

# Fatigue

## Summary Report

REPORT CATEGORY —



PAIN & FATIGUE

Report date: 10 January 2024

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REPORT PROVIDED BY

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## DISCLAIMER

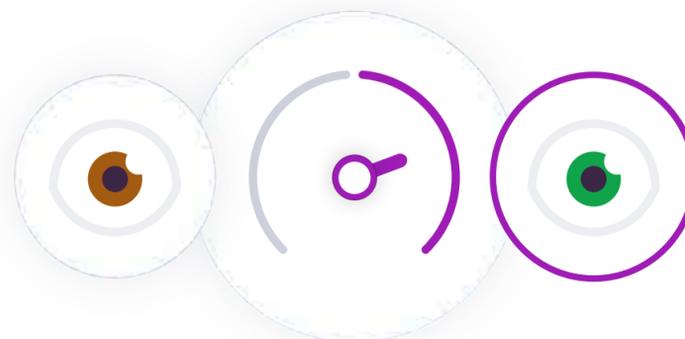
This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

# How this works

Our Health 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.

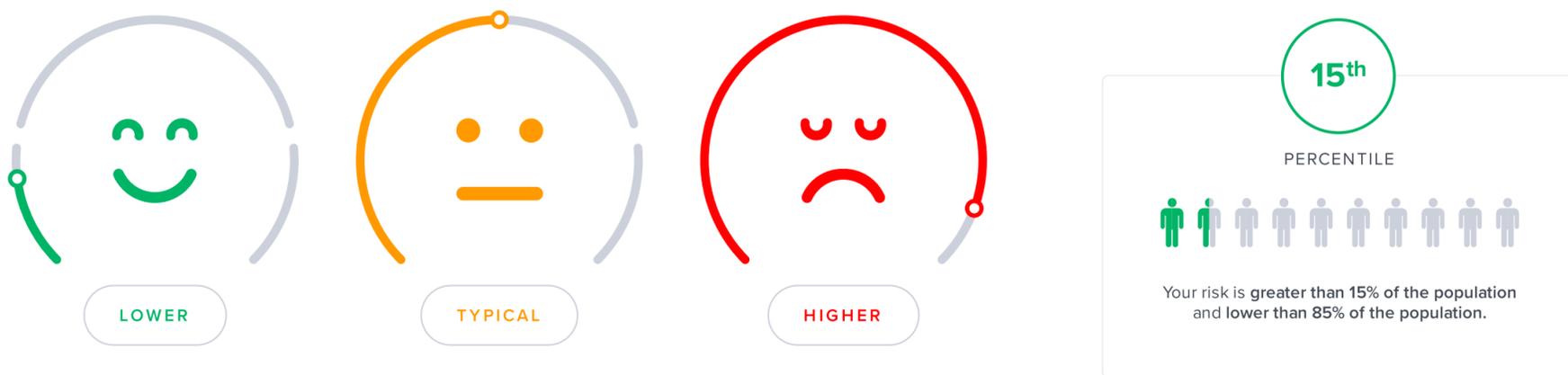
Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.

Our Summary Reports combine different Wellness and Trait Reports related to a certain health topic. They give you a more complete picture about different aspects of your health and wellness.



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

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



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: diet, lifestyle, 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 strength of evidence.**

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



**In Summary Reports, we combine top evidence-based recommendations for different conditions.**

**We focus on recommendations that help with more conditions included in a Summary Report.**

For each recommendation, we list all conditions it may help with. We also include impact, evidence, regimen, personalized parts, and other details specific to each condition.

1



## Recommendation

Helps with the following



Condition

IMPACT  
●●●●● 4 / 5

EVIDENCE  
●●●●● 4 / 5



Condition

IMPACT  
●●●●● 4 / 5

EVIDENCE  
●●●●● 4 / 5



Condition

IMPACT  
●●●●● 4 / 5

EVIDENCE  
●●●●● 4 / 5



Condition

IMPACT  
●●●●● 4 / 5

EVIDENCE  
●●●●● 4 / 5

# 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:

- The scores/gauges use the latest scientific studies. But they are not perfect and will change as the models improve.
- Not everyone with risk variants will develop a health condition.
- Genetics is not the whole story. Your health is most often a combination of genetics, lifestyle, and environmental factors. Great news, as this means that you can often change your lifestyle to lower your risk.
- Results might be more accurate for some ethnic groups than others. This depends on the studies used in each report.
- People without risk variants can also develop health conditions.
- It's important to work with your doctor to better understand your risks. Our reports do not diagnose or treat any health condition. They are not a substitute for medical advice. If you're diagnosed with a certain health condition, follow your doctor's advice.

# Summary

Sluggish, can't think straight, and tired most of the day? Or is it just at certain times? Fatigue is a normal part of life, but it can also be a serious health issue.

Chronic fatigue is one of those things that is easy to brush off, because, "Hey! Everyone gets tired." However, chronic fatigue is a significant factor in work injuries, obesity, depression, and heart disease, to name a few.

**Genetics creates unique responses to fatigue, as what makes *you* fatigued mentally or physically may have no impact on someone else.**

This comprehensive report will help you discover genetic risk factors related to fatigue and use this information to make smarter health decisions. Covered areas include:

- Overall fatigue
- Mental fatigue
- Physical fatigue
- Sleep disturbances

This summary report contains:

**17** Genetic Results

**50** Recommendations

# Overview of Your Results

## Overall Fatigue

 **TYPICAL LIKELIHOOD**  
**Low Energy (Chronic Fatigue)**

Typical likelihood of fatigue

 **HIGHER**  
**Red Blood Cells**

Likely higher red blood cell count

 **MORE LIKELY**  
**Anemia**

More likely to have anemia

 **INCREASED NEED**  
**Iron**

Likely increased need for iron

 **HIGHER LEVELS**  
**Hemoglobin**

Likely higher hemoglobin levels

## Mental Fatigue

 **TYPICAL LIKELIHOOD**  
**Brain Fog**

Typical likelihood of brain fog

 **TYPICAL LIKELIHOOD**  
**Low Mood**

Typical likelihood of chronically low mood

## Physical Fatigue

 **TYPICAL**  
**Exercise Recovery**

Likely typical recovery after exercise

 **TYPICAL**  
**Endurance**

Likely typical endurance

 **HIGHER**  
**Aerobic Capacity (VO2 Max)**

Likely higher VO2 max

# Sleep Disturbances



LESS LIKELY

**Insomnia**

Less likely to have insomnia



LESS LIKELY

**Sleep Movement**

Less likely to move during sleep



LESS LIKELY

**Restless Legs**

Less likely to have restless legs syndrome



TYPICAL LIKELIHOOD

**Sleep Apnea**

Typical likelihood of sleep apnea



MORE LIKELY

**Snoring**

More likely to snore



LESS LIKELY

**Daytime Sleepiness**

Less likely to experience daytime sleepiness



TYPICAL LIKELIHOOD

**Caffeine-Related  
Sleep Problems**

Typical likelihood of caffeine-related sleep problems

# Your Results in Details



## Overall Fatigue

Life throws stressors at you on a continual basis, some big and many small. Generally, your body and mind are designed to handle them. You have limits, however, both physically and mentally. **These limits are influenced by your genetics** and many other factors that can leave you drained of energy and in need of recovery.

Your genetic predispositions may make you more susceptible to fatigue in a direct way or affect other key players in fatigue, such as anemia. Knowing these factors can help you make better choices regarding your health regimen.



TYPICAL LIKELIHOOD

**Low Energy (Chronic Fatigue)**

Typical likelihood of fatigue



HIGHER

**Red Blood Cells**

Likely higher red blood cell count



MORE LIKELY

**Anemia**

More likely to have anemia



INCREASED NEED

**Iron**

Likely increased need for iron



HIGHER LEVELS

**Hemoglobin**

Likely higher hemoglobin levels

# Low Energy (Chronic Fatigue)

## Key Takeaways:

- Up to **40%** of differences in people's chances of having chronic fatigue may be due to genetics.
- Other risk factors include: serious infections, thyroid and liver problems, and nutrient deficiencies.
- Chronic fatigue is a rare condition, so even if your genetic risk is high, your actual risk is low.
- Chronic fatigue can cause poor sleep, brain fog, weakness, pain, gut issues, and flu-like symptoms.
- Click the **next steps** tab for relevant labs and lifestyle factors.

**Fatigue is our body's way of telling us it's time to rest and recover.** But what happens when that signal is sent too often, or all the time? What happens when normal, everyday activity is enough to drain you?

When fatigue goes on for more than 6 months, it's called *chronic fatigue* [R].

Chronic fatigue is often associated with [R, R, R, R, R, R, R, R]:

- Nutrient deficiency ([iron](#), [vitamin B12](#), [folate](#), [vitamin D](#))
- Thyroid problems
- Liver problems
- A recent serious infection

Chronic fatigue can lead to a decrease in social and physical activity. It can happen on its own or alongside chronic health conditions [R, R, R].

Some people can never seem to get their energy back, no matter how much they rest. This condition is known as *chronic fatigue syndrome*. It is a disabling condition that affects less than 1% of people [R, R].

Chronic fatigue can affect all parts of your body and may cause [R, R, R]:

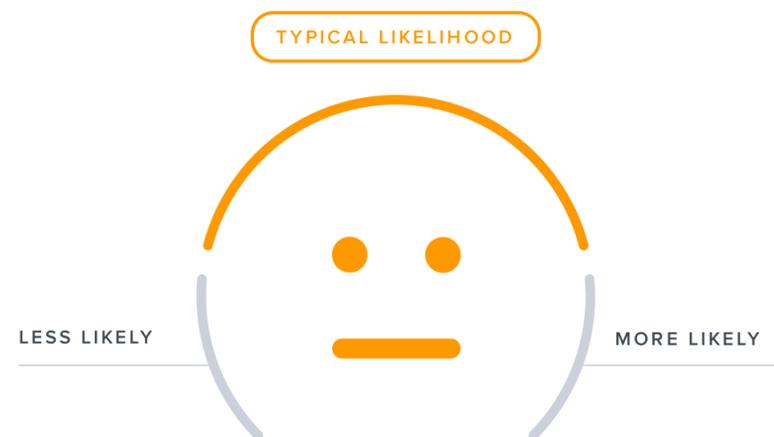
- Poor sleep
- Brain fog
- Weakness
- Pain
- Gut issues
- Flu-like symptoms

Unfortunately, there are no standard treatments for chronic fatigue. Many people try to manage their symptoms with alternative strategies [R, R].

Chronic fatigue seems to run in families. **Up to 40% of differences in people's chances of having chronic fatigue may be attributed to genetics** [R, R, R, R].

Genes that contribute to fatigue tend to influence [R]:

- The immune system (TNF, IL1B, IL4, IL6)
- Stress response (NR3C1, POMC)
- Sleep cycles (NPAS2)
- Brain chemistry (TPH2, GRIK2, MAOA, MAOB, COMT)



**Typical likelihood of fatigue based on 7,929 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
MAPT	rs242924	TG
ANKK1	rs6277	GA
THAP2	rs4570625	TG
COMT	rs4680	AG
ADRB2	rs1042714	CG
DRD3	rs6280	CT
NR3C1	rs852977	GA
CFH	rs1061170	TC
BLMH	rs2066713	GA
SPATA32	rs117228037	AA
SHISA4	rs2279681	GC
ARSA	rs1858756	GA
MEGF9	rs10985013	TT
TCF4	rs651350	AA
NTM	rs4937651	CC
EXD3	rs73581580	GA
CELF4	rs948536	AG
GRIA1	rs4644006	TC
NLGN1	rs529200	GA

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

# Red Blood Cells

**Red blood cells help carry oxygen from your lungs to all parts of the body.** Tissues can't function properly without enough oxygen. **Your red blood cell count measures the number of red blood cells in your blood.** Red blood cell count is usually measured as part of a complete blood count [R, R, R].

Causes of low red blood cell count include: [R, R]:

- Nutrient deficiency (iron, folate, vitamin B12)
- Blood loss
- Some health conditions

A low red blood cell count is also known as **anemia**. Symptoms of anemia include [R]:

- Fatigue and weakness
- Pale or yellowed skin
- Shortness of breath
- Dizziness
- Cold hands and feet

If you have anemia, it's important to work with your doctor and address the root cause.

A high red blood cell count can be caused by several factors, but it doesn't necessarily mean that you have a health condition. Causes of high red blood cell count include [R, R]:

- Smoking
- Heart disease or lung disease
- Living at a high altitude
- Dehydration

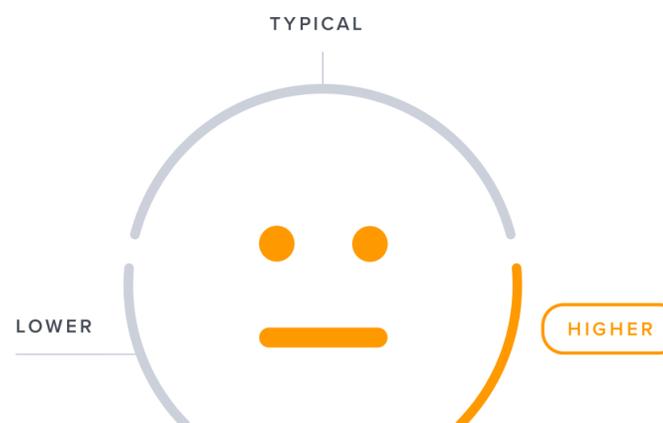
High red blood cell counts can cause [R]:

- Fatigue
- Itchy skin
- Nosebleeds
- Headaches
- Shortness of breath
- Blood clots

Talk to your doctor if your red blood cell count is high and you are experiencing any of these symptoms.

