

FTO (Weight)

Gene Report

REPORT CATEGORY —



WEIGHT & BODY FAT

Sample Client

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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.

Personal information

NAME

Sample Client

SEX AT BIRTH

Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg



How this works

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



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



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

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



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

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

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



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

You have 2 risk alleles

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

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

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

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



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

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



Impact

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

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

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

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

Recommendation Evidence

5 / 5

Recommendations that are considered effective and generally recommended by experts and medical bodies.

4 / 5

Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.

3 / 5

Recommendations that are considered possibly effective and have many studies supporting them

2 / 5

Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.

1 / 5

Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.

0 / 5

No evidence in humans.

Genotype-specific Evidence

High-quality

Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).

Medium-quality

Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).

Low-quality

Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).

Indirect

A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).

In theory

A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

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

Introduction

[FTO](#) is one of the best-studied genes when it comes to body weight and obesity, hence the name: *fat mass and obesity-associated gene*. It’s the first discovered [genetic link to obesity](#) and continues to be the gene with the largest known effect on body weight to this day [\[R\]](#), [\[R\]](#), [\[R\]](#).

A lot is still unclear about *FTO* functions, but studies suggest this gene works as a “master switch” that controls a variety of other weight-associated genes and pathways in our bodies [\[R\]](#), [\[R\]](#).

One of the primary ways that FTO may affect body weight is through its influence on appetite, emotional aspects of eating, and food preferences. Another potential mechanism includes its adverse effects on fat metabolism and energy expenditure [\[R\]](#), [\[R\]](#), [\[R\]](#).

FTO Genetics

An SNP in this gene, [rs9939609](#), has shown a robust association with obesity across different ages and ethnic groups. Carriers of the minor 'A' allele tend to gain more weight and have higher rates of obesity [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Many human studies suggest that the 'A' allele at rs9939609 is associated with:

- Higher levels of [ghrelin](#) or the "hunger hormone" [\[R\]](#)
- Higher food intake [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Increased preference for higher-calorie foods [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Increased enjoyment of food [\[R\]](#)
- Not feeling full after meals [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Eating in the absence of hunger [\[R\]](#), [\[R\]](#)
- Food cravings [\[R\]](#)
- Emotional and binge eating [\[R\]](#)

In contrast, the 'T' allele is linked to normal body weight, more satiety after meals, and possibly healthier dietary choices [\[R\]](#), [\[R\]](#), [\[R\]](#).

In addition to its potential influence on appetite and hunger control, this *FTO* SNP may also have metabolic effects that affect how the body actually processes the food we eat. For example, several studies suggest that the 'A' allele of rs9939609 may be linked with higher [insulin resistance](#) and [blood sugar](#) [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Following on this, a meta-analysis of data from over 40,000 Scandinavians found that people diagnosed with type-2 diabetes were more likely to carry the ‘A’ allele for this SNP. The authors also concluded that having the ‘A’ allele may make a person more likely to develop type-2 diabetes over time. However, another meta-analysis of over 150,000 people found this association significant only in some populations [\[R\]](#), [\[R\]](#).

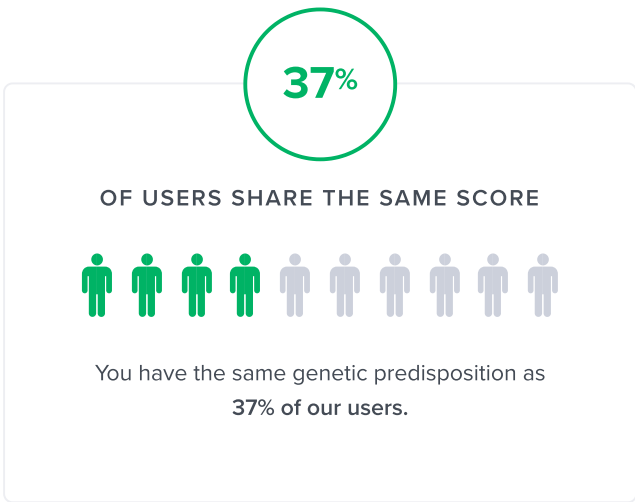
The good news is that **healthy dietary choices may reduce and even cancel out the harmful effects of the ‘A’ variant!**

Multiple studies have associated an increased intake of [dietary fat](#), specifically saturated and trans fat, with obesity in carriers of the ‘A’ allele [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).



