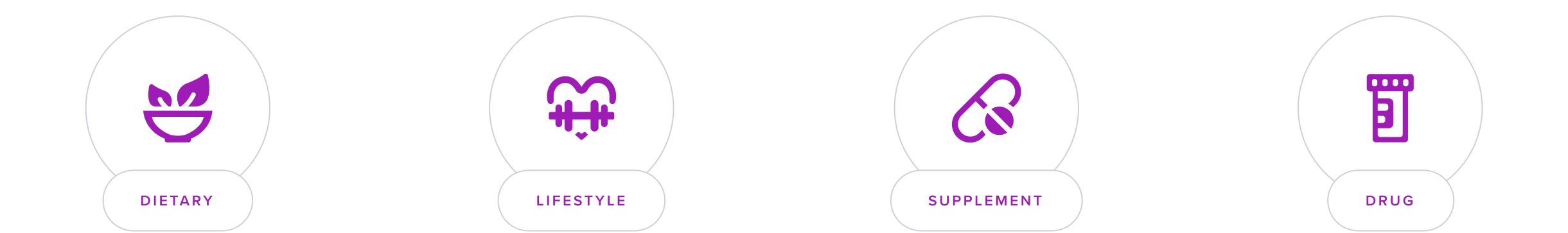
You have 2 risk alleles

Your risk is also displayed as a percentile. This will tell you how your risks compare to our sample population. The lower your percentile number, the lower your risk. The "50th percentile" would be an average risk.

Similarly, the gauge tells you your relative risk score compared to our sample population, or it indicates a specific trait or haplotype you are more likely to have based on your genetic variants.

When applicable, we also list top evidence-based recommendations that may help lower your risk. The focus is on recommendations that may be of benefit to you, based on your genetics.

Our recommendations come in four categories: lifestyle, diet, supplements and drugs.
The following icons tell you which category a recommendation falls into:



Our team of scientists also ranks each recommendation.
We rank based on impact and the strength of evidence in the medical literature.

Impact shows how strongly a recommendation will affect your health in a certain area.
Evidence is how much scientific support there is for the recommendation. Rankings are from 1 to 5 (low to high):



Impact

Impact scores range from 1-5. These scores reflect how much of an effect each recommendation can have. An impact score of 5 predicts the biggest effect.

When a recommendation affects something we can measure, we use those measurements to assign the impact score. For example, a recommendation that decreases cholesterol by 20% will have a higher impact score than one that decreases it by 5%.

Some recommendations affect things that we cannot directly measure, like stress or mood. For these, the impact score is based on how well they work relative to other recommendations and standard treatments. The best ones get the highest scores.

If there is a lot of research that shows a recommendation works especially well for your genotype, the impact score gets increased.

Recommendation Evidence

- 5 / 5
- Recommendations that are considered effective and generally recommended by experts and medical bodies.
-
- 4 / 5
- Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.
-
- 3 / 5
- Recommendations that are considered possibly effective and have many studies supporting them
-
- 2 / 5
- Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.
-
- 1 / 5
- Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.
-
- 0 / 5
- No evidence in humans.

Genotype-specific Evidence

- High-quality
- Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).
-
- Medium-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).
-
- Low-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).
-
- Indirect
- A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).
-
- In theory
- A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

- Genetics doesn’t play a considerable role in a condition or a trait.
- There is not enough research available to estimate a genetic predisposition.
- There are technical limitations to estimating or presenting a genetic predisposition.
- The topic is sensitive, and a genetic predisposition should only be estimated and presented by a healthcare professional.

Introduction

The [HTR2A](#) gene helps produce a [serotonin](#) receptor, 5HT2A [\[R\]](#).

5HT2A receptors are commonly found in brain cells, platelets, the heart, joints, immune cells ([monocytes](#)), and the [vagus nerve](#). In the brain, these receptors are concentrated in the prefrontal cortex, amygdala, and hippocampus--areas implicated in learning, memory, and overall cognitive ability [\[R, R, R, R, R, R, R\]](#).