Your genes play a role in your red blood cell count! Up to **65%** of differences in people's red blood cell count may be due to genetics [R, R].

Genetically predicted higher fasting insulin and high blood pressure (diastolic) may be associated with a higher red cell count [R, R].



**Likely higher red blood cell count based on 20,485 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
/	rs145910606	TT
KIT	rs218265	CT
TMEM72	rs2281841	CC
FADS2	rs174574	CC
TBX2	rs11657044	CC
PRKAG2	rs6464165	TC
FARSA	rs8110787	CT
LMF2	rs140522	TC
IKZF1	rs6592965	AG
PTPRC	rs1434282	TC
SH2B3	rs3184504	TC
SBF2	rs368417629	TG
/	rs3059421	IT
BET1L	rs11245997	GA
ATP2B4	rs4951074	GA
MAP4K5	rs12881869	CT
THRB	rs1505307	CT
PIZO1	rs837763	TC
C11ORF21	rs16928078	CT

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

# Anemia

## Key Takeaways:

- Up to **90%** of differences in people's hemoglobin levels may be due to genetics.
- Other risk factors include iron or vitamin B deficiency, certain diseases and medications, infections, toxic chemicals, alcohol misuse, blood loss, pregnancy, and aging.
- About **1 out of 20** people in the United States may be anemic.
- If your genetic risk is high, you may reduce your overall risk by taking action on factors that you can change.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

Red blood cells contain a protein called hemoglobin. This protein binds oxygen and transports it throughout the body. People with **anemia** don't have as much hemoglobin or red blood cells as others. This means that their tissues have trouble getting enough oxygen [\[R, R\]](#).

**About 1 out of 20 people in the United States may be anemic** [\[R\]](#).

To produce hemoglobin and red blood cells, your body needs nutrients from the foods you eat. Vitamin and mineral deficiencies that may cause anemia include [\[R\]](#):

- **Iron deficiency**
- B vitamin (folate or vitamin B12) deficiency

The following may also cause or contribute to anemia [\[R\]](#):

- Some diseases (e.g., HIV/AIDS, cancer, or Crohn's disease)
- Infections
- Some medications
- Toxic chemicals
- Alcohol misuse
- Blood loss, including during a period
- Pregnancy
- Aging
- **Genetics** (e.g., sickle cell disease, thalassemia)

People with anemia may experience symptoms such as [\[R\]](#):

- Fatigue and weakness
- Pale or yellowed skin
- Irregular heartbeat
- Shortness of breath
- Dizziness
- Chest pain
- Cold hands and feet
- Headaches

Untreated anemia can cause extreme fatigue and make it difficult to live your day-to-day life. If severe, it can cause life-threatening complications [\[R, R\]](#).

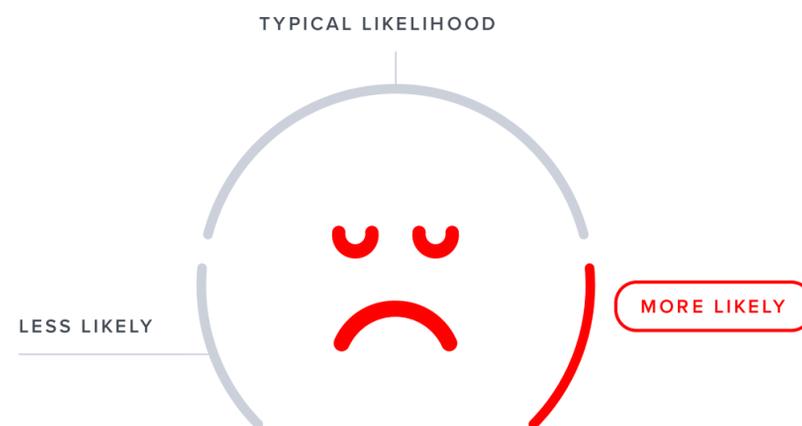
Treatment for anemia depends on the cause. For example, if it is caused by a deficiency of iron or vitamin B12, then getting more of the missing nutrient should solve the problem [\[R\]](#).

Other treatments for various types of anemia may include [\[R\]](#):

- Medication
- Blood transfusion

**Up to 90% of differences in people's hemoglobin levels may be attributed to genetics.** Genes involved in anemia may influence [\[R, R, R\]](#):

- Red blood cell shape, function, or survival
- Iron metabolism
- Immune system function



**More likely to have anemia based on 477,517 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
IGLV4-60	rs987710	AA
TMPRSS6	rs4820268	GA
TMPRSS6	rs855791	AG
BCL11A	rs1427407	GT
/	rs79798837	CC
/	rs550503980	CC
TRIM33	rs576432148	AA
TMPRSS6	rs228916	TT
TRIB2	rs118096157	TT
RNF43	rs199598395	CC
VMP1	rs143341655	CC
MXRA8	rs138300056	CC
MAN1A2	rs560838965	AA
CHD1L	rs141591111	AA
/	rs372345235	CC
CD101	rs141796902	GG
KAZN	rs141034704	CC
SLC16A1	rs12057664	CC
TAF3	rs11102547	CC

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

# Iron

## Key Takeaways:

- Iron is an essential mineral that your body needs to make hemoglobin, which is used by red blood cells. Women and vegetarians are more likely to be deficient.
- Iron-rich foods include meat, seafood, dark leafy greens, legumes, and fortified foods. You need about 18mg of iron per day.
- If your need is likely higher, you may want to make dietary changes to help ensure adequate intake. Speak to your doctor about supplementation, as high levels of iron can be toxic.
- Click the **next steps** tab for relevant labs.

**Iron (Fe) is an essential mineral.** It helps make [hemoglobin](#), a protein that red blood cells need to carry oxygen throughout the body. In this way, iron supports energy production and fights fatigue [\[R, R, R, R\]](#).

When iron levels are low, the body can't make enough red blood cells. This is called **iron-deficiency anemia**. Although mild cases may not lead to any signs or symptoms, people with more advanced iron-deficiency anemia may experience [\[R\]](#):

- Weakness and fatigue
- Pale skin
- Shortness of breath
- Dizziness
- Cold hands or feet
- Brittle nails

The following groups may be at a higher risk of iron deficiency [\[R, R\]](#):

- Women
- Children
- Routine blood donors
- Vegetarians

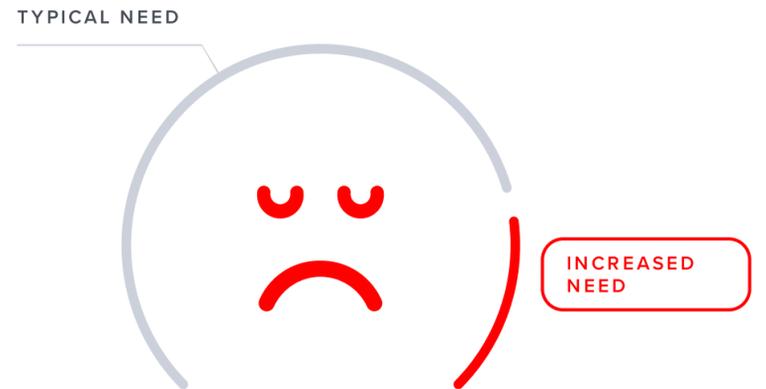
Iron from plant sources is harder to absorb than iron from animal sources. This makes vegetarians more prone to iron deficiency [\[R\]](#).

Iron-deficiency anemia can often be detected with a blood test. After it is diagnosed, your doctor may recommend supplementing with iron. Keep in mind that it may take several months of supplementation to help correct iron deficiency [\[R, R\]](#).

Genetically higher iron may be causally associated with:

- Varicose veins [\[R, R\]](#)
- Deep vein thrombosis [\[R\]](#)
- Anemia (lower risk) [\[R, R\]](#)
- Low Mood (lower risk) [\[R\]](#)
- High Blood Sugar [\[R\]](#)
- Fatty liver [\[R, R\]](#)
- Back Pain [\[R\]](#)
- Total Cholesterol [\[R\]](#)
- LDL Cholesterol [\[R, R\]](#)
- Parkinson's Disease (lower risk) [\[R\]](#)
- Painful Periods (lower risk) [\[R\]](#)
- eGFR [\[R\]](#)
- Joint Pain (lower risk) [\[R\]](#)
- Heart Health (lower risk) [\[R\]](#)
- Artery Hardening (lower risk) [\[R\]](#)
- Atrial Fibrillation [\[R\]](#)
- Lung Health (improved function) [\[R\]](#)
- Longevity (reduced) [\[R\]](#)
- Gout/Uric acid [\[R\]](#)
- Joint Inflammation (lower risk) [\[R\]](#)

**Note that it is best to get iron from food. A high dose of iron can lead to stomach pain and other unwanted out issues. It can also be toxic. Talk to**



**Likely increased need for iron based on 446,739 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
TMPRSS6	rs228916	TT
IGLV4-60	rs987710	AA
TMPRSS6	rs4820268	GA
TMPRSS6	rs855791	AG
MAPRE1	rs146680938	CC
CDH19	rs181670562	CC
CLDN11	rs113286612	GG
DTWD2	rs2442120	CC
SLC24A2	rs142401741	GG
IRX2	rs62330869	AA
ERG	rs117910189	TT
ZFAT	rs2315834	CC
HFE	rs1799945	CC
SCGN	rs115809796	AA
NOTCH4	rs41270472	AA
TMC5	rs4780797	GA
CARMIL1	rs111722075	CC
H3C6	rs113507773	GG
PLCG2	rs9934030	AG

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

# Hemoglobin

Hemoglobin is a protein found in red blood cells. With the help of iron, it binds oxygen in the lungs and carries it to the rest of the body. After oxygen is used, hemoglobin carries carbon dioxide back to the lungs, where it is exhaled [\[R, R\]](#).

Any condition that causes blood loss or lowers the number of red blood cells can lower hemoglobin levels. Examples include [\[R, R, R\]](#):

- Iron deficiency
- Low levels of B vitamins, like folate and vitamin B12
- Blood loss through menstruation, trauma, or bleeding in the gut
- Thyroid hormone levels being too low or too high
- Chronic conditions like kidney disease or lupus
- **Genetics**

Genetically predicted high fasting insulin, total testosterone, and bioavailable testosterone may be associated with higher hemoglobin levels [\[R, R\]](#).

If you have low hemoglobin, your doctor may use other lab tests to help figure out why.

**Anemia** is a condition that occurs when red blood cell counts or hemoglobin levels are low. It is a common cause of fatigue and pale skin [\[R\]](#).

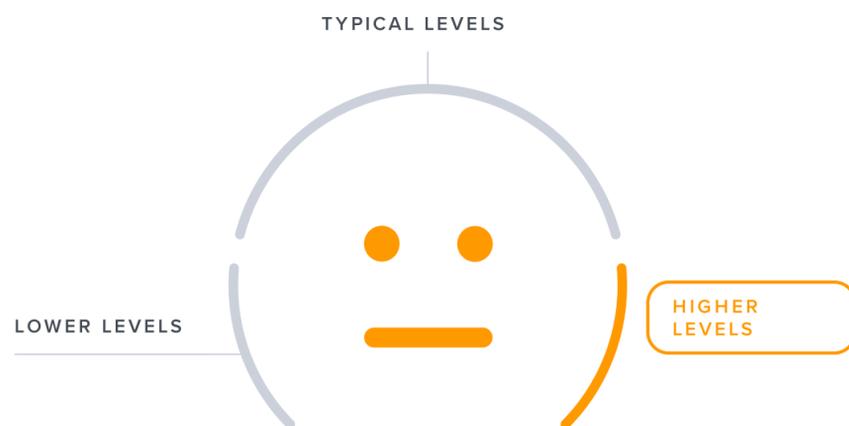
Groups at risk of anemia include [\[R\]](#):

- People who often lose blood, such as menstruating women and routine blood donors
- People who drink too much alcohol
- Vegetarians or vegans who don't get enough vitamin B12
- Pregnant women
- People over 65 years of age

On the other hand, high hemoglobin is generally caused by health conditions and lifestyle factors that cause low oxygen levels in the blood. This can include:

- Heart disease [\[R\]](#)
- Lung disease [\[R\]](#)
- Living at high altitude [\[R, R\]](#)
- Smoking [\[R, R, R\]](#)

This may be because the body produces extra red blood cells in response to the low-oxygen conditions [\[R, R, R\]](#).



**Likely higher hemoglobin levels based on 781,260 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
ENG	rs913987	GG
TBX2	rs9895661	TT
PRKAG2	rs10224210	TC
SH2B3	rs7137828	CT
PPP1R3B	rs4240624	AA
HBZ	rs3760047	AA
ESR2	rs1256061	TT
PIEZO1	rs551118	GC
KIT	rs218264	TA
ADM	rs59901009	CT
OPTC	rs7554335	GA
UNCX	rs62435145	GT
NRIP1	rs1997595	CA
MAP4K5	rs12881869	CT
SLC20A2	rs6474401	TC
FBXO24	rs143593369	AA
EGLN2	rs184088518	GG
ADAL	rs190543502	TT
EPAS1	rs10168349	GG

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



# Mental Fatigue

Your brain requires energy to perform tasks much like the rest of your body. Although only about 2% by weight, **it consumes about 20% of your calories!** If you engage in mental tasks like studying for an exam or dealing with an angry boss, you burn even more! Is it any wonder that mental fatigue can be difficult to deal with?