BETTER

Likely better *FTO* genetics based on the genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
FTO	rs9939609	TT

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

Carriers of this variant eating a low-fat diet or replacing saturated fat with healthy fats such as PUFA and MUFA may see greater reductions in [\[R, R, R, R, R\]](#):

- [Weight](#) and abdominal fat
- [Total cholesterol](#)
- [LDL](#)
- [CRP](#) (inflammation)
- Insulin resistance

Additionally, carriers of the ‘A’ variant may benefit from increasing their intake of [dietary protein](#). While a low-protein diet has been associated with higher BMI and waist circumference in people with the ‘AA’ genotype, ‘A’ carriers eating a high-protein diet may see greater improvements in their [\[R, R, R\]](#):

- Appetite and food craving control
- Total cholesterol
- Triglycerides
- LDL
- Insulin resistance

However, two meta-analyses failed to confirm these associations. One of them even came to the opposite conclusion: the link between FTO variants and BMI was **stronger** in those who consumed more protein. Further analysis of different populations confirmed this finding only in whites [\[R, R\]](#).

A 3-year-long study concluded that people with the 'AA' genotype may lose weight better on a [Mediterranean diet](#) compared to people with the ‘TT’ genotype. In addition, according to another study, this type of diet may protect people with the 'AA' genotype against diabetes [\[R, R\]](#).

Your Recommendations

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

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

DOSAGE		DOSAGE	
1	Limit Calorie Intake	2	Exercise At Least One Hour a Day1 hour
3	Low-Carbohydrate Diet	4	Low-Fat Diet
5	Mediterranean Diet	6	Glucomannan3 g
7	Garcinia Cambogia500 mg	8	Maintain Optimal Vitamin D Levels1000 iu

Limit Calorie Intake

IMPACT

5 / 5

EVIDENCE

5 / 5

How to implement

Consume fewer calories than your body needs for maintenance. Calculate your daily caloric needs using an online calculator based on your sex, age, weight, height, and activity level, then reduce that number by 500-1000 calories per day to safely lose 1-2 pounds per week. Adjust the caloric intake as needed based on your progress.

Description

People often limit their calorie intake to help them lose weight [R, R].

However, moderate calorie restriction may also help you stay healthier and age better [R, R, R, R, R].

There are different ways to take in fewer calories. You can:

- **Eat low-calorie foods**, such as those rich in proteins, fiber, and water. Avoid fatty and sugary foods, which tend to be high in calories [R].
- Try **intermittent fasting**, which involves changing how often you eat [R].

If you are restricting your calories, make sure your diet remains healthy and balanced. Experts also recommend being physically active, to prevent the loss of muscle and bone mass.

How it helps

To promote weight loss, experts recommend lowering your calorie intake by 30% of your daily requirement [R, R].

Eating fewer calories and intermittent fasting may support short-term weight loss equally. On the other hand, people who eat fewer calories may maintain their weight loss better in the long run [R, R, R, R, R, R].

Types of intermittent fasting that may be especially helpful for weight loss include:

- **Alternate-day fasting:** fasting every other day [\[R\]](#)
- **Time-restricted eating:** eating within a certain time frame each day [\[R, R, R, R, R\]](#)

A good way to limit calorie intake is to eat more low-calorie foods. These include soups and foods rich in protein and fiber. You can also try eating a low-calorie snack before a meal [R, R, R].

These methods can help make you feel more full and thus eat less [R, R, R].

Please note: Limiting calorie intake too much or fasting for too long can cause malnutrition, anemia, eating disorders, and other health problems. Children, pregnant women, and people with certain chronic conditions or substance abuse disorders shouldn't do intermittent fasting. Talk to your doctor before implementing any drastic calorie restriction [R].

2

Exercise At Least One Hour a Day

IMPACT

5 / 5

EVIDENCE

5 / 5

How to implement

Dedicate a minimum of 60 minutes to moderate-intensity activities such as brisk walking, swimming, or cycling. Do this most days of the week, aiming for at least 5 days to optimize benefits.

TYPICAL STARTING DOSE

1 hour

Description

[Exercise](#) can do wonders for your health. It can help you lose weight, improve your heart health, boost your mood, and more [\[R\]](#).

There are many ways you can be active. You can walk, run, swim, dance, or play team sports. **Everything counts, and it's never too late to start!**

Try to get at least **60 minutes of moderate physical activity on most days**, including walking. **Getting a mix of cardio (min 150 min/day) and strength training (min 2 times a week) may be optimal.**

How it helps

Most experts agree that getting 150-300 minutes of exercise per week can help you control your weight. For best results, try to push yourself a bit with **moderate or intense exercise** [\[R\]](#), [\[R\]](#).

Exercise helps by burning calories and boosting your metabolism. It may also lower your appetite [\[R\]](#), [\[R\]](#).