Some researchers hypothesize that 5HT2A receptors decrease with age. The activity of these receptors may also follow the [circadian rhythm](#), becoming more or less active during certain parts of the sleep-wake cycle [\[R\]](#).

Serotonin is a crucial chemical messenger throughout the brain and body. It's sometimes called the "happiness hormone" due to its prominent role in mood and mental health. It helps control [\[R, R, R, R, R, R, R\]](#):

- Mood and emotions
- Movement
- Sleep
- Appetite
- Digestion
- Blood vessel function
- Immunity
- Reproductive health

However, more serotonin is not necessarily better. Excessive levels can cause [serotonin syndrome](#), a serious medical condition, and worsen some mental health problems [\[R, R\]](#).

HTR2A Genetics

The most widely investigated variant is [rs6313](#). Its minor ‘A’ allele increases the number of active receptors. This variant has been associated with an increased risk of [\[R\]](#), [\[R\]](#):

- [Chronic pain](#), including hip and low back pain [\[R\]](#), [\[R\]](#)
- [Panic disorder](#) [\[R\]](#)

Carriers may also require higher doses of anesthetic drugs (propofol) and longer times to induce sedation [\[R\]](#).

However, it may be protective against:

- [Fatigue disorders](#) such as chronic fatigue syndrome and fibromyalgia [\[R\]](#)
- [Headaches](#) [\[R\]](#)
- IBS [\[R\]](#)
- Temporomandibular joint disorders [\[R\]](#)
- Suicide attempts [\[R\]](#)

Another well-researched variant is [rs6311](#). Its minor ‘T’ variant is usually inherited together with the ‘A’ variant at rs6313 and also increases the number of active 5HT2A receptors. This variant has been associated with [\[R\]](#), [\[R\]](#):

- Increased odds of chronic pain, including hip and low back pain [\[R\]](#), [\[R\]](#)
- Greater depressive symptoms [\[R\]](#)
- Increased risk of IBS [\[R\]](#)

However, this variant may be protective against:

- Headaches [\[R\]](#)
- Rheumatoid arthritis [\[R\]](#)

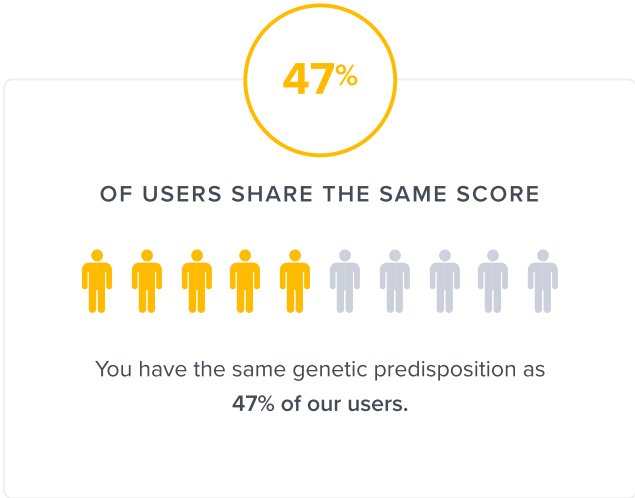
Interestingly, this variant has been associated with decreased aggressiveness and social dominance. This was linked to being a worse [speed dater](#) in men but better in women [\[R\]](#).

Finally, two variants believed to impair serotonin signaling (‘A’ at [rs7322347](#) and ‘C’ at [rs7984966](#)) have been associated with an increased risk of [ADHD](#) [\[R\]](#), [\[R\]](#).



TYPICAL ACTIVITY

Likely typical HTR2A activity based on the genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
HTR2A	rs6313	GA
HTR2A	rs6311	CT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Your Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your genetics, 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	Acupuncture	1 hour	
2	Feverfew	50 mg	
3	Probiotics	30 billion CFU	
4	Magnesium	350 mg	
5	Tryptophan	500 mg	
6	Progressive Muscle Relaxation	10 minutes	
7	Mindfulness-Based Stress Reduction (MBSR)	2 hours	
8	Aerobic Exercise (Cardio)	1 hour	
9	5-HTP	100 mg	
10	Cognitive-Behavioral Therapy (CBT)		
11	Relaxation Techniques	30 minutes	
12	Breathing Techniques	10 minutes	
13	Maintain Optimal Vitamin D Levels	1000 iu	
14	Good Eating Habits		

1



Acupuncture

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Visit a licensed acupuncturist for a session, typically lasting between 30 to 60 minutes, once or twice a week. Depending on your specific condition, a course of treatment might range from a few weeks to several months.