Mental stress can leave you feeling drained, muddled, and overwhelmed. **Your genetic predispositions may put you at risk for things like brain fog and low mood.** This information can help you know what to expect and arm yourself with smart choices accordingly.



TYPICAL LIKELIHOOD

**Brain Fog**

Typical likelihood of brain fog



TYPICAL LIKELIHOOD

**Low Mood**

Typical likelihood of chronically low mood

# Brain Fog

## Key Takeaways:

- Brain fog is a common symptom of chronic fatigue syndrome.
- It manifests as memory problems, difficulty focusing, jumbled or hazy thoughts, and confusion.
- Risk factors include: stress, sleep problems, air pollution, smoking, and your genetics.
- A high genetic risk may be mitigated by addressing modifiable risk factors.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and next steps for relevant labs.

**Brain fog is a feeling of mental slowness and fatigue.** People with brain fog may experience [\[R, R\]](#):

- Memory problems
- Difficulty focusing
- Jumbled or hazy thoughts
- Confusion

**The exact cause of brain fog is unknown.** Factors that may contribute to it include [\[R, R, R, R, R\]](#):

- Stress
- Sleep problems
- Air pollution
- Smoking
- **Genetics**

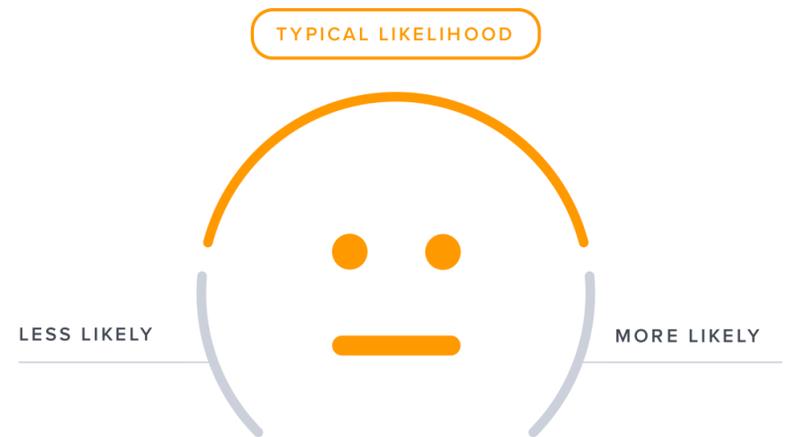
Brain fog is a common symptom of **chronic fatigue syndrome**. People with this condition are tired even after getting lots of rest [\[R, R\]](#).

Other conditions that may cause brain fog include:

- Autoimmune disease [\[R, R, R\]](#)
- Some infections [\[R, R, R, R\]](#)
- Pain [\[R, R\]](#)
- Conditions affecting the brain [\[R, R, R\]](#)

You may be able to improve brain fog by addressing its cause. If the cause is sleep deprivation, for example, it should go away with enough rest [\[R, R\]](#).

**If you are struggling with brain fog, work with your doctor to figure out the cause.**



**Typical likelihood of brain fog based on 5,554 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
EXOC5	rs565429549	AA
/	rs77332613	GG
CNTN2	rs114589565	CC
/	rs148678515	TT
MRPS9	rs185526961	TT
CCDC138	rs115847251	AA
MRPS9	rs181406718	GG
OOSP1	rs115901332	CC
PSG9	rs115749421	CC
PSD3	rs113714584	TT
MRPS9	rs145642147	TT
MRPS9	rs138753234	GG
ACTL7B	rs190045124	GG
CNOT2	rs142649262	CC
PKD2L2	rs10070991	TT
RAB1A	rs185175713	TT
/	rs193120535	TT
MRO	rs143628339	TT
ADAMTS16	rs139940967	GG

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

# Low Mood

## Key Takeaways:

- About 40% of differences in people's odds of developing depression may be due to genetics.
- It is more likely for young adults and the elderly but can affect people of all ages.
- Other risk factors include traumatic and stressful events, serious medical conditions, and substance use problems.
- If you have high genetic risk, you may want to consider optimizing your stress management.
- Click the **next steps** tab for relevant labs and lifestyle factors.

**Depression is more than just a low mood.** People with depression tend to have [\[R\]](#):

- Low motivation
- Problems with concentration
- Changes in appetite
- Poor sleep quality
- Aches and pains
- Thoughts of self-harm or suicide

If any of these symptoms resonate with you, you can work with your doctor to improve them. **Psychotherapy and medication are the most effective treatments for depression.** Strategies such as [exercise](#) may also boost your mood [\[R, R\]](#).

**The strategies most likely to work for you may depend on your genetics. This is because genetic factors account for roughly 40% of differences in depression [\[R\]](#).**

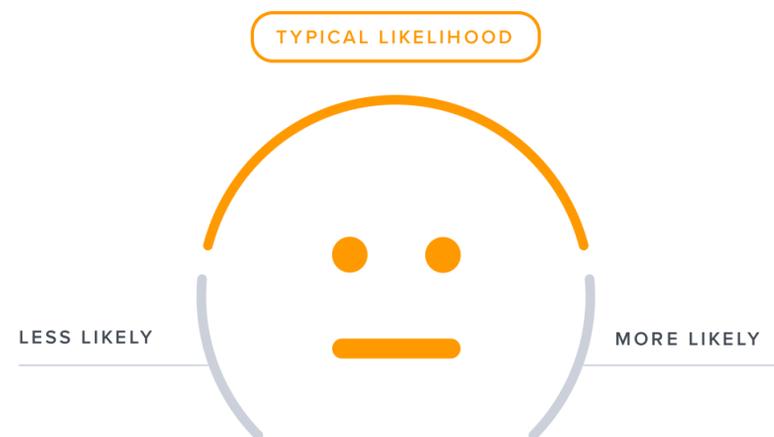
Gene variants linked to this condition may cause [\[R, R, R, R\]](#):

- An exaggerated stress response (CRHR1, [COMT](#))
- Low levels or activity of brain chemicals ([COMT](#), OPRM1, SLC6A4, DRD2)
- Impaired brain function ([BDNF](#), VRK2)
- Inflammation (IL6, VRK2)
- Sleep disturbances (CLOCK, TIMELESS)

Genetically high white blood cell count and testosterone and low DHA may be causally associated with a higher risk of depression. Moreover, depression may also lead to increased white blood cells [\[R, R, R\]](#).

It's important to note that **genetics is only one piece of the puzzle.** Other risk factors for depression include [\[R\]](#):

- Stressful or traumatic events
- Serious medical conditions, such as cancer
- Heavy drug and alcohol use



**Typical likelihood of chronically low mood based on 84,205 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
MICB	rs1150757	GG
NEGR1	rs1993709	GG
MEF2C	rs409645	GG
TCF4	rs1452787	GG
ZCCHC7	rs3824344	CT
CRHR1	rs17689882	GA
RABGAP1L	rs75650221	CC
KIAA1109	rs77087420	AA
SLC44A5	rs116362708	GG
DPY19L3	rs10405382	CC
VWC2L	rs17711053	AA
/	rs10156548	GG
APEH	rs4625	AA
LINGO1	rs7175083	TT
PTPRT	rs6130328	GG
CRHR1	rs62057061	CG
CSNK1G1	rs35755513	TC
UBXN2A	rs34668726	CG
GPM6A	rs6818081	CT

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



# Physical Fatigue

Pushed it to the limit and now you feel like an 80-year-old in need of a cane to walk? Your ability to handle physical activity and recover from it can vary a lot depending on your efforts to manage it. However, **your genetics plays a key role as well.**

Your genetic predispositions may impact physical activity in a number of ways, from your ability to recover in a timely manner to how much you can endure in the first place. **Check out this section for more details and information that will help you boost your energy levels.**



TYPICAL

**Exercise Recovery**

Likely typical recovery after exercise



TYPICAL

**Endurance**

Likely typical endurance



HIGHER

**Aerobic Capacity  
(VO2 Max)**

Likely higher VO2 max

# Exercise Recovery

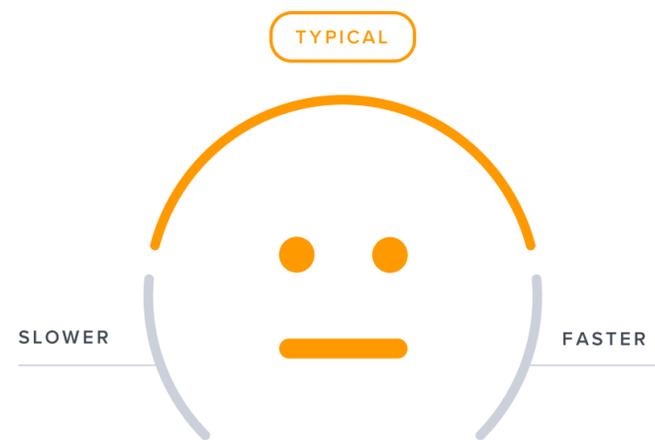
Exercise puts stress on the body. After exercise, it's common to feel tired and sore. Our bodies need time to recover after each bout. Many athletes have perfected ways of quickly returning to their best, including massage, heat or cold application, increased protein and carb intake, or antioxidant supplements [\[R, R\]](#).

Some people may recover from exercise more quickly and easily than others. Part of the reason for this may be genetic.

Genes involved in exercise recovery may influence [\[R, R, R, R, R\]](#):

- Nerve development
- Heart development
- Muscle function
- Blood sugar levels

Be sure to use techniques like stretching, massage, and cold applications after you exercise.



**Likely typical recovery after exercise based on 30 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
SLC16A1	rs1049434	AT
FTO	rs9939609	TA
IGF2	rs3213221	GG
SPP1	rs28357094	GG
IL1B	rs1143634	GG
CCR2	rs1799865	TT
CCL8	rs2857656	GG
COL5A1	rs12722	TT
HGF	rs5745697	GG
HGF	rs5745678	GG
IGF2	rs2230949	GG
CYBA	rs4673	GA
SLC30A8	rs13266634	TC
SLC16A1	rs7169	GA
CD28	rs3116496	CT
STEAP1B	rs1800795	GC
MYLK	rs2700352	GA
COL2A1	rs2070739	CT
TRIM63	rs2275950	TC

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

# Endurance

**Endurance is the ability to produce low-intensity movements for a long period of time (e.g., cycling, running, swimming).** It's made up of **cardiorespiratory endurance** (the ability of the heart and lungs to deliver oxygen to muscles during longer, less intense periods of exercise) and **muscular endurance** (the ability of muscles to contract during longer, less intense periods of exercise) [R, R, R, R, R].

Some people may have greater endurance than others. This may be due to [R, R, R, R, R, R, R]:

- Fitness levels
- Age (endurance can actually improve with age!)
- **Genetics**

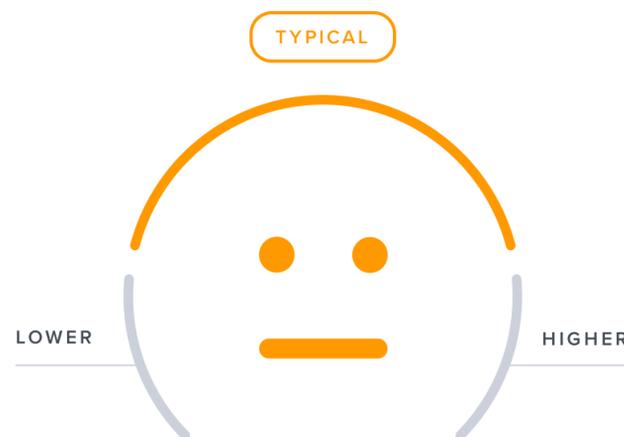
**Up to 70% of people's differences in endurance may be due to genetics.**

Genes involved may influence [R, R, R, R, R, R, R]:

- The body's ability to use oxygen
- Heart function
- Muscle composition and efficiency

Some tips that may help you build endurance include:

- Doing the same exercise regularly and letting your body adapt to it over time
- Slowly increasing the amount and intensity of your workouts over time
- Getting at least than 150 min of cardio per week
- Switching between periods of high-intensity training and resting. This is called high-intensity interval training (HIIT).



**Likely typical endurance based on 32 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
HFE	rs1799945	CC
GABPB1	rs7181866	AA
GABPB1	rs8031031	CC
NR1H3	rs7120118	CT
MYBPC3	rs1052373	TC
ACTN3	rs1815739	TC
GABPB1	rs12594956	AC
TTN	rs10497520	CC
DES	rs7564856	AA
KDR	rs1870377	TT
ADRB2	rs1042713	GG
PRDM1	rs10499043	CC
ADRB3	rs4994	AA
CHRN3	rs4950	AA
GSTP1	rs1695	AA
GNB3	rs5443	CC
TSHR	rs7144481	TT
SLC16A1	rs1049434	AT
ADRB2	rs1042714	CG

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

# Aerobic Capacity (VO2 Max)

## Key Takeaways:

- Between **45%-70%** of differences in people's VO2 max may be due to genetics.
- Other factors that influence VO2 max include gender, age, body composition, weight, and health status.
- VO2 max tends to drop by about **2%** per year after age 30. However, exercise may help improve VO2 max by up to **30%**.
- If your genetic risk is high, you may lower your overall risk by taking action on those factors that you can change.
- Click the **Recommendations** tab for potential dietary and lifestyle changes.