However, it might take a while to see the results of your hard work. **The benefits of moderate or intense exercise may only show after 12 weeks** [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Note that exercise may be less effective at helping you lose weight than limiting your calorie intake. However, **it will likely help you maintain a lower weight in the long run** [\[R\]](#), [\[R\]](#), [\[R\]](#).

3



Low-Carbohydrate Diet

IMPACT

4 / 5

EVIDENCE

5 / 5

How to implement

Limit your daily intake of carbohydrates to less than 26% of your total daily calories. For a standard 2000-calorie diet, this means consuming no more than 130 grams of carbohydrates per day. Focus on including non-starchy vegetables, lean proteins, and healthy fats in your meals while minimizing the intake of sugars, bread, pasta, and other high-carb foods.

Description

Low-carbohydrate diets can promote weight loss, improve blood sugar control, and support heart health. They may also be beneficial for individuals with certain medical conditions, such as epilepsy or metabolic syndrome.

How it helps

Four meta-analyses (the largest one with 17 trials concluded that low-carb diets decrease body weight, fat mass, BMI, and waist circumference. Very low-carbohydrate diets may be the most effective [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

A meta-analysis of 32 studies found that the short-term effects of low-carb diets on weight parameters persist in the long term, but to a small degree. Another meta-analysis (25 trials) found significant effects of low-carb diets on body weight at 3-8 months, but not at 10-30 months, and on BMI at 3-4 months but not at other time points [\[R\]](#), [\[R\]](#).

Low-carb diets help in part with weight loss by **increasing energy expenditure** according to a meta-analysis of 29 trials [\[R\]](#).

The combination of low-carb diets with exercise further decreases waist circumference, body weight, and BMI according to 2 meta-analyses. However, a meta-analysis of 8 studies found no added benefits in trained individuals [\[R\]](#), [\[R\]](#), [\[R\]](#).

Six meta-analyses (the largest one with 38 trials found low-carb diets more effective than low-fat diets for reducing weight. In line with this, a meta-analysis of 48 trials comparing different diets found the low-carb diet had the largest effect on weight loss. However, 3 meta-analyses found both diets similarly effective at reducing body weight and waist circumference [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

In patients with type 2 diabetes, the low-carb dietary pattern is the most effective one at lowering body weight according to 2 meta-analyses [\[R\]](#), [\[R\]](#).

4



Low-Fat Diet

IMPACT

4 / 5

EVIDENCE

4 / 5

How to implement

Adopt a diet where less than 30% of your daily calories come from fat. Incorporate plenty of fruits, vegetables, whole grains, and lean proteins. Avoid or significantly limit high-fat foods like fried foods, processed snacks, and fatty meats. Aim for this dietary pattern consistently each day.

Description

Low-fat diets are often recommended for heart health and weight management. They can help reduce the intake of saturated and trans fats, lowering the risk of cardiovascular disease.

A low-fat diet is a diet that provides **30% or less** of the daily energy requirement from fat [\[R\]](#).

This type of diet may be useful for **losing weight, reducing cholesterol levels, and lowering the risk of certain health conditions**, such as [\[R, R, R, R\]](#):

- Heart disease
- Diabetes
- Certain types of cancer

Low-fat diets prioritize the following foods [\[R, R\]](#):

- Vegetables and fruits
- Whole grains
- Legumes (e.g., beans, lentils, peas)
- Skinless poultry (e.g., chicken, duck, and turkey)
- Fish and seafood (e.g., salmon, lake trout, tuna, and herring)
- Egg whites
- Low-fat dairy products

How it helps

Low-energy-density foods are foods that provide few calories per weight. Fatty and sugary foods are especially energy-dense, while those rich in proteins, fiber, and water reduce dietary energy density. In 4 non-placebo-controlled trials of 431 people on weight loss programs, those who ate less energy-dense foods lost more weight and maintained it better in the long term [\[R, R, R, R\]](#).

In weight-loss interventions lasting 2-12 months, weight reduction increases by 0.37 kg for every 1% reduction of dietary fat according to a meta-analysis of 16 trials and 1,728 participants [\[R\]](#).

Five meta-analyses (the most recent one with 37 trials and over 57k participants) found that adopting a low-fat diet reduces weight (by 1.4-5.41 kg), BMI (by 0.5 kg/m2), waist circumference (by 0.3 cm), body fat (by 0.3-10.2%), and energy intake (by 1,138 kJ/day) when compared with the usual diet. Greater fat reductions resulted in greater weight loss [\[R, R, R, R, R\]](#).

A low-fat diet reduces calorie intake, which can contribute to weight loss.

