

Organophosphate Sensitivity

Biohacker Report

REPORT CATEGORY —



Sample Client

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Personal information

NAME

Sample Client

SEX AT BIRTH

Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg

DISCLAIMER

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



How this works

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



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



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

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



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

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

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



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

You have 2 risk alleles

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

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

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

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



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

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



Impact

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

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

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

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

Recommendation Evidence

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

Genotype-specific Evidence

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

Some things to keep in mind:

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

Introduction

Pesticides include all chemicals used to kill weeds, insects, fungi, and microbes. They are mainly used in agriculture to improve crop yields.

Organophosphates (OP) are the most widely used pesticides worldwide. They include [\[R\]](#):

- Parathion
- Malathion
- Chlorpyrifos
- Diazinon
- Phosmet

Did you know? OP pesticides belong to the same family of chemicals as some nerve gasses used as chemical weapons in WWII [\[R\]](#).

Although they are supposed to degrade when exposed to air and light, OP residue remains on many of the fruits and vegetables we eat. The widespread use of pesticides in schools, parks, and other public spaces also puts many people at risk of low-level exposure [\[R\]](#).

What happens when you’re exposed to OPs? The symptoms of acute OP poisoning include [fatigue](#), muscle weakness. In severe cases, it may progress into paralysis and end fatally if untreated [\[R\]](#).

However, if you don’t work with pesticides, acute OP poisoning is highly unlikely. Your bigger concern is chronic exposure to lower OP amounts, especially if you are more sensitive to them. OP exposure has been linked to [\[R\]](#), [\[R\]](#):

- Fertility problems
- Cognitive problems
- Nerve damage
- Cancer and gene damage

Genetics of OP Sensitivity

Although adverse effects of chronic OP exposure are inevitable, some people seem to be at a much higher risk. The reason for this lies partly in genetics!

In people carrying certain gene variants, OP pesticides have shown a stronger link with DNA damage, Parkinson’s disease, cancer, and more. These variants belong to genes that play a role in [\[R, R, R, R, R\]](#):

- Pesticide detox ([PON1](#), [ABCB1](#), [CYP1A1](#))
- Oxidative stress ([NOS1](#))
- Brain health and cognition ([BCHE](#))
- Vitamin D activity ([GC](#), [VDR](#))

However, keep in mind that your other gene variants, lifestyle, and environment may also influence your OP sensitivity.



Likely typical organophosphate sensitivity based on 26 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
ABCB1	rs1045642	GG
RPS18	rs1547387	CC
POU5F1B	rs4242382	GG
FBXO21	rs2682826	GG
NOS1	rs3741480	CT
USPL1	rs9579645	AA
BCHE	rs1803274	TC
ADIPOR1	rs12733285	TT
PON1	rs854560	AT
ALOXE3	rs3027208	TC
GC	rs12512631	TC
CYP2D6	rs3892097	CC
CASTOR1	rs2072159	GA
LDLR	rs8110695	AT
A4GALT	rs8136914	AG
PON1	rs662	TT
ABCB1	rs2032582	CT
TMEM106C	rs4328262	GG

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

Your Recommendations

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

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

DOSAGE		DOSAGE	
1	Avoid Organophosphate Pesticide Exposure	2	Activated Charcoal500 mg
3	Magnesium Sulfate200 mg	4	N-acetylcysteine (NAC)600 mg
5	Avoid Exposure To Organic Solvents	6	Air Purifier
7	Avoid Exposure to Solvents	8	Avoid Pesticide Exposure
9	Avoid Processed High Phosphate Foods	10	Avoid Herbicide Exposure

1



Avoid Organophosphate Pesticide Exposure

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

To reduce organophosphate pesticide exposure, buy organic produce when possible, thoroughly wash and peel fruits and vegetables, avoid using chemical pesticides in your home and garden, and wear protective clothing and a mask if you must handle pesticides for agricultural or landscaping work.

Description

Reducing organophosphate exposure involves minimizing contact with pesticides and insecticides containing these chemicals, which can protect against potential health risks such as neurotoxicity and respiratory issues, particularly for individuals working in agriculture or pest control.

