

Zinc-Iron Gene Check

XXXXXXXXXXXXX

Date of birth: XXXXXXX

Code: XXXXXX

WHAT THE REPORT INCLUDES

- Detailed EXPLANATION of the test performed and recommendations to be followed.
- SUMMARY TABLE presenting the metabolic areas analysed and the results from the DNA analysis, providing a quick overview of an individual's overall health status and highlighting any potential issues.
- BIBLIOGRAPHY providing scientific references for the test.

COLOURS USED

It indicates that the variants identified in the analysis do not unfavourably alter enzymetic activity of the proteins they encode and/or the risk associated with certain diseases.

It indicates that the variants identified in the analysis slightly unfavourably alter enzyme activity and/or the risk associated with certain disorders or diseases.



It indicates that the variants identified in the analysis alter enzyme activity in a particularly unfavourable way, resulting in an increased risk of developing certain disorders or associated diseases.

The results shown, as well as the considerations and explanations contained in the following pages of this booklet, should not be regarded as a medical diagnosis it is important to bear in mind that the genetic information is only a part of the total information needed togain a complete picture of a person's state of health, and the data reported here is therefore a too available to the treating physician to formulate a correct assessment of the patient's physiological state and suggest an appropriate personalised treatment.

INTRODUCTION

Minerals are essential elements that support the proper functioning of the human body. Although required in relatively small amounts, they play a crucial role in maintaining physiological balance and enabling a wide range of vital functions. These include bone and teeth formation, oxygen transport in the blood, water balance, and muscle contraction, among others.

Among the many essential minerals, zinc (Zn) and iron (Fe) stand out due to their significant roles in biological processes. Their deficiency can have serious health consequences.

Zinc (Zn)

Zinc is a vital mineral necessary for immune function, protein synthesis, and wound healing. It plays a key role in cell growth and division and is essential for healthy skin, eyes, and hair. Additionally, zinc supports enzymatic activity related to metabolism.

Zinc is present in all cells of the human body and contributes to numerous physiological functions:

- 1. Enzymatic Role: Zinc is a crucial component of over 300 enzymes involved in protein synthesis, cell division, immune response, and wound healing.
- 2. **Immune Function:** It strengthens the immune system by aiding in the production of immune cells and defending against infections.
- 3. **Growth and Development:** Zinc is essential for DNA synthesis and cell division, making it particularly important for growth in children and during pregnancy.
- 4. **Protein Synthesis and DNA Metabolism** It supports the formation of proteins and DNA, contributing to healthy skin, hair, and nails
- 5. **Cognitive Function:** Zinc plays a role in brain function and memory, supporting overall cognitive health.

Iron (Fe)

Iron is a fundamental component of haemoglobin, the protein responsible for transporting oxygen in the blood. Without adequate iron levels, the body cannot effectively oxygenate tissues and organs, leading to fatigue and weakness. Additionally, iron supports the immune system and energy metabolism.

Iron serves several critical functions, including:

- 1. **Oxygen Transport:** Its primary role is to bind with oxygen in haemoglobin and distribute it throughout the circulatory system.
- 2. **Energy Production:** Iron is also a component of myoglobin, which stores oxygen in muscles and aids in cellular energy production.
- 3. **Immune System Support:** It contributes to a healthy immune response and the production of red blood cells.
- 4. **Brain Development:** Iron is essential for cognitive and motor development, particularly in children, and its deficiency can lead to developmental issues.

Ensuring a well-balanced diet rich in these essential minerals is key to maintaining overall health and supporting the body's vital processes.

ZINC

The **SLC30A3** gene encodes **ZnT3 (Zinc Transporter 3)**, a protein belonging to the zinc transporter family. ZnT3 plays a key role in regulating zinc levels within cells, particularly in the brain.

ZnT3 is responsible for transporting zinc into **synaptic vesicles**, which are specialized structures that store and release neurotransmitters. Zinc is essential for central nervous system function, contributing to **synaptic modulation** and **neuronal communication**. Additionally, zinc possesses **neuroprotective properties** and plays a role in **cellular signal regulation**.

Because of its role in maintaining zinc balance, the **SLC30A3 (ZnT3) gene** is critical for brain health and nervous system function. **Mutations or dysfunctions** in this gene have been linked to neurological disorders, including **memory impairment and cognitive decline**.

In summary, the **StC30A3 gene** is essential for **zinc transport and regulation**, making it a vital component of **brain function and neural health**.



Effects of the Unfavourable Variant:

A genetic variant in the **SLC30A3** gene, which encodes the **ZnT3 protein** (a zinc transporter), may negatively impact zinc regulation, particularly in the brain. Since ZnT3 plays a crucial role in transporting zinc into **synaptic vesicles** and maintaining zinc storage within the central nervous system, an unfavourable variant could disrupt zinc balance, potentially affecting neurological function.

Recommended Solutions:

Managing the effects of this genetic variant requires a **comprehensive approach**, including dietary adjustments, lifestyle modifications, and medical guidance. The following strategies may help **support brain health and optimize zinc regulation**:

1. Monitoring Zinc Levels

Since this variant may impair the body's ability to regulate zinc, periodic **blood tests** to check zinc levels can be beneficial. This allows for timely dietary adjustments or supplementation to **correct deficiencies or prevent excess zinc accumulation**.