TYPICAL STARTING DOSE

1 hour

Description

Acupuncture is a part of traditional Chinese medicine. It involves inserting thin needles at specific points on the body. People use it to relieve pain and allergies, as well as reduce nausea and improve sleep.

[Acupuncture](#) is a part of traditional Chinese medicine. It involves **inserting thin needles at specific points on the body**. People use it to [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Relieve pain
- Improve sleep quality
- Relieve allergies
- Reduce nausea

How it helps

According to decent clinical evidence, [acupuncture](#) may help with different types of chronic pain [\[R\]](#), [\[R\]](#).

It's also an alternative treatment approach with promising results in managing headaches, especially migraines [\[R\]](#), [\[R\]](#).

Acupuncture relieves pain partly by balancing serotonin levels and targeting the 5-HT2A receptors [\[R\]](#), [\[R\]](#).

2



Feverfew

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a feverfew supplement containing 50-150 mg daily, ideally choosing a product standardized to contain at least 0.2% parthenolide. This regimen should be continued daily for the prevention of migraines. Consult with a healthcare provider for personalized advice, especially if currently taking blood-thinning medications.

TYPICAL STARTING DOSE
50 mg

Description

Feverfew is an herbal remedy traditionally used to alleviate headaches and migraines. Some studies suggest that its compounds may have anti-inflammatory and pain-relieving effects, which can contribute to headache relief.

[Feverfew](#) (*Tanacetum parthenium*) is a member of the daisy family. People have used it for centuries to treat pain, such as [\[R\]](#):

- Headaches
- Joint pain
- Toothaches

How it helps

Folks have traditionally used [feverfew](#) for different pain types, including headaches. Clinical trials have confirmed its effectiveness for migraines [\[R, R, R, R\]](#).

Feverfew may help with chronic headaches by targeting the 5-HT2A receptor [\[R\]](#).

3



Probiotics

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a probiotic supplement containing 10 billion or more live cultures once daily, preferably with a meal or as directed by the packaging or a healthcare provider.

TYPICAL STARTING DOSE
30 billion CFU

Description

Probiotics are live beneficial bacteria and yeasts that can support gut health and digestive function when consumed as supplements or found in fermented foods like yogurt and sauerkraut. They may be beneficial to gut health, immune function, blood sugar, and mood.

Probiotic bacteria are “good” bacteria found mainly in the large intestine. They support your body and mind by [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Maintaining gut health
- Supporting a healthy immune system
- Improving your mood
- Helping to maintain healthy blood sugar

Prebiotics are certain types of fiber and other complex carbs that serve as food for gut bacteria. **They support gut health by helping boost the activity and growth of “good” bacteria** [\[R\]](#), [\[R\]](#).

Prebiotics are also added to foods and supplements. Common prebiotic ingredients are [\[R\]](#), [\[R\]](#):

- Oligo-fructose
- Oligo-galactose
- [Inulin](#)

Mixtures of probiotics and prebiotics are known as **synbiotics** [\[R\]](#).

How it helps

Genetic variants of the *HTR2A* gene may impair BDNF levels in the brain, causing an increase in cortisol and anxiety as a result.

The combination of [Bifidobacterium longum](#) and [Lactobacillus helveticus](#) taken daily for 30 days decreased anxiety, hostility, and levels of the stress-related hormone [cortisol](#) in healthy volunteers [\[R\]](#).

4



Magnesium

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take up to 350 mg of magnesium daily as a supplement, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

350 mg

Description

Magnesium is an essential mineral involved in various bodily functions, including muscle contractions, nerve signaling, and bone health. Maintaining adequate magnesium levels through diet or supplements can support overall well-being and reduce the risk of magnesium deficiency-related health issues.