Organophosphates (OP) are the most widely used pesticides worldwide. They include [\[R\]](#):

- Parathion
- Malathion
- Chlorpyrifos
- Diazinon
- Phosmet

Chronic exposure to OPs has been linked to [\[R\]](#), [\[R\]](#):

- Fertility problems
- Cognitive problems
- Nerve damage
- Cancer and gene damage

How it helps

Reducing exposure to OPs may help prevent their potentially harmful effects on health. Ways to reduce your exposure to OPs and other pesticides include [\[R\]](#), [\[R\]](#):

- Eating a variety of fruits and vegetables to avoid high exposure to one pesticide
- Buying organic food when possible
- Thoroughly washing and drying your food, even if it's labeled organic
- Scrubbing or peeling fruits and vegetables when possible
- Discarding the outer layer of leafy vegetables

2



Activated Charcoal

IMPACT1 / 5

EVIDENCE2 / 5

How to implement

Take 500-1000 mg of activated charcoal with a full glass of water at least 1 hour before a meal or 2 hours after a meal. Do not consume it daily for long periods; use it for short-term detoxification or occasional upset stomach only.

TYPICAL STARTING DOSE
500 mg

Description

Activated charcoal is a porous substance that is highly effective at absorbing and trapping toxins and chemicals in the digestive tract. It is sometimes used in emergency medical settings for poisoning treatment and in certain beauty and wellness products.

How it helps

Activated charcoal may help with acute organophosphate poisoning [\[R, R, R, R, R\]](#).

However, some studies didn't find it beneficial [\[R, R\]](#).

Activated charcoal may bind to organophosphate compounds, potentially reducing their absorption in the gut.

3



Magnesium Sulfate

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 200-400 mg of magnesium sulfate orally with water once daily, ideally in the evening or as directed by your healthcare provider. Continue this supplementation as recommended by your healthcare provider, often for several weeks to months for optimal benefits.

TYPICAL STARTING DOSE
200 mg

Description

Magnesium sulfate, also known as Epsom salt, is used in baths and topical applications to soothe sore muscles, alleviate stress, and promote relaxation. It is believed to be absorbed through the skin, providing a calming effect on muscles and the nervous system.

How it helps

Intravenous magnesium sulfate (4 g/day) as an add-on to conventional treatment may reduce hospitalization days and rates of mortality in people with acute organophosphate poisoning [\[R\]](#).

4



N-acetylcysteine (NAC)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 600 mg of N-Acetylcysteine (NAC) supplement daily with water. It can be taken at any time of the day, but try to take it at the same time each day for best results.

TYPICAL STARTING DOSE
600 mg

Description

NAC is a supplement that contains a form of the amino acid cysteine, a protein building block that your body uses to make the antioxidant glutathione. It is used for its potential antioxidant properties and its ability to support lung, gut, and mental health.

[N-acetylcysteine](#) (NAC) is converted to cysteine in the body. Cysteine is a protein building block (amino acid) that helps make the antioxidant glutathione [\[R\]](#).

People take NAC to potentially support [\[R\]](#), [\[R\]](#):

- Mental health
- Ovarian health and pregnancy outcomes
- Lung health
- Gut health

How it helps

N-acetylcysteine (NAC) enhances your body's production of glutathione, a key antioxidant that helps neutralize harmful substances like organophosphates. It can remove these toxins, thereby reducing symptoms associated with Organophosphate Sensitivity.

In a [placebo-controlled trial of 30 patients with acute organophosphate poisoning](#), NAC (600 mg three times daily for 3 days) as an add-on to conventional treatment **reduced atropine requirements** [\[R\]](#).

5



Avoid Exposure To Organic Solvents

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Ensure to work in well-ventilated areas and wear protective gear when handling products like paints, varnishes, and adhesives. When possible, choose solvent-free or water-based products to minimize exposure. Regularly check labels for any solvents listed and strive to limit their use in both personal and professional settings.

Description

Avoiding exposure to organic solvents, commonly found in paints, adhesives, and cleaning products, can protect against the potential health risks associated with inhalation or skin contact, such as respiratory issues and skin irritation.

Organic solvents are used in various industries and workplaces for tasks like cleaning, painting, and manufacturing.

However, their use can be hazardous to workers' health. Exposure to these solvents can lead to problems such as breathing difficulties, skin irritation, and reduced fertility [R].

