

RGS2 (Anxiety)

Gene Report

REPORT CATEGORY —



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

19 Next Steps

- 19 Your Lab Results

Personal information

NAME

Sample Client

SEX AT BIRTH

Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg

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

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

G protein-coupled receptors are proteins that turn information from outside of the cell into changes inside of the cell. The [RGS2](#) gene encodes a protein called ‘regulator of G protein signaling 2’. It can reduce the activity of these receptors, leading to lower levels of certain cell functions [\[R, R, R\]](#).

RGS2 is found in higher amounts in parts of the brain that are related to emotion. The relationship between *RGS2* and mental health is highly complex. In brief, however, variants that decrease RGS2 levels may prevent the brain from appropriately regulating fearful emotions. As a result, these variants may lead to increased susceptibility to [anxiety](#) and [PTSD](#) [\[R, R, R\]](#).

RGS2 Genetics and Anxiety

Some variants produce less RGS2 protein. As a result, fewer G protein-coupled receptors will turn off and your brain becomes more active than normal, leading to anxiety. Some of these variants include [\[R\]](#), [\[R\]](#):

- ‘C’ at [rs4606](#)
- ‘G’ at [rs10801153](#)
- ‘G’ at [rs16834831](#)
- ‘A’ at [rs1890397](#)
- ‘A’ at [rs16829458](#)



LOWER ACTIVITY

Likely lower RGS2 activity based on 5 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
RGS2	rs10801153	GG
RGS2	rs4606	CC
RGS2	rs16834831	TG
RGS2	rs1890397	AG
RO60	rs16829458	GG

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	Cognitive-Behavioral Therapy (CBT)	2	Psychotherapy1 hour
3	Progressive Muscle Relaxation10 minutes	4	Music Therapy30 minutes
5	Limit Caffeine Intake	6	Meditation30 minutes
7	Relaxation Techniques30 minutes	8	Mindfulness Meditation30 minutes
9	Maintain Optimal Vitamin D Levels1000 iu		

1



Cognitive-Behavioral Therapy (CBT)

IMPACT

5 / 5

EVIDENCE

5 / 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

CBT (8-20h of sessions) is the best type of psychotherapy for anxiety. Health experts worldwide recommend CBT as the “gold standard” treatment for anxiety [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

CBT can soothe anxiety by helping you [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Cope with stress
- Control negative thoughts and emotions
- Improve social skills
- Build stronger relationships

Studied forms of CBT include [\[R\]](#), [\[R\]](#):

- In-person
- Internet-based
- Self-guided

Psychotherapy

IMPACT

5 / 5

EVIDENCE

5 / 5

How to implement

Schedule and attend regular sessions with a licensed psychotherapist, typically once a week for 50-60 minutes, over a period of several months to years depending on your individual needs and progress. Consistency is key, and the duration can vary widely based on personal goals and the type of psychotherapy being practiced.

TYPICAL STARTING DOSE

1 hour

Description

Psychotherapy is a broad term for therapeutic approaches that address mental and emotional health issues through talking and counseling. It can be used to treat a wide range of psychological and emotional challenges.

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

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

- Depression
- Anxiety disorders
- PTSD
- OCD
- Weight problems
- Eating disorders

Cognitive-behavioral therapy (CBT) is a type of psychotherapy. 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

Cognitive-behavioral therapy (CBT) is the best type of psychotherapy for anxiety. Health experts worldwide recommend CBT as the “gold standard” treatment for anxiety [R, R, R].

CBT can soothe anxiety by helping you [R, R, R]:

- Cope with stress
- Control negative thoughts and emotions
- Improve social skills
- Build stronger relationships

Other types of psychotherapy that may help with anxiety include:

- **Cognitive bias modification:** teaches you not to focus on negative information [R, R]
- **Art therapy:** helps you manage and express your feelings through art [R, R, R]
- **Animal-assisted therapy:** involves human-animal interaction to foster emotional healing [R, R]

Progressive Muscle Relaxation

IMPACT

EVIDENCE

4 / 5

4 / 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

In a non-placebo-controlled trial of nursing students, practicing progressive muscle relaxation, both alone and combined with listening to nature sounds, reduced anxiety and pulse rates [R].

In a non-placebo-controlled trial of 162 patients with a primary diagnosis of anxiety disorder or major depressive disorder, both progressive muscle relaxation and auricular acupuncture were equally effective at improving tension, anxiety, and anger/aggression. Progressive muscle relaxation failed to improve memory performance but did reduce state anxiety in a non-placebo-controlled trial of 15 elderly adults performing a memory task [R, R].

A meta-analysis of 12 trials and 1147 cancer patients found that progressive muscle relaxation improves anxiety and other health-related outcomes. Another meta-analysis (4 studies and 224 patients) found that progressive muscle relaxation improves anxiety in patients with COVID-19 [R, R].