[Magnesium](#) is an essential mineral. Your body needs it for [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Muscle, nerve, and bone function
- Blood sugar and blood pressure control
- DNA and protein production
- Strong immunity

Women need **310-320 mg** of magnesium per day, while men need **400-420 mg** [\[R\]](#).

Foods rich in magnesium include **nuts, seeds, and leafy greens**. Magnesium is also available as a supplement [\[R\]](#).

How it helps

[Magnesium](#) deficiency can impair serotonin levels and blood flow in the brain, potentially contributing to migraines [\[R\]](#), [\[R\]](#).

People with migraines and other [pain](#) disorders are often deficient in magnesium and may benefit from supplementation [\[R\]](#), [\[R\]](#).

High-dose magnesium citrate (600 mg) is possibly effective for migraine prevention [\[R\]](#).

5



Tryptophan

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of tryptophan supplement daily. This dosage can be taken all at once, preferably before bedtime to support sleep, or as directed by a healthcare professional.

TYPICAL STARTING DOSE

500 mg

Description

Tryptophan is an essential amino acid found in various protein-rich foods. It serves as a precursor for serotonin, a neurotransmitter that plays a role in mood regulation. Tryptophan is used in dietary supplements to potentially support mood and sleep disorders, although its effectiveness can vary among individuals.

[Tryptophan](#) is an amino acid. Your body uses it to make proteins and some hormones. **Humans can’t make tryptophan, so we need to get it from protein-rich foods** [\[R, R\]](#).

Your body uses tryptophan to make [serotonin](#) and [melatonin](#). **These brain chemicals are important for mood and sleep** [\[R, R\]](#).

An average adult needs at least **250-425 mg** of tryptophan per day, which is the amount you can get from [\[R\]](#):

- A pound of turkey or chicken
- Two cups of milk
- An ounce of canned tuna
- Two cups of oatmeal

Other foods high in tryptophan include **cheddar cheese, peanuts, pumpkin seeds, and seafood**. Most people get enough tryptophan from their diets, but supplements are also available [\[R, R\]](#).

How it helps

In the body, serotonin is made from 5-hydroxytryptophan ([5-HTP](#)), and 5-HTP is made from [L-tryptophan](#). Therefore, increasing the levels of either of these “building blocks” (metabolic precursors) can, in theory, lead to increased overall levels of serotonin [\[R\]](#).

Limited research suggests that taking L-tryptophan may raise plasma serotonin, and may improve certain cognitive, motor, or gut issues in those who are deficient [\[R, R\]](#).

6



Progressive Muscle Relaxation

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Set aside at least 10-15 minutes daily in a quiet, comfortable spot where you won't be disturbed. Start by tensing the muscles in your feet for 5 seconds, then relax for 30 seconds, and progressively work your way up through the major muscle groups of your body, tensing then relaxing each for 5 and 30 seconds respectively.

TYPICAL STARTING DOSE
10 minutes

Description

Progressive Muscle Relaxation is a relaxation technique involving the systematic tensing and releasing of muscle groups to reduce muscle tension, stress, and anxiety. Regular practice can lead to improved physical and mental relaxation.

Progressive muscle relaxation is a relaxation technique focused on releasing muscle tension. In this technique, you focus on tensing and relaxing different parts of your body, one after the other, to relieve stress [R](#), [R](#)].

It is common to start with the toes and slowly work your way up to the neck and head. Try to focus on a single muscle group at a time (for example, the calf muscles). Tense these muscles for 5-10 seconds, then relax for 20-30 seconds before moving on to the next muscle group [R](#), [R](#)].

How it helps

Genetic variants of the HTR2A gene may impair BDNF levels in the brain, causing an increase in cortisol and anxiety as a result. Cortisol, in turn, appears to decrease serotonin signaling [R](#)].

Relaxation therapy with breathing practices and muscle relaxation exercises has also been reported to help with fatigue from conditions such as chronic fatigue syndrome, multiple sclerosis, cancer, heart failure, and stem cell transplantation. However, CBT was more effective in those studies that compared both treatments [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#)].