How it helps

Organic solvents can be potent triggers for those with chemical sensitivities; avoiding them can help prevent symptoms.

6



Air Purifier

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Install an air purifier in your home, ideally in the rooms you spend the most time in, such as your bedroom and living room. Keep the air purifier on for at least 12 hours each day, or continuously if possible, to effectively reduce airborne contaminants. Regularly clean or replace the filters according to the manufacturer's instructions to maintain its efficiency.

Description

Air purification is the process of cleaning the air around us. Using a high-quality air purifier with a HEPA filter helps remove harmful particles like dust, smoke, and bacteria. Having clean air to breathe can help boost your health by reducing allergies, asthma problems, and even certain infections.

How it helps

Air purifiers can remove contaminants and potentially harmful chemicals from the indoor environment, which may lessen exposure to substances that could trigger sensitivity.

7



Avoid Exposure to Solvents

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Wear protective gloves and masks when using solvent-based products such as paint thinners, degreasers, or nail polish removers. Ensure adequate ventilation by working outdoors or in well-ventilated areas whenever possible. Seek solvent-free or low-VOC (Volatile Organic Compounds) alternatives for household and professional use.

Description

Avoiding exposure to organic solvents, often found in cleaning products and industrial settings, can reduce the risk of potential health issues such as respiratory problems and skin irritation. Implementing safety measures and proper ventilation helps minimize contact with these chemicals.

How it helps

Avoiding solvents, which might be found in various household products and industrial emissions, helps reduce the risk of sensitivity-related symptoms.

8



Avoid Pesticide Exposure

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Purchase organic produce when possible, wash fruits and vegetables thoroughly under running water, and peel them if not organic. Use natural pest control methods instead of chemical pesticides at home and garden. Limit the use of non-organic lawn and garden chemicals.

Description

Pesticides include all chemicals used to kill weeds, insects, fungi, and microbes. Reducing pesticide exposure involves choosing organic or pesticide-free foods and using natural pest control methods to limit contact with potentially harmful chemical residues. It supports overall health by reducing the risk of pesticide-related health issues.

Pesticides include all chemicals used to kill weeds, insects, fungi, and microbes. They are widely used in agriculture to improve crop yields. Common groups of pesticides include:

- Organophosphates (glyphosate, parathion, malathion, chlorpyrifos, diazinon, phosmet)
- Neonicotinoids (imidacloprid, acetamiprid, thiacloprid, clothianidin)
- Pyrethroids (permethrin, alpha-cypermethrin)

Chronic exposure to pesticides has been linked to:

- Fertility problems [\[R\]](#)
- Cognitive problems [\[R\]](#)
- Alzheimer’s and Parkinson’s disease [\[R\]](#), [\[R\]](#)
- Thyroid problems [\[R\]](#)
- Obesity [\[R\]](#)
- DNA damage and cancer [\[R\]](#), [\[R\]](#), [\[R\]](#)

How it helps

Decreasing the exposure to pesticides can be crucial in managing sensitivities to chemicals like organophosphates.

9

Avoid Processed High Phosphate Foods

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

To follow this recommendation, remove or significantly reduce processed foods such as sodas, packaged snacks, processed meats, and canned foods from your daily diet. Instead, opt for fresh fruits, vegetables, whole grains, and lean proteins. It's helpful to read nutrition labels, aiming to keep your daily phosphate intake below 700 mg if possible.

Description

Processed foods often have high levels of phosphate. These include fast foods and soda. Extra phosphate can make bones brittle and damage your blood vessels over time. So, it's healthier to choose fresh foods over processed ones.

How it helps

Processed foods high in phosphates may increase the body's exposure to organophosphates, amplifying sensitivity and potentially triggering symptoms.

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Avoid Herbicide Exposure

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Minimize your contact with herbicides by wearing protective clothing such as gloves and masks when handling these chemicals. Choose organic produce when possible to reduce herbicide intake from food sources. Additionally, avoid areas where herbicides are being sprayed and use natural weed control methods in your own garden.

Description

Avoiding exposure to herbicides and pesticides can reduce the risk of potential health concerns associated with these chemicals, such as adverse effects on the nervous system and long-term environmental impacts.

How it helps

Herbicides may contain organophosphates, and avoiding them can limit symptoms in individuals with organophosphate sensitivity.

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.