Maximal oxygen uptake (VO2 max) is the **maximum amount of oxygen (O2) that your body can absorb and use during exercise**. A higher VO2 max means a higher ability for more intense cardio exercise (e.g., running, swimming) [[R](#), [R](#), [R](#), [R](#)].

Between **45%-70%** of differences in people's VO2 max may be due to **genetics** [[R](#), [R](#)].

Genetic variants linked to a lower VO2 max are associated with a higher risk of [[R](#)]:

- Obesity
- High cholesterol
- Heart disease
- Diabetes
- Alzheimer's and Parkinson's disease
- Shorter lifespan

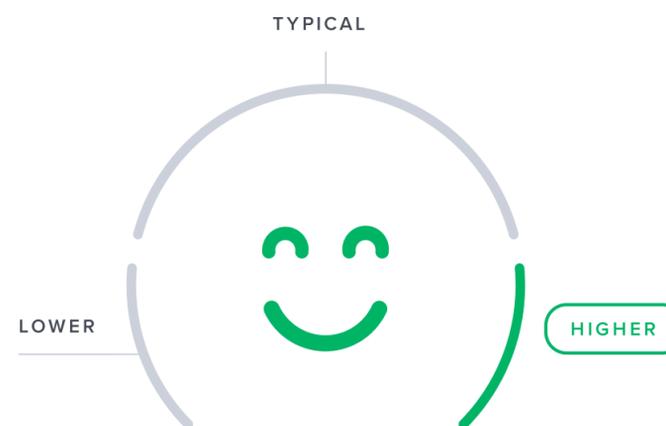
**Gender and age also influence VO2 max.** Men typically have a greater VO2 max than women. VO2 max tends to drop by about 2% per year after age 30 [[R](#)].

**Exercise may help improve VO2 max** by up to 30%, especially in those who are the least fit [[R](#), [R](#)].

Other factors that influence VO2 max include [[R](#), [R](#), [R](#)]:

- Body composition
- Body weight
- Health status

Being at a higher altitude also affects VO2 max. When you are in the mountains, your VO2 max decreases even after some acclimatization [[R](#), [R](#)].



**Likely higher VO2 max based on 41 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
NUP93	rs78291913	CC
SCN10A	rs6801957	CC
ERBIN	rs251295	AA
CCDC141	rs142556838	CT
MOXD1	rs589756	CC
KLRK1	rs10743889	TT
RSU1	rs11254160	GG
POLM	rs10232743	CC
CCDC141	rs10497529	GG
SEC31B	rs11190709	AA
KCND3	rs269071	AA
TGM2	rs4811602	AA

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



# Sleep Disturbances

**Good-quality sleep is your strongest weapon against fatigue!** Sleep disturbances that affect sleep duration and quality can be a major factor in fatigue.

**This section reveals your genetic predisposition to different sleep disturbances.** In case you want to dive deeper into your sleep genetics, make sure to check out the summary Sleep report.



LESS LIKELY

**Insomnia**

Less likely to have insomnia



LESS LIKELY

**Sleep Movement**

Less likely to move during sleep



LESS LIKELY

**Restless Legs**

Less likely to have restless legs syndrome



TYPICAL LIKELIHOOD

**Sleep Apnea**

Typical likelihood of sleep apnea



MORE LIKELY

**Snoring**

More likely to snore



LESS LIKELY

**Daytime Sleepiness**

Less likely to experience daytime sleepiness



TYPICAL LIKELIHOOD

**Caffeine-Related Sleep Problems**

Typical likelihood of caffeine-related sleep problems

# Insomnia

## Key Takeaways:

- About **40%** of differences in people's chances of getting insomnia may be due to genetics.
- Insomnia is common, affecting about **1 in 4 Americans**. Even if your genetic risk is low, your overall risk can still be high due to other factors.
- Risk factors include: depression, shift work, caffeine, inconsistent bedtimes, and more.
- Insomnia can contribute to fatigue, high blood pressure, obesity, heart disease, and diabetes.
- Click the **next steps** tab for relevant labs and lifestyle factors.

You have a “clock” inside your body that regulates sleep and other 24-hour cycles. These cycles are called *circadian rhythms* [R].

**If your internal clock is disrupted, it can lead to insomnia.** People with insomnia have trouble falling asleep, staying asleep, or both [R, R].

**Insomnia is the most common sleep condition in the US.** In fact, **about 1 in 4 Americans are struggling with it** [R, R].

If you've ever struggled to fall or stay asleep, you're likely to [R, R]:

- Feel tired
- Have trouble focusing
- Have trouble remembering things
- Feel irritable

Insomnia may also lead to more serious problems, such as [R]:

- High blood pressure
- Heart disease
- Obesity
- Diabetes
- Asthma

Luckily, **there are many things you can try to potentially help with insomnia.** Doctors often recommend medication, talk therapy, or changing your sleep habits [R, R].

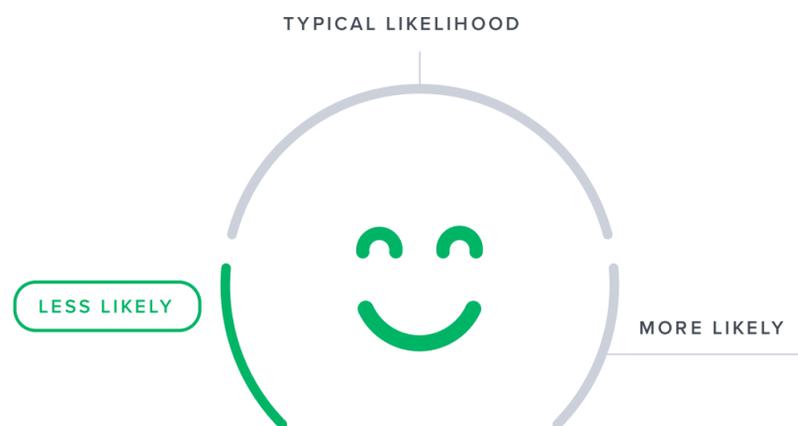
**People are more likely to develop insomnia if they're under a lot of stress.** Other risk factors for insomnia include [R, R]:

- Depression
- Shift or night work
- Noise or light at night
- Traveling to different time zones
- Going to bed at different times every night
- Taking a lot of naps during the day
- **Genetics**

In fact, **about 40% of differences in people's chances of getting insomnia may be attributed to genetics.** Genes that may contribute to insomnia influence [R, R, R, R, R]:

- Circadian rhythm (CLOCK, PER2, MTNR1A)
- Brain function (CACNA1C, RBFOX3)
- Stress response and alertness (SLC6A4)

Moreover, genetically low L-carnitine levels may be causally associated with insomnia in Parkinson's disease [R].



**Less likely to have insomnia based on 776,133 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
MPZL2	rs148118632	AA
OLFM4	rs117352467	GG
ISL1	rs116701328	GG
OLFM4	rs79169188	GG
ZFP64	rs1033714	AA
ELAVL2	rs141890451	AA
OLFM4	rs4883690	CC
OLFM4	rs9536412	GG
OLFM4	rs1443914	TT
OLFM4	rs17059996	TT
LSAMP	rs817493	TT
LSAMP	rs9861346	TT
OLFM4	rs2491124	TT
SPATS2L	rs75671770	CG
OLFM4	rs4884401	CG
OLFM4	rs9596775	TC
RWDD3	rs75639751	CT
PDE2A	rs79693059	GC
OLFM4	rs9536382	CA

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

# Sleep Movement

Shifting around when you sleep? Partner letting you know even if you aren't aware? Sleep movements are common, particularly with age, and they can affect sleep quality. They don't usually disturb the mover's sleep. However, when they do disrupt sleep, they can make a person sleepy during the day [\[R\]](#), [\[R\]](#).

Some genetic variants may be linked to increased sleep movement.

People with the following variants in the MEIS1 gene tend to move more in their sleep [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

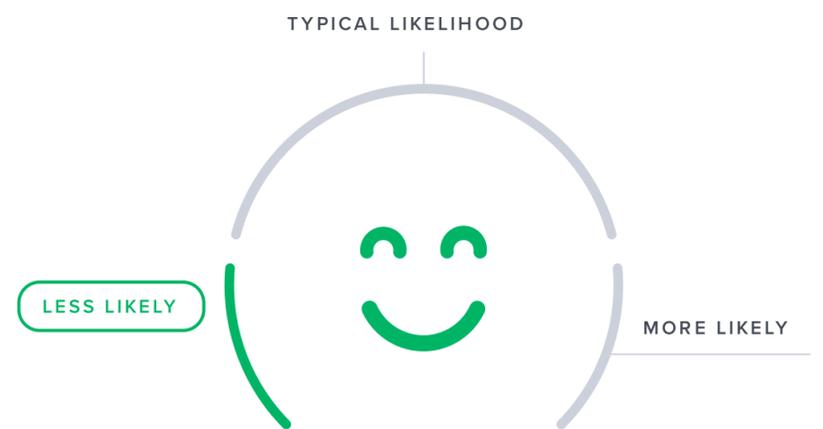
- rs2300478-G
- rs113851554-T

This gene may influence iron metabolism in the brain [\[R\]](#).

In addition, people with one variant in the BTBD9 gene (rs3923809-A, also linked to the *GLO1* gene) tend to move more while sleeping. In fact, people with two copies of this variant may have two times more sleep movements than people without any copies [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

This gene may influence dopamine and iron metabolism [\[R\]](#), [\[R\]](#).

Finally, one gene variant near the TOX3 gene, rs3104788-T, is linked to sleep movement [\[R\]](#), [\[R\]](#).



**Less likely to move during sleep based on 4 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
TOX3	rs3104788	CT
GLO1	rs3923809	GG
MEIS1	rs2300478	TT
MEIS1	rs113851554	GG

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

# Restless Legs

## Key Takeaways:

- Around **60%** of the differences in people's risk of developing RLS may be due to genetics.
- Other risk factors include iron deficiency, pregnancy, toxic urea levels, and certain medical conditions.
- RLS is fairly common, occurring in about **1 in 10 people**.
- If you have a high genetic risk, your overall risk may be lowered by taking action on risk factors that you can change.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

Restless legs syndrome (RLS) is a condition that causes an uncontrollable urge to move the legs. It is relatively common – around **1 in 10 people** have it [R].

Experts aren't sure what causes RLS. There is evidence that it may have to do with iron or dopamine levels in the brain [R, R].

RLS occurs in all age groups. Factors that may raise the risk for RLS include [R, R]:

- Iron deficiency
- Pregnancy
- Toxic buildup of urea in the blood (often found in people with kidney disease)
- Other chronic medical conditions
- **Genetics**

The feelings associated with RLS are described as pulling, creeping, and tugging. Typically, RLS symptoms [R]:

- Begin with rest, such as driving or sitting at a movie theater
- Relieve with movement, such as stretching, jiggling the legs, or walking
- Worsen in the evening
- May be associated with limb twitching

If left untreated, RLS may disrupt sleep. This can lead to daytime sleepiness, irritability, or problems at work.

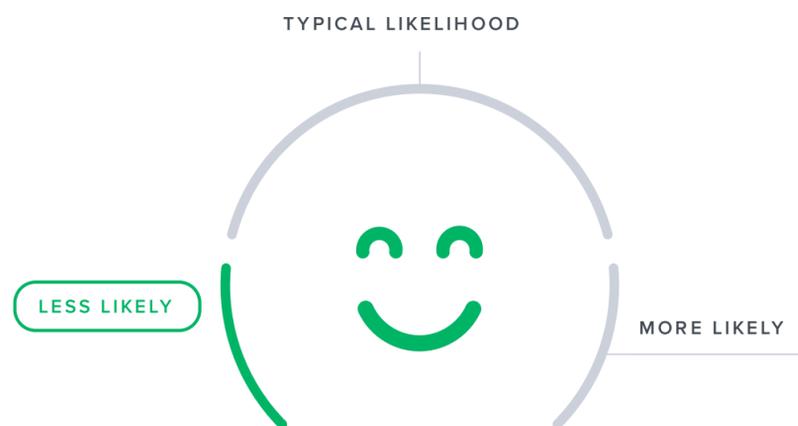
The following lifestyle changes can help improve symptoms [R, R]:

- Exercise
- Massage
- Applying heat using a heating pad or a warm bath
- Avoiding or limiting caffeine, alcohol, and tobacco

Some supplements, like iron, may help people with RLS who have low iron. For severe cases, a doctor may prescribe medications.

Around 60% of the differences in people's risk of developing RLS may be due to genetics. Genes involved with RLS may influence [R, R, R, R]:

- Iron metabolism
- Nerve function
- Dopamine activity



**Less likely to have restless legs syndrome based on 34 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
MAP2K5	rs12593813	GG
SEMA6D	rs111652004	GG
TOX3	rs3104767	TG
MEIS1	rs6747972	GA
DCDC2C	rs10208712	AA
PKP4	rs80319144	CC
PTPRD	rs62535767	CC
C1D	rs1820989	CA
CCDC167	rs17636328	AG
DACH1	rs340561	GT
SETBP1	rs12962305	CT
PMAIP1	rs58127855	CC
MEIS1	rs113851554	GG
GLO1	rs3923809	GG
MEIS1	rs2300478	TT
GLO1	rs9296249	CC
GLO1	rs9357271	CC
PTPRD	rs4626664	GG
PTPRD	rs1975197	GG

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

# Sleep Apnea

## Key Takeaways:

- About 10-40% of differences in people's chances of developing sleep apnea may be due to genetics.
- Other important risk factors include being male, older, overweight, nasal congestion issues, a smoker, and drinking alcohol.
- If you are at high genetic risk, be aware of symptoms indicating sleep apnea, and take action on those risk factors you can control.
- Click the **next steps** tab for relevant labs.