7

Mindfulness-Based Stress Reduction (MBSR)

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Enroll in an 8-week MBSR course, which includes a weekly 2.5-hour class, one all-day class after the sixth week, and 45 minutes of daily home practice guided by assignments and instructional recordings.

TYPICAL STARTING DOSE

2 hours

Description

Mindfulness-Based Stress Reduction (MBSR) is a structured program that teaches mindfulness techniques to reduce stress and improve overall mental and emotional health. MBSR has been shown to help individuals cope with chronic pain, anxiety, and other stress-related conditions.

How it helps

Genetic variants of the HTR2A gene may impair BDNF levels in the brain, causing an increase in cortisol and anxiety as a result. Cortisol, in turn, appears to decrease serotonin signaling [R].

Cognitive-behavioral therapy (CBT) for stress management has been reported to reduce fatigue from [chronic fatigue](#) syndrome, fibromyalgia, and [multiple sclerosis](#) in several studies. Similarly, its combination with mindfulness [meditation](#) (mindfulness-based stress reduction) may help with fatigue from fibromyalgia and cancer [R, R, R, R, R].

8



Aerobic Exercise (Cardio)

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Engage in at least 150 minutes of moderate-intensity aerobic exercise or 75 minutes of vigorous-intensity activity each week. Distribute this time over at least 3 days per week, avoiding consecutive days of vigorous exercise to allow for recovery.

TYPICAL STARTING DOSE

1 hour

Description

Engaging in regular aerobic exercise, such as running, swimming, or cycling, offers numerous health benefits, including improved cardiovascular fitness, weight management, and mood enhancement. It supports overall physical and mental well-being while reducing the risk of chronic diseases.

Cardio, short for cardiovascular exercise, is any type of physical activity that temporarily increases your heart rate. Examples include **running, cycling, swimming, and brisk walking**.

Regular cardio exercise has many benefits for your overall health. It can help lower your risk of heart disease and diabetes, support weight loss, and improve your mood and energy levels. To get the most out of cardio, try to do it for at **least 30 minutes, 3-5 times a week**.

Interval training is a type of cardio that combines periods of high-intensity training with brief rest periods.

How it helps

Regular aerobic [exercise](#) improved attention deficit and other ADHD symptoms in multiple clinical trials [\[R, R, R\]](#).

Exercise boosts serotonin in the brain and increases the activity of 5-HT2A receptors [\[R, R\]](#).

9



5-HTP

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take 100 mg of 5-HTP as a supplement daily, ideally with a glass of water. It can be taken at any time of the day but taking it at the same time each day may help establish a routine.

TYPICAL STARTING DOSE

100 mg

Description

5-HTP is a building block for serotonin. 5-HTP and serotonin help make melatonin, a hormone that promotes sleep. People mainly use 5-HTP as a mood-boosting supplement. It may also help reduce appetite, help with chronic pain and fatigue, and improve sleep quality.

[5-HTP](#) is a building block for the “happiness hormone” [serotonin](#). 5-HTP and serotonin help make [melatonin](#), a hormone that promotes sleep [\[R\]](#).

People mainly use 5-HTP as a mood-boosting supplement [\[R, R\]](#). According to early research, it may also:

- Reduce appetite [\[R, R, R\]](#)
- Help with chronic pain and fatigue [\[R, R, R\]](#)
- Improve sleep quality [\[R, R\]](#)

Please note: 5-HTP can interact with SAM-e, St. John’s wort, and different medications. Combining it with antidepressants can be dangerous and even life-threatening. Never take 5-HTP without consulting your doctor [\[R, R, R\]](#).

How it helps

In the body, serotonin is made from 5-hydroxytryptophan ([5-HTP](#)), and 5-HTP is made from [L-tryptophan](#). Therefore, increasing the levels of either of these “building blocks” (metabolic precursors) can, in theory, lead to increased overall levels of serotonin [\[R\]](#).