Progressive muscle relaxation also reduced anxiety in multiple trials on 128 patients undergoing dental procedures, 126 pregnant women, 141 women undergoing in vitro fertilization, 142 caregivers, 106 patients with schizophrenia, 80 burn patients, 25 patients with atopic dermatitis, 90 women with ectopic pregnancy, 187 cancer patients, 54 parents of children with cancer, 155 patients with COPD and other breathing disorders, 152 patients with obstructive sleep apnea, 84 extremity surgery patients, 70 patients undergoing upper and lower gastrointestinal surgery, and 93 patients undergoing a knee arthroscopy [R, R, R, R, R, R, R, R, R, R, R, R, R, R].

How to implement

TYPICAL STARTING DOSE

30 minutes

Description

Music therapy provides tools for body relaxation and positive imagery. It aims to improve communication, quality of life, and well-being [R, R].

How it helps

Music therapy may help by stimulating the brain to produce feel-good chemicals like serotonin.

5



Limit Caffeine Intake

IMPACT4 / 5

EVIDENCE4 / 5

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.

Description

Although caffeine is the world's most popular stimulant, some people choose to limit or avoid it due to potential adverse effects on their sleep, mood, or blood pressure.

How it helps

Caffeine can worsen anxiety, especially in sensitive people. People who consume **over 1000 mg of caffeine per week** (143 mg per day) are more likely to be anxious. That would include anyone who drinks 2+ cups of coffee, 4+ cups of black tea, or 4+ cans of cola per day [\[R\]](#), [\[R\]](#), [\[R\]](#).

Caffeine can reduce the levels of [GABA](#), a mind-calming chemical. **People who consume a lot of caffeine might have a stronger reaction to stressful situations** [\[R\]](#), [\[R\]](#).

6



Meditation

IMPACT

4 / 5

EVIDENCE

4 / 5

How to implement

Set aside 10-20 minutes each day in a quiet space without distractions to practice meditation. Focus on your breath or perform guided meditation using an app or audio track.

TYPICAL STARTING DOSE

30 minutes

Description

Meditation is a mindfulness practice that can reduce stress, improve mental clarity, and promote relaxation. Regular meditation is associated with numerous mental and emotional health benefits, including reduced anxiety and enhanced emotional well-being.

Meditation is a relaxation technique that trains your mind to focus and redirect your thoughts. Some of the main types of meditation are [\[R\]](#):

- Mindfulness
- Focused
- Transcendental
- Mantra
- Moving

People use meditation to improve [\[R\]](#), [\[R\]](#):

- Stress and anxiety
- Mood
- Sleep disturbances
- Pain

How it helps

A meta-analysis of 14 trials and 862 participants concluded that meditation is a bit more effective than relaxation techniques at improving anxiety, both in the short term and at 12-month follow-up [\[R\]](#).

Interestingly, a review of 41 trials and 2,993 participants concluded that mindfulness is the only form of meditation that reliably improves anxiety [\[R\]](#).

Meditation may help by stimulating relaxation and enhancing emotional regulation.

7



Relaxation Techniques

IMPACT

4 / 5

EVIDENCE

4 / 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

Stress plays a major role in anxiety. **Relaxation techniques may help by reducing stress and promoting calmness and positivity** [\[R, R, R, R\]](#).

Relaxation techniques that may improve anxiety include [\[R, R, R\]](#):

- **Applied relaxation:** teaches you to recognize anxiety triggers and relax when they occur [\[R, R, R, R\]](#)
- **Mindfulness meditation:** helps you be non-judgmental and aware of the present moment [\[R, R, R\]](#)
- **Yoga:** combines breathing, stretching, and meditation to achieve calmness [\[R, R\]](#)
- **Massage:** relaxes your body and mind by applying pleasant physical touch [\[R, R, R, R\]](#)

8



Mindfulness Meditation

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

Practice mindfulness meditation for 10-20 minutes daily. Find a quiet, comfortable place to sit or lie down, then focus on your breath, observing thoughts and sensations without judgment. Consistency is key, so try to incorporate it into your daily routine, perhaps in the morning or before bed.

TYPICAL STARTING DOSE
30 minutes

Description

Mindfulness meditation involves focused attention on the breath or a specific point of focus to cultivate mindfulness and reduce stress. Regular meditation practice is associated with improved mental clarity, emotional regulation, and overall well-being.

How it helps

A review of 41 trials and 2,993 participants concluded that mindfulness is the only form of meditation that reliably improves anxiety [R].

Mindfulness meditation may help by reducing rumination and promoting relaxation.

9



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

Low vitamin D levels may be associated with a higher risk of anxiety [\[R, R\]](#).

In line with this, supplementation with vitamin D may help reduce anxiety symptoms. Vitamin D may help by supporting the proper function of the gut bacteria [\[R, R, R\]](#).

Protein kinase C (PKC), which has been associated with increased RGS2 levels, requires calcium to function properly. A study in rats also found that PKC appears to be activated by both calcium and vitamin D. One way to increase calcium levels is to take vitamin D supplements [\[R, R, R\]](#).

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.