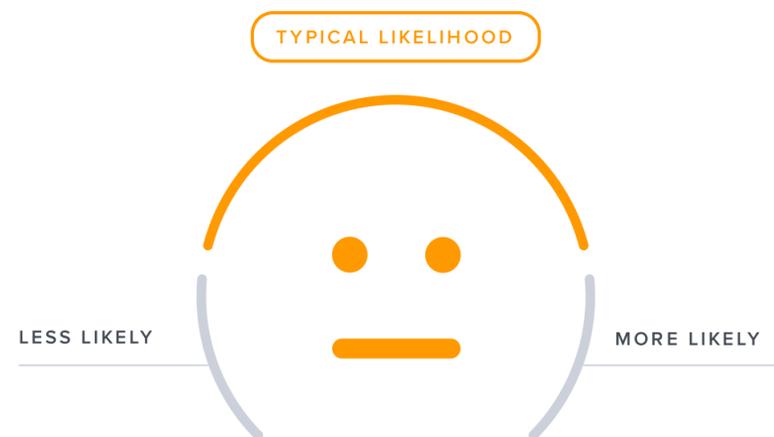
Sleep apnea is a disorder that interrupts your breathing while you sleep. A person with sleep apnea might wake up dozens of times to restore normal breathing, leading to daytime sleepiness. Left untreated, sleep apnea can affect your health, quality of life, and driving safety [\[R, R\]](#).

About 10-40% of differences in people's chances of developing sleep apnea may be due to genetics. Genes involved in sleep apnea may influence [\[R, R\]](#), [\[R, R\]](#):

- **Weight**
- Upper airway structure
- Sleep duration and quality

However, keep in mind that genetics is just one of many risk factors, along with [\[R\]](#):

- Male sex
- Older age
- Excess weight
- Nasal congestion
- Smoking
- Drinking alcohol



Typical likelihood of sleep apnea based on 1,227,186 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
FOXP2	rs1006437246	GG
LMX1A	rs140743827	GG
GPR83	rs116791765	TT
LAX1	rs116133558	CC
NRG1	rs10097555	AG
RGS18	rs11588454	TT
ARRB1	rs35329661	CC
RGMA	rs148024591	CC
/	rs11610782	GG
SERTAD2	rs999944	GA
FTO	rs11075985	CA
LRATD1	rs2033354	TT
TDRD15	rs11897825	AG
TDRD15	rs11897825	AG
UBE3A	rs72699765	GG
FTO	rs9937053	GA
PLCB1	rs2743173	CT
SLC35F3	rs75108997	GG
YIPF5	rs111942351	AA

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

# Snoring

Snoring is a common issue of disrupted breathing during sleep due to restricted airways. A variety of factors can influence susceptibility to snoring, including your genetics. While snoring once in a while usually isn't a serious problem, regular snoring can disrupt your sleep. It may also be a symptom of a more serious health condition such as sleep apnea [\[R\]](#).

Snoring may often be improved with a few lifestyle changes, such as [\[R, R, R, R\]](#):

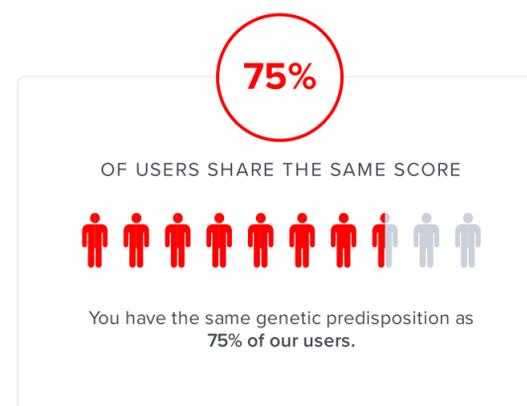
- Treating any ongoing nasal congestion
- Losing weight, if you're overweight
- Quitting smoking
- Sleeping on your side
- Elevating your head with an extra pillow
- Doing vocal exercises that increase muscle tone in the throat
- Going to sleep at the same time every night
- Not eating or drinking alcohol near bedtime

Having a partner who snores is a common reason for sleep loss in non-snorers. Chronic sleep loss can have negative impacts on your health. It can also lead to feelings of resentment in the relationship. If you have a partner who snores, work with them to find a good solution. If lifestyle changes don't help, encourage them to talk to their doctor [\[R, R, R\]](#).

Improving snoring can help benefit your overall health. It may also improve sleep quality for you and your bed partner [\[R, R, R\]](#).



**More likely to snore based on 1,021,845 genetic variants we looked at**



**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
TSHZ3	rs8108822	CC
LEMD3	rs10878269	TT
KDSR	rs4987719	TC
ANAPC4	rs34811474	GG
GRM5	rs11018488	AA
SNX11	rs11409890	TT
NSUN3	rs202110996	AA
PLEKHM1	rs57222984	AG
LGR4	rs2049045	GC
XKR9	rs13251292	AG
SIM1	rs17060460	GA
PITX1	rs4976269	GA
SRR	rs8069947	TC
/	rs145367119	CT
CEP120	rs34732995	CI
PTBP2	rs12119849	GG
GPD2	rs61597598	GG
GATA3	rs725861	AA
POC5	rs2307111	CC

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

# Daytime Sleepiness

Daytime sleepiness is the feeling of excessive sleepiness during the day. People with excessive daytime sleepiness often complain of not feeling well-rested, having difficulty waking up, or accidentally falling asleep during the day, among others [\[R, R, R\]](#).

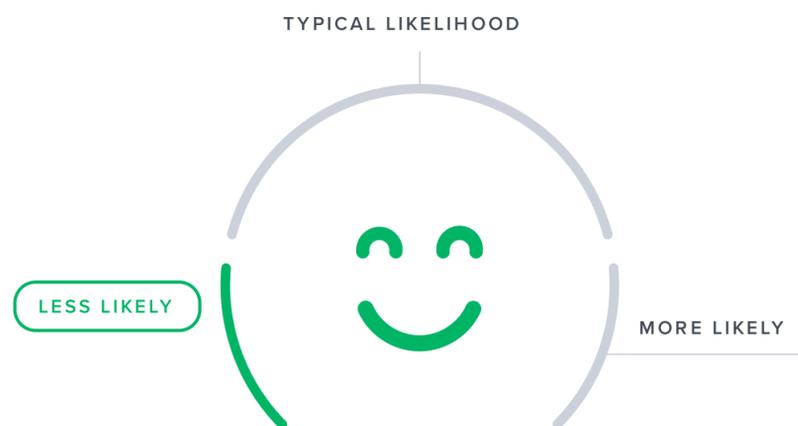
Daytime sleepiness is usually a consequence of poor sleep duration or quality. Other risk factors include [\[R\]](#):

- Shift work [\[R\]](#)
- Sleep disorders (obstructive sleep apnea, narcolepsy) [\[R, R\]](#)
- Mood disorders (depression, bipolar disorder) [\[R\]](#)
- Allergies (asthma, hay fever) [\[R, R\]](#)
- GERD [\[R\]](#)
- Parkinson's disease [\[R\]](#)
- Epilepsy [\[R\]](#)
- Obesity [\[R\]](#)
- **Genetics**

Up to 40% of differences in people's chances of experiencing daytime sleepiness may be due to genetics. Genes involved may influence the sleep/wake cycle and sleep duration or quality [\[R, R, R, R\]](#).

Interventions aimed at improving sleep duration and quality may also reduce daytime sleepiness. These include [\[R, R, R, R\]](#):

- Reducing your bright light exposure (screen time) in the evenings
- Maintaining a sleep area that's cool, dark, and quiet
- Sticking to a regular sleep schedule
- Avoiding hunger or large meals before bed
- Avoiding nicotine, caffeine, and alcohol before bed



**Less likely to experience daytime sleepiness based on 999,088 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
ASB3	rs76645968	GG
PATJ	rs12140153	GG
/	rs920065	CC
FGGY	rs371398972	AA
AR	rs73536079	G
/	rs553962214	TT
PTPRM	rs558006880	GG
LBP	rs6099524	CC
SLC2A9	rs543431433	TT
TENT5A	rs189689339	CC
FGGY	rs192315283	TT
TMEM132B	rs142261172	GG
/	rs182765975	GG
AP3B2	rs17507216	GG

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

# Caffeine-Related Sleep Problems

**Caffeine is a well-known stimulant.** It can promote wakefulness and interrupt sleep by reducing the activity of [adenosine](#), a sleep-promoting compound that builds up while we are awake and decreases while we sleep. **Caffeine's effects on sleep tend to be strongest in the evening, before bedtime.** Older people and those who sleep less may be more sensitive to caffeine [\[R, R, R, R\]](#).

Up to **40%** of differences in caffeine-related sleep problems may be due to genetics. Interestingly, the majority of these genetic factors are specific to caffeine, and they don't affect sleep in general [\[R\]](#).

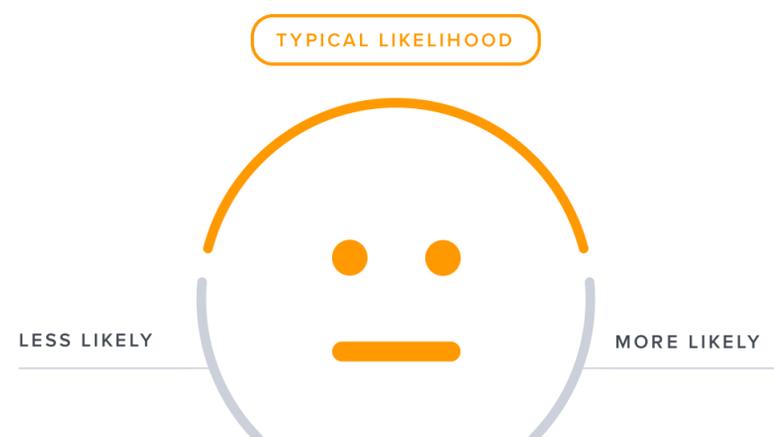
A gene called *ADORA2A* helps make a receptor for adenosine. Caffeine promotes wakefulness and interrupts sleep by blocking this receptor. Unsurprisingly, a variant belonging to this gene, *rs5751876*, is linked to caffeine-related sleep problems [\[R, R, R, R\]](#).

What's surprising is the opposite effect of this variant on caffeine-related anxiety. **People carrying the "T" allele may be less prone to sleep problems but more prone to anxiety due to caffeine intake** [\[R, R, R\]](#).

Other gene variants linked to caffeine-related sleep problems may affect:

- Melatonin (*MTNR1B*)
- Compounds similar to adenosine (*GBP1*, *GBP4*)
- Brain function (*ADGRL2*)
- Heart function (*NEBL*)

**Please note:** Your other gene variants, lifestyle, and environment may also affect caffeine-related sleep problems.



**Typical likelihood of caffeine-related sleep problems based on 18 genetic variants we looked at**

**Your top variants that most likely impact your genetic predisposition:**

GENE	SNP	GENOTYPE
UPB1	<i>rs5751876</i>	<b>TC</b>
FCHSD2	<i>rs1791933</i>	<b>CC</b>
/	<i>rs16905439</i>	<b>CC</b>
TMEM51	<i>rs2103117</i>	<b>GG</b>
ADORA2A	<i>rs2065779</i>	<b>GG</b>
SLC7A1	<i>rs2388082</i>	<b>CC</b>
GBP3	<i>rs12407812</i>	<b>TC</b>
NEDD4L	<i>rs158856</i>	<b>CC</b>
ADGRL2	<i>rs12725617</i>	<b>TC</b>
MTNR1B	<i>rs10830964</i>	<b>CT</b>
MDFIC2	<i>rs7628219</i>	<b>TC</b>
LRTM1	<i>rs11706236</i>	<b>AG</b>
PRIMA1	<i>rs6575353</i>	<b>AG</b>
PRIMA1	<i>rs12895096</i>	<b>GT</b>
NEBL	<i>rs9665295</i>	<b>CC</b>
ALDH7A1	<i>rs13172305</i>	<b>GG</b>
GBP7	<i>rs521704</i>	<b>AA</b>
KCTD15	<i>rs11878836</i>	<b>TT</b>

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.

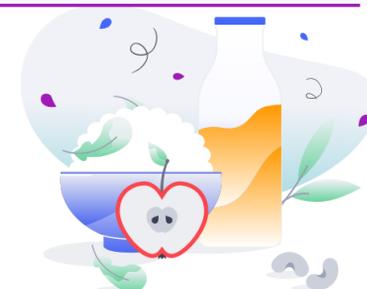
You'll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

1



## Limit Alcohol Intake

Helps with the following



Anemia

IMPACT 2 / 5

EVIDENCE 2 / 5

Alcohol misuse is a well-known cause of some forms of anemia [\[R, R\]](#).

Alcohol can contribute to anemia by:

- Decreasing red blood cell production [\[R, R, R\]](#)
- Lowering absorption of nutrients in the gut [\[R, R\]](#)



Snoring

IMPACT 3 / 5

EVIDENCE 3 / 5

Drinking alcohol may increase the number of snoring episodes. Importantly, alcohol increases the risk and severity of sleep apnea [\[R, R, R, R, R\]](#).

Alcohol may contribute by relaxing the throat muscles. This can make it harder to breathe properly [\[R\]](#).



Sleep Apnea

IMPACT 3 / 5

EVIDENCE 3 / 5

Drinking alcohol is linked to a higher risk of sleep apnea and more severe symptoms [\[R, R, R, R\]](#).