In a small clinical trial of people suffering from fibromyalgia, supplementation with 5-HTP improved fatigue and other symptoms of the condition in half of the patients [\[R\]](#).

10



Cognitive-Behavioral Therapy (CBT)

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Schedule weekly sessions with a certified cognitive-behavioral therapist for a period of 5 to 20 weeks. Engage actively in exercises assigned by your therapist both during sessions and as homework to apply CBT strategies to daily life.

Description

Cognitive-behavioral therapy (CBT) is a psychotherapeutic approach that has been effective in treating various mental health conditions by helping individuals identify and change negative thought patterns and behaviors. It is widely used for conditions like depression, anxiety, and phobias.

Psychotherapy (talk therapy) involves talking about your health with a licensed therapist. It may improve the way you react to certain experiences [\[R\]](#).

Talk therapy is a great way to improve many conditions, including [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Depression
- Anxiety disorders
- PTSD
- OCD
- Substance use disorder
- Bipolar disorder

Cognitive-behavioral therapy (CBT) is a type of talk therapy. CBT aims to change the way you think about your life and yourself. Through CBT, a therapist can help you develop healthy coping mechanisms [\[R\]](#).

How it helps

Genetic variants of the HTR2A gene may impair BDNF levels in the brain, causing an increase in cortisol and anxiety as a result. Cortisol, in turn, appears to decrease serotonin signaling [\[R\]](#).

Cognitive-behavioral therapy (CBT) for stress management has been reported to reduce fatigue from [chronic fatigue](#) syndrome, fibromyalgia, and [multiple sclerosis](#) in several studies. Similarly, its combination with mindfulness [meditation](#) (mindfulness-based stress reduction) may help with fatigue from fibromyalgia and cancer [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

11



Relaxation Techniques

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate relaxation techniques such as deep breathing exercises, meditation, or yoga into your daily routine. Spend at least 15-30 minutes each day practicing one of these techniques, preferably in a quiet, comfortable space without interruptions.

TYPICAL STARTING DOSE

30 minutes

Description

Relaxation techniques encompass various methods like deep breathing, yoga, meditation, and progressive muscle relaxation, aimed at reducing stress and promoting mental and physical relaxation. Practicing these techniques regularly can help manage stress, improve mental clarity, and enhance overall emotional well-being.

We all get stressed from time to time.

[Stress](#) can help you deal with a challenge or avoid danger. However, **it’s not healthy to be stressed for a long time** [\[R\]](#), [\[R\]](#).

Relaxation techniques such as [yoga](#) and [meditation](#) can relieve stress in different ways. Most of them focus on breathing and help you get rid of negative thoughts and emotions [\[R\]](#).

People use relaxation techniques to improve conditions like [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Anxiety
- Depression
- Chronic pain

Progressive muscle relaxation is another relaxation technique. In this technique, you focus on tensing and relaxing different parts of your body. It is common to start with the toes and slowly work your way up to the neck and head [\[R\]](#), [\[R\]](#).

Autogenic training is a relaxation technique that a person may carry out on their own. It uses exercises that take the mind’s attention to bodily sensations such as warmth and heaviness [\[R\]](#), [\[R\]](#).

How it helps

Genetic variants of the HTR2A gene may impair BDNF levels in the brain, causing an increase in cortisol and anxiety as a result. Cortisol, in turn, appears to decrease serotonin signaling [\[R\]](#).

Relaxation therapy with breathing practices and muscle relaxation exercises has also been reported to help with fatigue from conditions such as chronic fatigue syndrome, multiple sclerosis, cancer, heart failure, and stem cell transplantation. However, CBT was more effective in those studies that compared both treatments [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

12



Breathing Techniques

IMPACT

2 / 5

EVIDENCE

2 / 5

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

Description

Breath awareness and specific breathing techniques, such as deep breathing or mindfulness-based practices, can help reduce stress, improve focus, and enhance overall mental well-being. These techniques are valuable tools for managing anxiety and promoting relaxation.

Most breathing techniques involve taking slow and even breaths. Their main goal is to prevent rapid breathing (**hyperventilation**) [\[R\]](#).