5



Mediterranean Diet

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Incorporate a variety of primarily plant-based foods, such as fruits, vegetables, whole grains, nuts, and legumes, into every meal. Choose healthy fats, like olive oil, over saturated fats and consume fish and poultry at least twice a week. Limit red meat to a few times a month and include a moderate amount of dairy products. Opt for water and red wine in moderation as your beverages.

Description

The [Mediterranean diet](#) is based on the traditional cuisine from the Mediterranean regions. It moderates the intake of red meat and dairy, while being rich in fruits and vegetables, whole grains, and healthy fats ([olive oil](#)).

The [Mediterranean diet](#) focuses on traditional cuisine from the Mediterranean regions. It’s rich in [\[R\]](#):

- [Olive oil](#)
- Fruits and vegetables
- Whole grains
- Nuts and seeds
- Fish

This type of diet may **reduce inflammation and protect the brain and heart** [\[R, R, R, R\]](#).

Limited intake of animal products, saturated fat, and refined sugar likely contribute to the health benefits of the Mediterranean diet [\[R\]](#).

How it helps

The Mediterranean diet may support weight loss more than a low-fat diet. Combining the Mediterranean diet with exercise and calorie restriction may even boost its effects on weight [\[R, R, R, R, R\]](#).

What makes the Mediterranean diet a great choice?

- It’s low in saturated fat [\[R\]](#)
- It’s rich in healthy fat sources like olive oil and fish [\[R, R\]](#)
- It’s rich in fiber [\[R\]](#)

This diet may also support weight loss in people with type 2 diabetes [\[R, R, R, R\]](#).

6



Glucomannan

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Take 1 gram of glucomannan powder with 8 ounces of water, 15 minutes to 1 hour before each meal, three times daily. It's essential to drink plenty of water when taking glucomannan to ensure it reaches the stomach and expands, helping to promote a feeling of fullness.

TYPICAL STARTING DOSE

3 g

Description

Glucomannan is a dietary fiber derived from the root of the konjac plant and is often used as a weight loss supplement. It may promote feelings of fullness and support weight management when used in conjunction with a balanced diet.

How it helps

A meta-analysis of 14 studies and 531 participants found that supplementation with glucomannan lowers body weight by 0.79 kg [R].

However, a meta-analysis of 8 studies only found non-significant effects (0.22-kg reduction) of glucomannan on body weight [R].

Nevertheless, a meta-analysis of 79 studies identified glucomannan (with an effect of 1.27 kg) among the supplements lowering body weight [R].

Glucomannan may help by promoting a feeling of fullness, which may reduce food intake and lead to weight loss.

 PERSONALIZED TO YOUR GENES

A supplement with glucomannan may promote weight loss more in people with your **FTO** gene variant [R].

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
FTO	rs9939609	TT	

7



Garcinia Cambogia

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of Garcinia Cambogia as a supplement 30 to 60 minutes before each meal. It is typically recommended to do this three times a day for effective results.

TYPICAL STARTING DOSE

500 mg

Description

Garcinia cambogia is a tropical fruit extract commonly used in weight management supplements. It contains hydroxycitric acid (HCA), which is believed to help curb appetite and support weight loss goals, although scientific evidence is mixed.

[Garcinia cambogia](#) is a plant native to Asia [\[R\]](#).

Different parts of *G. cambogia* are used to [\[R\]](#):

- Preserve and flavor food
- Make artwork and polish metals

In traditional medicine, people mainly use *G. cambogia* and its active compounds to manage weight [\[R\]](#), [\[R\]](#).

How it helps

Supplementing with **Garcinia cambogia (up to 4.7 g/day for 8-12 weeks)** may support weight loss. Combining *G. cambogia* with other herbs may have similar benefits [\[R\]](#), [\[R\]](#), [\[R\]](#).

Its active component **HCA (1-2.8 g/day for 2-12 weeks)** may also help with weight control [\[R\]](#).

G. cambogia helps by [\[R\]](#), [\[R\]](#):

- Lowering fat production
- Promoting fat burning
- Reducing appetite

Note that the evidence is mixed. *G. cambogia* extract didn't promote weight loss in some of the studies [\[R\]](#), [\[R\]](#), [\[R\]](#).

Please note: *G. cambogia* may cause liver damage. Consult your doctor before taking it [\[R\]](#), [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

A combination of glucomannan and *Garcinia cambogia* may reduce weight and visceral fat more in people with your [FTO](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
FTO	rs9939609	TT	

8

Maintain Optimal Vitamin D Levels

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

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

TYPICAL STARTING DOSE

1000 iu

Description

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

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

- Mood
- Immunity
- Heart health
- Blood sugar control

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

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

How it helps

People with certain gene variants may be at increased risk of obesity if their vitamin D levels are low.

Next Steps

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

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

Your lab results

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

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