Alcohol may contribute to sleep apnea by relaxing the throat muscles. This can make it harder to breathe properly [\[R\]](#).



PERSONALIZED TO YOUR GENES

**Your NRG1 gene variant may be linked to lower odds of sleep apnea. However, drinking alcohol may cancel out the protective effect of this variant [\[R\]](#). Try to limit your alcohol intake.**

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
NRG1	rs10097555	/	■■■■■



## Red Blood Cells



## Daytime Sleepiness



**Excessive alcohol drinking is linked to daytime sleepiness and poor sleep quality** [[R](#), [R](#), [R](#)].

Although it promotes drowsiness, alcohol also impairs deep sleep, disrupts the sleep/wake cycle, and causes awakening in the middle of the night [[R](#), [R](#)].

Drinking alcohol is also linked to a higher risk of sleep apnea and more severe symptoms [[R](#), [R](#), [R](#), [R](#)].



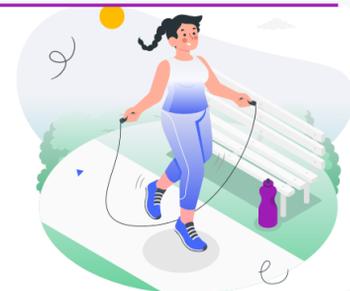
## Sleep Movement



2



## Maintain a Healthy Weight



Helps with the following



**Anemia**

IMPACT

● ● ● ● ● 2 / 5

EVIDENCE

● ● ● ● ● 2 / 5

Obesity has been linked to iron deficiency. This may be because those who are obese have decreased iron absorption [\[R, R, R, R\]](#).



**Snoring**

IMPACT

● ● ● ● ● 3 / 5

EVIDENCE

● ● ● ● ● 3 / 5

Being overweight or obese may increase the risk of snoring and sleep apnea. Excess body fat can narrow the airway and make it harder to breathe during sleep [\[R, R, R, R\]](#).

Excess weight may also contribute to snoring in children and pregnant women [\[R, R\]](#).

**Weight loss through diet and exercise may help improve snoring** [\[R\]](#).



**Sleep Apnea**

IMPACT

● ● ● ● ● 4 / 5

EVIDENCE

● ● ● ● ● 5 / 5

Being overweight or obese may increase the risk of sleep apnea. Excess body fat can narrow the airway and make it harder to breathe [\[R, R, R, R\]](#).

**Experts recommend losing excess weight to help with the condition** [\[R, R, R\]](#).

**Weight loss through diet and exercise may help improve symptoms of sleep apnea.** For example, it may decrease the number of sleep apnea episodes [\[R, R, R, R, R\]](#).



**Daytime Sleepiness**

IMPACT

● ● ● ● ● 3 / 5

EVIDENCE

● ● ● ● ● 3 / 5

**Excess weight is linked with poor sleep and daytime sleepiness.** Excess weight plays a role in stress and metabolic disorders, which are linked to poor sleep [\[R\]](#).

**Losing weight through exercise and diet may help improve daytime sleepiness.** The more weight a person loses, the greater the improvement [\[R\]](#).

Importantly, being overweight or obese may increase the risk of **sleep apnea**. This condition is linked to poor sleep quality and daytime sleepiness. Weight loss may improve daytime sleepiness in people with this condition [\[R, R, R, R, R, R, R, R\]](#).



PERSONALIZED TO YOUR GENES

**Your FTO gene variant is linked to obesity. Try maintaining a healthy weight to improve sleep quality and reduce daytime sleepiness** [\[R, R, R\]](#).

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
FTO	rs9939609	/	● ● ● ● ●



Sleep Movement

IMPACT

●●●●● 0/5

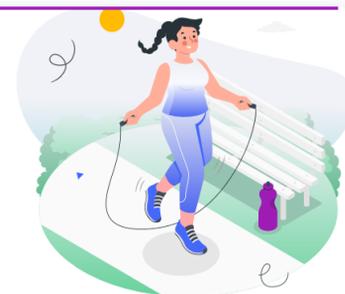
EVIDENCE

●●●●● 0/5

3



# Singing



Helps with the following



Snoring



Recommendation references: [\[R, R\]](#)



Snoring



Low Mood

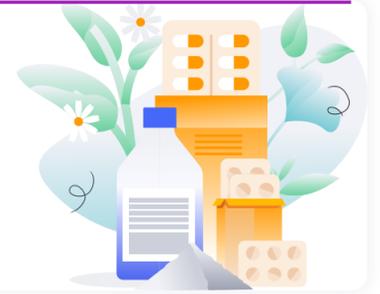


Recommendation references: [\[R, R, R, R, R, R, R, R, R\]](#)

4



## Vitamin D



Helps with the following



Anemia

IMPACT

0 / 5

EVIDENCE

0 / 5



Low Energy (Chronic Fatigue)

IMPACT

2 / 5

EVIDENCE

2 / 5

Some people become fatigued because of chronic health conditions. If they are also vitamin D deficient, supplements may help. However, the evidence is mixed [R, R, R, R, R, R].

**Please note:** Experts recommend getting 600-800 IU of vitamin D per day. Medical bodies recommend against taking more than 4,000 IU per day [R].



PERSONALIZED TO YOUR GENES

Your GC gene variant is linked to lower vitamin D levels [R]. Take care to get enough vitamin D to prevent fatigue.

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
/	rs2282679	/	2 / 5



Low Mood

IMPACT

2 / 5

EVIDENCE

3 / 5

Vitamin D (400-5,000 IU/day for 6-8 weeks) may improve symptoms of depression. However, more research is necessary to confirm this benefit [R, R, R, R].

Vitamin D may help by increasing the levels of [R, R]:

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

**Please note:** Experts recommend getting 600-800 IU of vitamin D per day. Medical bodies recommend against taking more than 4,000 IU per day [R].



Red Blood Cells

IMPACT

0 / 5

EVIDENCE

0 / 5



## Aerobic Capacity (VO2 Max)

IMPACT  
● ● ● ● ● 1 / 5

EVIDENCE  
● ● ● ● ● 1 / 5

People with low vitamin D levels may have lower VO2 max, especially if they are physically inactive [\[R\]](#), [\[R\]](#).

Supplementation with vitamin D (50,000 IU/week) as an add-on to aerobic exercise may further increase VO2 max. However, vitamin D alone may be ineffective [\[R\]](#), [\[R\]](#), [\[R\]](#).

**Please note:** *Experts recommend getting 600-800 IU of vitamin D per day. Medical bodies recommend against taking more than 4,000 IU per day* [\[R\]](#).

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## Sleep Movement

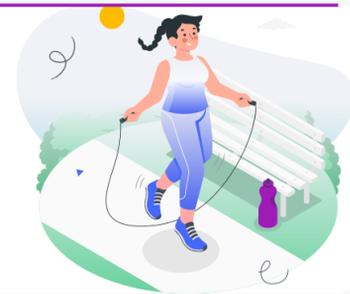
IMPACT  
● ● ● ● ● 0 / 5

EVIDENCE  
● ● ● ● ● 0 / 5



## Avoid Cigarette Smoke

Helps with the following



### Snoring

IMPACT



EVIDENCE



Smokers may develop sleep apnea at an earlier age. They may also have more severe symptoms, including snoring [\[R, R\]](#).

Children exposed to cigarette smoke may have an increased likelihood of snoring [\[R, R, R, R\]](#).

Cigarette smoke may contribute by increasing [\[R, R\]](#):

- Airway inflammation
- Airway lining thickness
- The amount of fluid in the airway



### Brain Fog

IMPACT



EVIDENCE



**Smoking is linked to problems with attention.** It may even speed up cognitive decline in older people, especially in men [\[R, R, R, R, R\]](#).

Many people who quit have trouble concentrating early on. However, quitting smoking may improve brain fog in the long run [\[R, R, R\]](#).



### Sleep Apnea

IMPACT



EVIDENCE



Smokers may develop sleep apnea at an earlier age. They may also have more severe symptoms [\[R, R, R, R\]](#).

Smoking may contribute to sleep apnea by increasing [\[R, R\]](#):

- Airway inflammation
- Airway lining thickness
- The amount of fluid in the airway



### Red Blood Cells

IMPACT



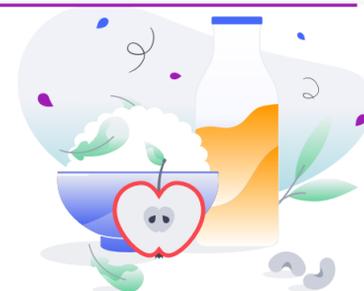
EVIDENCE



6



## Dark Chocolate



Helps with the following



Low Energy (Chronic Fatigue)

IMPACT



EVIDENCE



**Please note:** There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.

Recommendation References: [\[R\]](#)



Brain Fog

IMPACT



EVIDENCE



**Please note:** There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.

Recommendation References: [\[R\]](#)



Exercise Recovery

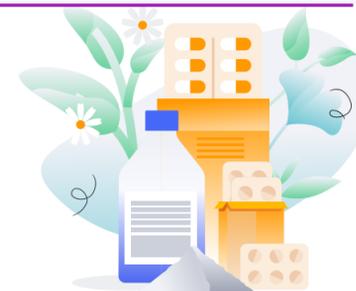
IMPACT



EVIDENCE



7



# Iron

Helps with the following



Low Energy (Chronic Fatigue)

IMPACT



EVIDENCE



Iron helps transport oxygen to cells. This is essential for energy production. Thus, **fatigue is common in people with iron deficiency** [R, R].

**In deficient people, supplementing with iron may help reduce fatigue.** It may also boost physical performance [R].

**Please note:** A high dose of iron can be toxic. If you are not deficient, it is best to get iron from food. Talk to your doctor before taking iron supplements [R].



PERSONALIZED TO YOUR GENES

**Your TMPRSS6 gene variant is linked to low levels of iron [R]. Make sure to get enough iron to prevent fatigue.**

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TMPRSS6	rs855791	/	



Red Blood Cells

IMPACT



EVIDENCE





## Restless Legs

IMPACT

4 / 5

EVIDENCE

4 / 5

Low iron levels in the brain may play a role in restless legs syndrome (RLS). Experts recommend iron supplements for people with restless legs syndrome (RLS) and iron deficiency [\[R, R, R, R\]](#).

Correcting iron deficiency may help reduce symptoms of RLS [\[R, R, R\]](#).

**Please note:** Talk to your doctor before starting iron therapy. It is recommended to test iron and ferritin levels before starting iron therapy for restless legs syndrome.



PERSONALIZED TO YOUR GENES

**Your TMPRSS6 gene variant is linked to iron deficiency [\[R, R\]](#). Take special care to maintain healthy iron levels.**

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TMPRSS6	<b>rs855791</b>	/	



## Sleep Movement

IMPACT

3 / 5

EVIDENCE

3 / 5

Low iron levels in the brain may play a role in sleep movements, especially in children. Experts recommend iron supplements for people with sleep movements and iron deficiency [\[R, R, R, R\]](#).

Correcting iron deficiency may help reduce symptoms of sleep movements [\[R, R, R, R, R\]](#).

**Please note:** Talk to your doctor before starting iron therapy. It is recommended to test iron and ferritin levels before starting iron therapy for sleep movements.



PERSONALIZED TO YOUR GENES

**Your TMPRSS6 gene variant is linked to iron deficiency [\[R, R\]](#). Take special care to maintain healthy iron levels.**

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TMPRSS6	<b>rs855791</b>	/	



## Aerobic Capacity (VO2 Max)

IMPACT

2 / 5

EVIDENCE

3 / 5

Supplementation with iron (100-300 mg/day) may increase VO2 max in iron-deficient athletes and women of reproductive age. **However, there is no evidence that iron increases VO2 max in people with sufficient iron levels [\[R, R\]](#).**

8



# Lactobacillus Plantarum



Helps with the following



Anemia



Low Mood



Endurance



Insomnia

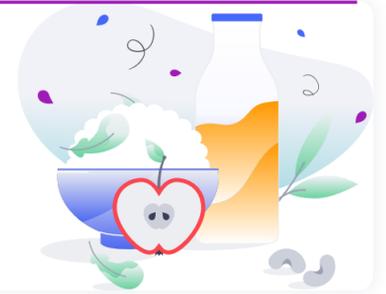


Aerobic Capacity (VO2 Max)





## Dietary Iron



Helps with the following



**Anemia**

IMPACT



EVIDENCE



**Please note:** Increased iron intake from meat is linked to higher odds of diabetes and heart disease. Try to find a balance between plant and animal iron sources [\[R, R, R, R\]](#).



**Brain Fog**

IMPACT



EVIDENCE



**Iron deficiency is detrimental to cognitive function. Women are at a higher risk of having low iron levels.** In fact, **brain fog is a common symptom** in women lacking iron [\[R, R, R\]](#).

Taking **iron supplements** or eating **iron-enriched foods** may improve attention and processing speed in those who lack iron [\[R, R, R, R, R\]](#).

**Please note:** A high dose of iron can be toxic. If you are not deficient, it is best to get iron from food. Talk to your doctor before taking iron supplements [\[R\]](#).

**Please note:** Increased iron intake from meat is linked to higher odds of diabetes and heart disease. Try to find a balance between plant and animal iron sources [\[R, R, R, R\]](#).