Breathing techniques tend to help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Stress
- Anxiety
- Sleep problems
- Asthma

One example is the **Buteyko breathing technique**. It's often used by people with asthma or other conditions that affect the lungs [\[R\]](#).

Another example is **yogic breathing**. [Yoga](#) is a practice that combines breathing techniques with exercise and meditation [\[R\]](#), [\[R\]](#).

How it helps

Genetic variants of the HTR2A gene may impair BDNF levels in the brain, causing an increase in cortisol and anxiety as a result. Cortisol, in turn, appears to decrease serotonin signaling [\[R\]](#).

Relaxation therapy with breathing practices and muscle relaxation exercises has also been reported to help with fatigue from conditions such as chronic fatigue syndrome, multiple sclerosis, cancer, heart failure, and stem cell transplantation. However, CBT was more effective in those studies that compared both treatments [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

13

Maintain Optimal Vitamin D Levels

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Check your vitamin D levels, they should ideally be in the 30-66 ng/mL range. If your levels are lower than that, take a vitamin D supplement, 1000-4000 IU daily, to reach an optimal range.

TYPICAL STARTING DOSE

1000 iu

Description

Vitamin D, often referred to as the "sunshine vitamin," can be synthesized by the skin when exposed to sunlight, as well as being found in fish, eggs, and fortified milk. It helps regulate calcium absorption, promoting strong bones and a healthy immune system. Vitamin D deficiency can lead to conditions like rickets in children and osteoporosis in adults.

Your body needs [vitamin D](#) for strong bones. Vitamin D also plays a role in [\[R\]](#):

- Mood
- Immunity
- Heart health
- Blood sugar control

[Sunlight](#) is our main source of vitamin D. Experts recommend getting at least **5-15 minutes of midday sun, 2-3 times per week**. People with darker skin and those living at high latitudes may need longer periods of sun exposure [\[R, R\]](#).

Foods like fish, eggs, and fortified milk provide small amounts of vitamin D. **People lacking vitamin D should consider taking a supplement** [\[R\]](#).

How it helps

[Vitamin D](#) helps the body make, release, and use serotonin, including in the brain by activating an enzyme that converts tryptophan into serotonin. If vitamin D levels are low, our brains make less serotonin. Thus, increasing vitamin D intake may increase serotonin levels, thereby potentially supporting mental health [\[R, R\]](#).

Many studies have associated [vitamin D](#) deficiency with fatigue and muscle weakness, although not all people with this deficiency experience these symptoms [\[R, R, R, R\]](#).

Unsurprisingly, correcting vitamin D deficiency with supplements improved fatigue in both healthy people and those with various diseases [\[R, R, R, R, R\]](#).

14



Good Eating Habits

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate a variety of fruits, vegetables, whole grains, lean proteins, and healthy fats into your meals daily. Aim to eat at regular intervals, ideally three meals and one to two healthy snacks per day, to maintain energy levels and avoid overeating. Reduce consumption of processed foods, sugary snacks, and beverages.

Description

Practicing good eating habits, such as balanced and portion-controlled meals, can help maintain a healthy weight, support proper nutrition, and reduce the risk of chronic diseases.

Eating habits involve the how, what, when, and where of your diet. Some eating habits can be good for your health, but others... not so much.

Good eating habits include [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Planning and preparing most of your meals
- Eating mindfully and slowly
- Only eating when hungry
- Not skipping meals

Developing good eating habits takes attention, practice, and effort [\[R\]](#).

How it helps

Snacking late at night (after 10 pm), was found to have a host of negative health impacts, including increased anxiety and cortisol levels. This was in comparison with individuals who only ate between 6 am and 10 pm [\[R\]](#).

Next Steps

Remember, your genes only tell one important part of your health story!

Now that you've seen your DNA-based results for this health topic, let's take a look at other contributing factors.

Your lab results

Your lab results are impacted by the combined effect of your genes, environment and lifestyle.

Lab tests will give you the best picture of your current health status, while your genes provide insight into your health predispositions and which recommendations are best for you.