PERSONALIZED TO YOUR GENES

**Your TMPRSS6 gene variant is linked to low iron levels [\[R\]](#). Getting more iron may make up for this effect and improve brain fog.**

### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TMPRSS6	<b>rs855791</b>	/	



**Red Blood Cells**

IMPACT



EVIDENCE



**Please note:** Increased iron intake from meat is linked to higher odds of diabetes and heart disease. Try to find a balance between plant and animal iron sources [\[R, R, R, R\]](#).

# Vitamin B12



Helps with the following

-  **Anemia** IMPACT 0/5 | EVIDENCE 0/5

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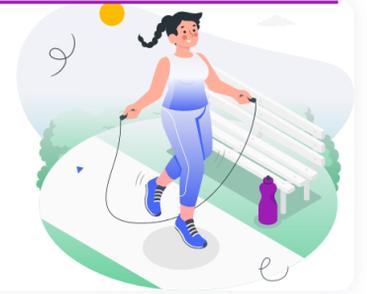
-  **Red Blood Cells** IMPACT 0/5 | EVIDENCE 0/5

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-  **Low Mood** IMPACT 1/5 | EVIDENCE 1/5



## Airway Muscle Training



Helps with the following



### Snoring

IMPACT



EVIDENCE



Airway muscle training may help decrease the snoring in people with and without sleep apnea. Helpful forms include [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- **Myofunctional therapy** (a combination of mouth and throat exercises)
- Playing wind instruments
- Singing

Airway training may help by improving the strength and function of mouth and throat muscles. This helps keep the airways open during sleep [\[R\]](#).



### Endurance

IMPACT



EVIDENCE



Recommendation References: [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#)



### Sleep Apnea

IMPACT



EVIDENCE



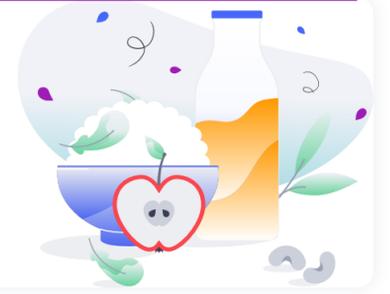
Airway muscle training may help decrease the number of sleep apnea episodes. It may also improve sleep quality, daytime sleepiness, and snoring. Helpful forms include [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- **Myofunctional therapy** (a combination of mouth and throat exercises)
- Playing wind instruments
- Singing

Airway training may help by improving the strength and function of mouth and throat muscles. This helps keep the airways open during sleep [\[R\]](#).



## Dietary Folate



Helps with the following



Anemia

IMPACT



EVIDENCE



Low Mood

IMPACT



EVIDENCE



**Folate** may improve symptoms of depression by increasing the production of [serotonin](#) and [dopamine](#) [R, R, R, R].

**Please note:** You shouldn't consume more than 1,000 micrograms of folate from supplements per day [R].



Low Energy (Chronic Fatigue)

IMPACT



EVIDENCE



13



## Vitamin C



Helps with the following



Anemia

IMPACT



EVIDENCE



Red Blood Cells

IMPACT



EVIDENCE



Sleep Movement

IMPACT

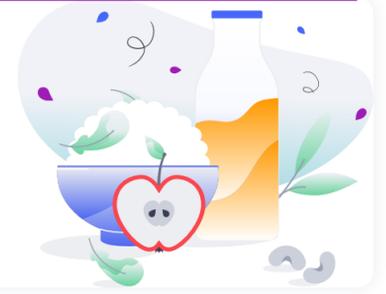


EVIDENCE





# Tomato



Helps with the following



## Exercise Recovery



Recommendation References: [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#)



## Insomnia



Recommendation References: [\[R\]](#), [\[R\]](#)



## Vitamin A



Helps with the following

### Anemia

IMPACT  2 / 5

EVIDENCE  2 / 5

Vitamin A supplements may support healthy hemoglobin levels and reduce the risk of anemia [\[R, R\]](#).

**Please note:** A high dose of vitamin A or taking high amounts of vitamin A long-term can be harmful. Vitamin A may also interact with some medications. Talk to your doctor before supplementing with vitamin A [\[R\]](#).

### Red Blood Cells

IMPACT  0 / 5

EVIDENCE  0 / 5

16



## Alpha-GPC Choline



Helps with the following



Endurance

IMPACT



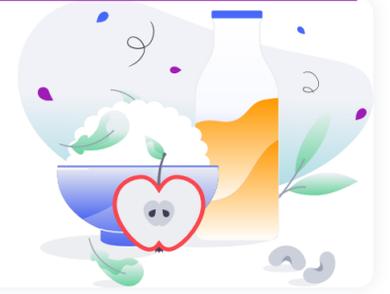
EVIDENCE



17



# Spinach



Helps with the following



Endurance

IMPACT



EVIDENCE



18



# Spirulina



Helps with the following



Anemia

IMPACT 0 / 5

EVIDENCE 0 / 5

Recommendation References: [R](#)



Brain Fog

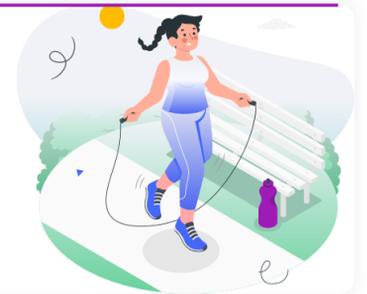
IMPACT 0 / 5

EVIDENCE 0 / 5



## Airflow Devices

Helps with the following



Snoring

IMPACT

●●●●● 4 / 5

EVIDENCE

●●●●● 5 / 5

Oral devices that advance the position of the jaw, tongue, and soft palate may improve snoring in people with and without sleep apnea. **Experts recommend the use of oral devices supervised by a dental specialist to optimize their fit, check for changes in jaw morphology, and assess oral health** [R, R, R].

**Positive Airway Pressure (PAP) devices are the primary treatment for snoring due to sleep apnea.** In those with the condition, they may [R, R, R]:

- Decrease the number of sleep apnea episodes
- Improve sleep quality
- Reduce daytime sleepiness
- Lower blood pressure

PAP devices may also reduce the number of snoring episodes per hour in people without sleep apnea [R].

Continuous PAP (CPAP) machines are the most common option. However, some may find them uncomfortable or difficult to use. Work with your doctor to ensure that machine settings and mask fit are the best for you. Even with adjustments, some may still dislike using CPAP machines regularly. Doctors may suggest alternative options, such as oral devices [R, R].



Sleep Apnea

IMPACT

●●●●● 5 / 5

EVIDENCE

●●●●● 5 / 5

**Positive Airway Pressure (PAP) devices are the primary treatment for sleep apnea.** In those with the condition, they may [R, R, R]:

- Decrease the number of sleep apnea episodes
- Improve sleep quality
- Reduce daytime sleepiness
- Lower blood pressure

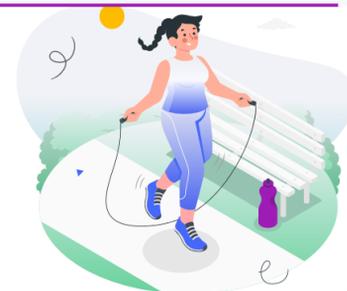
Continuous PAP (CPAP) machines are the most common option. However, some may find them uncomfortable or difficult to use. Work with your doctor to ensure that machine settings and mask fit are the best for you [R, R].

Even with adjustments, some may still dislike using CPAP machines regularly. Doctors may suggest alternative options, such as oral devices [R, R, R, R, R].

Like PAP machines, oral devices may also help reduce the number of sleep apnea episodes and improve sleep quality [R, R, R].



## Avoid Sleeping on Your Back



Helps with the following



### Snoring

IMPACT



EVIDENCE



In comparison to sleeping on your side, sleeping on your back may increase the number of snoring episodes. This is because it may cause the tongue and soft tissue at the back of the mouth to droop and block the airway [R, R, R].

Sleeping on the side may help reduce snoring, especially in people without sleep apnea [R, R, R, R, R].



### Sleep Apnea

IMPACT



EVIDENCE



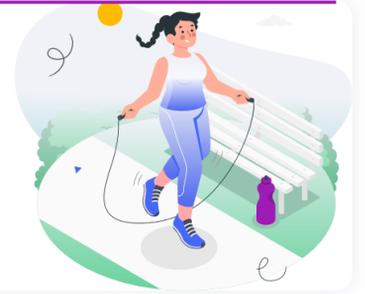
In comparison to sleeping on your side, sleeping on your back may increase the number of sleep apnea episodes. This is because it may cause the tongue and soft tissue at the back of the mouth to droop and block the airway [R, R].

For people who have sleep apnea when sleeping on their back, sleeping in a different position may help [R, R, R, R]:

- Decrease the number of sleep apnea episodes
- Increase total sleep time



# Avoid Cadmium Exposure



Helps with the following



Anemia



Recommendation References: [\[R\]](#)



Low Mood



Recommendation References: [\[R\]](#), [\[R\]](#)

22



# Chlorella



Helps with the following



Anemia



Recommendation References: [R](#)

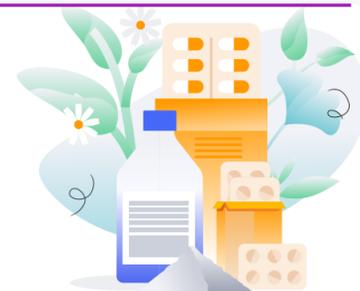


Low Mood





## Probiotics



Helps with the following



### Anemia

IMPACT

2 / 5

EVIDENCE

2 / 5

Probiotics may improve iron levels and reduce the risk of anemia. Species that may help include [\[R\]](#), [\[R\]](#):

- *Lactobacillus plantarum*
- *L. acidophilus*

Probiotics may help by:

- Supporting iron absorption in the gut [\[R\]](#)
- Increasing the levels of B vitamins needed for red blood cell production [\[R\]](#)



### Low Mood

IMPACT

3 / 5

EVIDENCE

3 / 5

**Your gut bacteria can affect your mood!** People with mental illness tend to have different gut bacteria compared to healthy people [\[R\]](#), [\[R\]](#).

**Probiotic supplements may improve your mood by restoring “good” gut bacteria.** They may also benefit people with depression [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Supplements used for mood problems contained one or more of the following probiotics [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- *L. helveticus*
- *B. longum*
- *L. acidophilus*
- *L. rhamnosus*
- *B. bifidum*
- *L. casei*



PERSONALIZED TO YOUR GENES

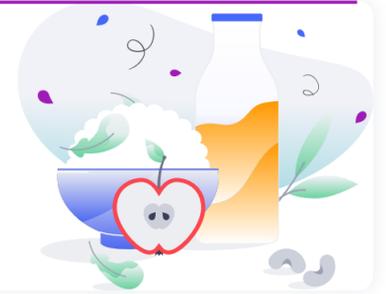
**Probiotics may be more likely to improve mood in people with your IL1B variant [\[R\]](#).**

#### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
/	<b>rs16944</b>	/	5 / 5



## Riboflavin (Vitamin B2)



Helps with the following



Anemia

IMPACT



EVIDENCE



Low Mood

IMPACT



EVIDENCE

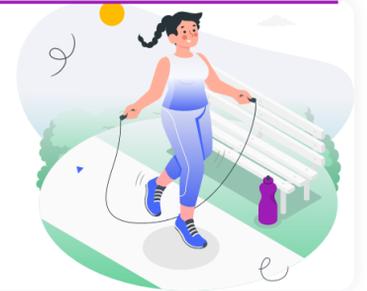


A study found that **low riboflavin levels are associated with depression** [\[R\]](#).

In line with this, a high dietary intake of riboflavin is associated with a lower risk of depression, especially in women [\[R, R\]](#).



# Avoid Arsenic Exposure



Helps with the following



Anemia



Restless Legs



Recommendation References: [\[R\]](#)



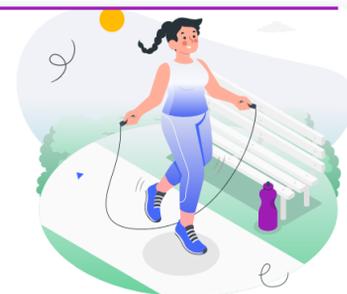
Sleep Movement



Recommendation References: [\[R\]](#)



## Avoid Exposure to Heavy Metals



Helps with the following



Anemia

IMPACT

2 / 5

EVIDENCE

3 / 5

Exposure to heavy metals like arsenic and lead is linked to anemia [\[R, R, R, R, R, R\]](#).

This may be because heavy metals can damage red blood cells. It's also possible that low levels of iron increase the absorption of heavy metals such as lead [\[R, R\]](#).

Lead can be found in [\[R\]](#):

- Contaminated soil
- Older cookware and utensils
- Cans
- Ammunition
- Older paint

Arsenic can be found in [\[R\]](#):

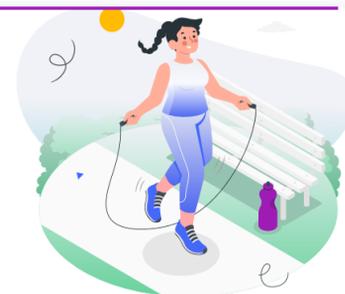
- Metal alloys
- Semiconductors
- Wood preservatives
- Contaminated water

If you're working with lead or arsenic, take steps to reduce exposure by using the required safety equipment, or changing clothes after working. In addition, if your water contains arsenic, you may want to install a water filter.

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## Avoid Lead Exposure



Helps with the following



Anemia

IMPACT

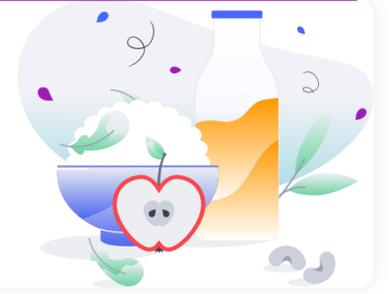
0 / 5

EVIDENCE

0 / 5



## Check Your Vitamin B Levels



Helps with the following



Anemia

IMPACT



EVIDENCE



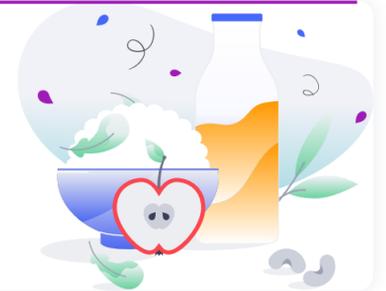
Your body needs vitamin B12 and folate to produce red blood cells. Not getting enough B vitamins is a common cause of anemia [\[R\]](#).

Replenishing missing B vitamins can help treat certain kinds of anemia. **Folate** may improve anemia due to folate deficiency. **Vitamin B12** may improve anemia related to vitamin B12 deficiency [\[R, R, R\]](#).

**Please note:** *Talk to your doctor before starting a new supplement. B Vitamins should only be taken for certain types of anemia. Your doctor will help you decide if it's right for you.*



## Check Your Iron Levels



Helps with the following



**Anemia**

IMPACT



EVIDENCE



Getting more iron from food or supplements may improve iron-deficiency anemia [\[R, R, R, R, R, R, R, R\]](#).

Iron-deficiency anemia is the most common type of anemia. People at risk for iron-deficiency anemia who may benefit from increased iron intake include [\[R, R, R\]](#):

- Menstruating women
- Blood donors
- People with certain chronic health conditions (e.g., celiac disease)

Using iron cookware (such as cast iron) may also improve iron levels [\[R, R\]](#).

**Please note:** A high dose of iron can be toxic. If you are not deficient, it is best to get iron from food. Iron should only be taken for specific types of anemia. In some types of anemia, iron supplementation may cause harm. Talk to your doctor before taking iron supplements [\[R\]](#).



PERSONALIZED TO YOUR GENES

**People with your TMPRSS6 gene variant may be more prone to iron deficiency anemia [\[R, R\]](#). Take special care to maintain healthy iron levels.**

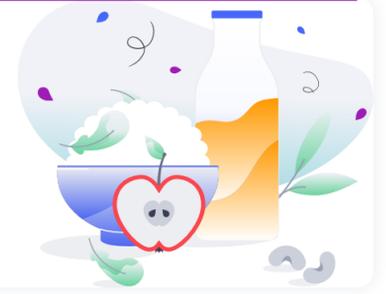
### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TMPRSS6	<b>rs855791</b>	/	

30



## Chicken Liver



Helps with the following



Anemia

IMPACT

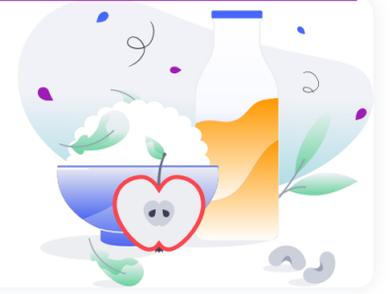


EVIDENCE





## Dietary Copper



Helps with the following



Anemia

IMPACT

0 / 5

EVIDENCE

0 / 5

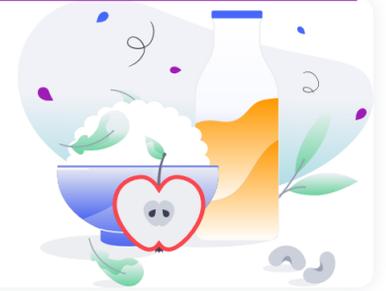
**Please note:** *There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.*

**Genetically higher copper levels may be associated with reduced risk of anemia. [R]**

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## Dietary Vitamin B12



Helps with the following



Anemia

IMPACT

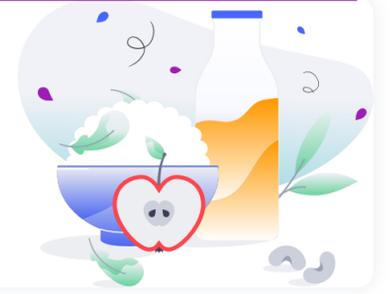
0 / 5

EVIDENCE

0 / 5



## Dietary Vitamin C



Helps with the following



**Anemia**

IMPACT



EVIDENCE



Vitamin C deficiency is a rare cause of anemia. It can make the blood vessels more fragile and increase bleeding [\[R, R, R\]](#).

In people without vitamin C deficiency, vitamin C may help support iron absorption and healthy hemoglobin levels [\[R, R, R, R\]](#).

However, the effects may be negligible in people who get enough vitamin C in their diets. Most studies found that vitamin C did not help as part of standard treatment for iron-deficiency anemia [\[R, R, R\]](#).

**Please note:** *Supplementing with vitamin C is linked to a slightly higher risk of kidney stones in men. Talk to your doctor before taking vitamin C* [\[R, R, R\]](#).



PERSONALIZED TO YOUR GENES

**People with your SLC23A1 gene variant may have lower levels of vitamin C. Getting enough vitamin C may support healthy iron levels** [\[R, R\]](#).

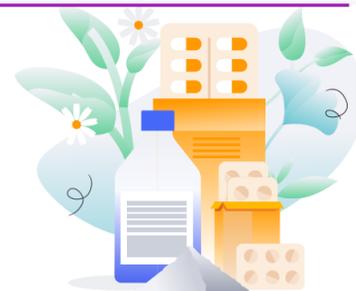
### YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
/	<b>rs4257763</b>	/	

34



## Folate



Helps with the following



Anemia

IMPACT

0 / 5

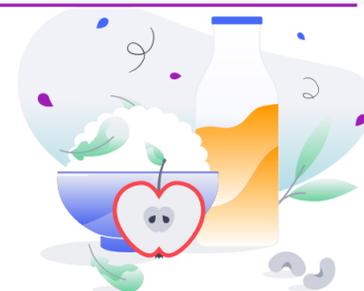
EVIDENCE

0 / 5

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## Gold Kiwifruit



Helps with the following



Anemia

IMPACT



EVIDENCE

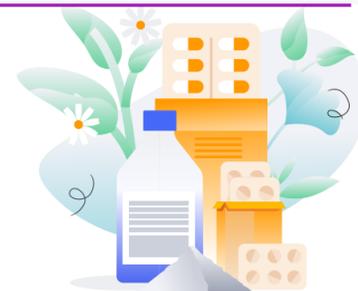


Recommendation References: [\[R\]](#)

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## Hibiscus



Helps with the following



Anemia

IMPACT

0 / 5

EVIDENCE

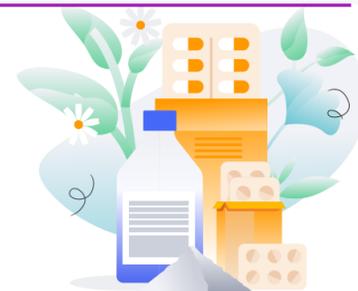
1 / 5

**Please note:** Hibiscus may interact with painkillers and anti-inflammatory drugs such as diclofenac and drugs for high cholesterol such as simvastatin. Make sure to consult your doctor before consuming hibiscus [\[R, R\]](#).

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## Lactoferrin



Helps with the following



Anemia

IMPACT

●●●●● 3/5

EVIDENCE

●●●●● 3/5

Lactoferrin may help people with iron deficiency anemia. It may support healthy levels of iron and hemoglobin. Lactoferrin supplements may also be less upsetting to the stomach than iron supplements [\[R\]](#), [\[R\]](#), [\[R\]](#).

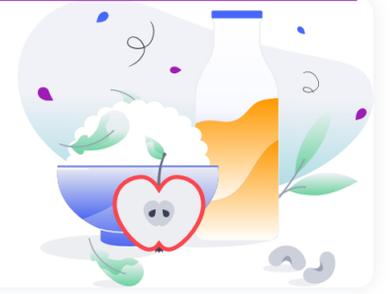
Lactoferrin may help by reducing inflammation [\[R\]](#).

**Please note:** Lactoferrin should only be taken for specific types of anemia. In some types of anemia, increasing iron levels may cause harm. Talk to your doctor before taking lactoferrin supplements.



## Avoid Coffee After Iron-Rich Meal

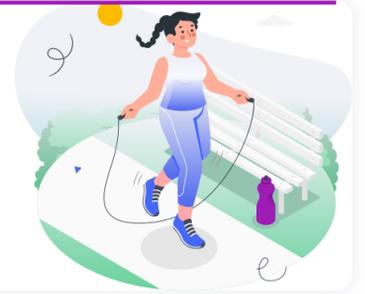
Helps with the following



39



## Avoid Perchlorate



Helps with the following



Iron

IMPACT



EVIDENCE

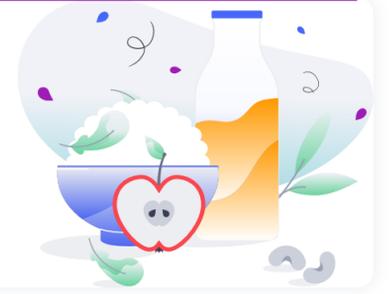


Recommendation References: [\[R\]](#)



## Avoid Tea After Iron-Rich Meal

Helps with the following

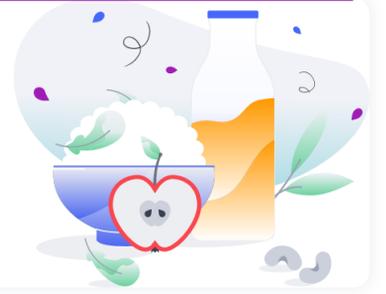


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## Beef

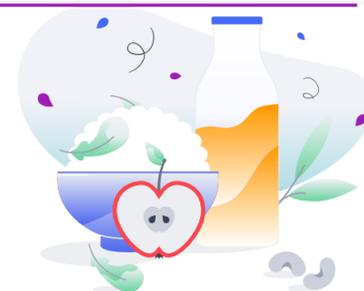
Helps with the following





## Beef Heart

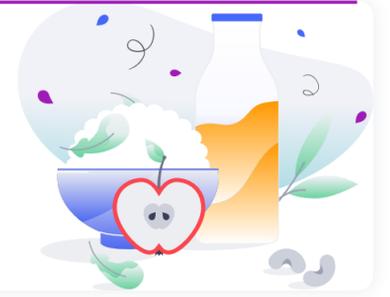
Helps with the following





## Beef liver

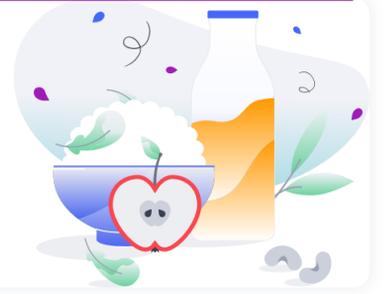
Helps with the following





## Beef Spleen

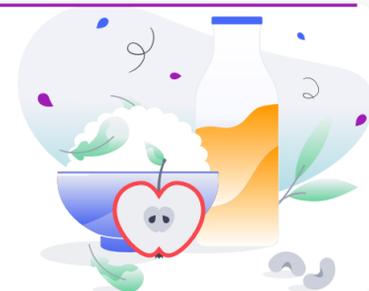
Helps with the following





## Brussels Sprouts

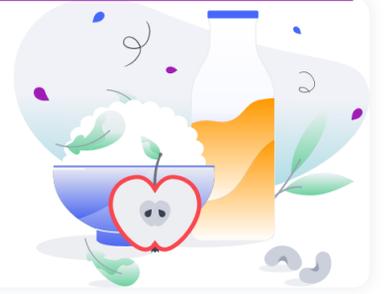
Helps with the following





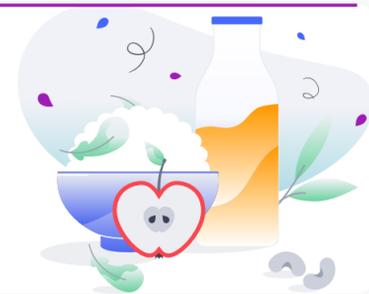
# Chickpeas

Helps with the following





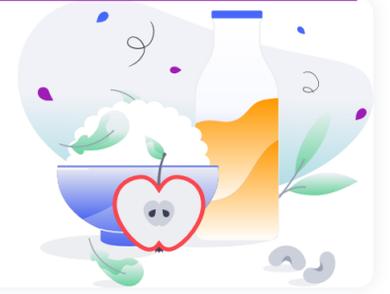
# Coconut



Helps with the following



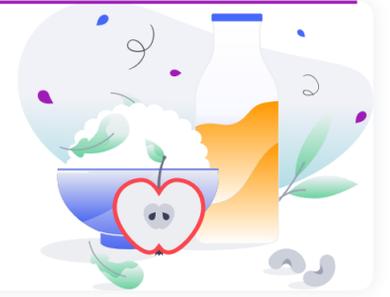
# Guava



Helps with the following



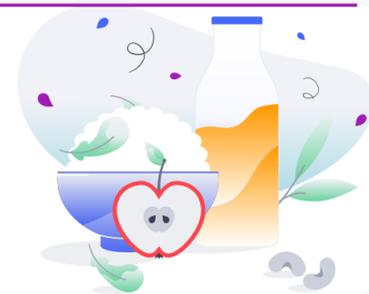
# Kidney beans



Helps with the following



# Lentils



Helps with the following