Maintaining an **adequate dietary intake of zinc** is essential. Zinc-rich foods include:

- Red meat (e.g., beef, lamb)
- **Seafood** (e.g., oysters, crabs, prawns)
- Seeds (e.g., pumpkin, sunflower seeds)
- Legumes (e.g., beans, lentils, chickpeas)
- Nuts (e.g., almonds, cashews)
- Whole grains
- Brewer's yeast

It is also important to maintain a **balanced intake of other essential minerals**, such as copper and iron, as they can influence **zinc absorption**.

3. Zinc Supplements

For individuals diagnosed with a **zinc deficiency**, supplementation may be necessary. However, **excessive zinc intake** can interfere with the absorption of other minerals, such as copper, and may cause adverse effects. **Consulting a doctor** before starting supplements is strongly recommended.

4. Supporting Brain and Neurological Function

Since the SLC30A3 variant may affect brain health, adopting habits that promote **neurological wellbeing** is beneficial:

- **Regular physical activity** Helps stimulate neurotransmitter production and supports cognitive function.
- Antioxidant-rich diet Consuming fresh fruits and vegetables (especially berries, leafy greens, and citrus fruits) helps combat oxidative stress and protect brain cells.
- **Neurotransmitter balance** Nutrients like **magnesium** may positively impact neurological function.
- Stress management Techniques such as yoga, meditation, and deep breathing can help reduce stress, which may exacerbate neurological symptoms.

5. Consulting a Doctor or Geneticist

Given the potential impact of the **SLC30A3 variant on neurological health**, seeking guidance from a **physician or geneticist** is highly recommended. They can develop a **personalized management plan** and suggest additional **genetic testing** or neurological evaluations if necessary.

6. Treatment for Associated Disorders

If the genetic variant is linked to **neuropsychiatric or cognitive issues**, a healthcare professional may recommend targeted treatments, such as:

- Cognitive Behavioral Therapy (CBT)
- Medications for psychiatric or cognitive symptoms
- Psychological support and cognitive training programs

7. Maintaining Overal Nytritional Balance

A **balanced diet** is essential for **optimal brain function**. In addition to zinc, key nutrients for neurological health include:

- Vitamin D
- Omega-3 fatty acids
- Folate (Vitamin B9) and other B vitamins

8. Avoiding Excess Intake of Other Metals

Since this variant may impair **zinc regulation**, avoiding excessive intake of **competing minerals** - such as **copper and iron**—can help maintain a **healthy mineral balance**.

CONCLUSION:

Managing an unfavourable variant in the SLC30A3 gene requires a multifaceted approach, including a well-balanced diet, possible zinc supplementation, regular physical activity, and professional medical supervision. A personalized consultation with a healthcare provider is crucial to developing an individualized plan that addresses specific needs and associated risks.

IRON

The **TMPRSS6** gene plays a vital role in regulating iron metabolism in the human body. It encodes a protein called **matriptase-2**, which is crucial for maintaining iron balance.

One of its key functions is regulating the production of **hepcidin**, a hormone that controls iron absorption and distribution. **Mutations in the TMPRSS6 gene** can disrupt this process, leading to iron-related disorders such as **iron deficiency anaemia** or **hemochromatosis** (iron overload).

Iron is an **essential mineral** required for various physiological functions. While its primary role is **oxygen transport** via haemoglobin, it is also critical for:

- Energy production at the cellular level
- Muscle health and function
- Immune system support
- DNA synthesis and cell division
- Brain function and cognitive performance

Iron deficiency can lead to serious health issues, including anaemia, fatigue, cognitive difficulties, and a weakened immune system. Ensuring an adequate iron intake through a balanced diet - or supplementation when necessary - is essential for overall well-being.



Effects of the Unfavourable Variant:

A **variant in the TMPRSS6 gene** can impact the regulation of iron metabolism and disrupt iron homeostasis in the body. Since TMPRSS6 influences the production of **hepcidin**, a key hormone that

controls iron absorption and release, mutations in this gene may lead to either **iron deficiency or iron overload**. A personalized and well-monitored approach is essential to prevent complications.

Recommended Solutions:

1. Regular Monitoring of Iron Levels

If you have or suspect an unfavorable **TMPRSS6 gene variant**, it is crucial to regularly check:

- Serum iron levels
- Ferritin (reflecting iron storage)
- Hepcidin (regulating iron absorption)

These tests help detect deficiencies or excess iron early, allowing for timely interventions.

2. Maintaining a Balanced and Controlled Diet

A well-planned diet is key to maintaining optimal iron levels.

✓ Iron Sources:

- Heme iron (from animal sources): Found in red meat (beef, lamb), poultry, fish, and seafood. This type of iron is easily absorbed by the body.
- Non-heme iron (from plant source): Found in legumes, spinach, tofu, nuts, and seeds. Pairing with vitamin C (from citrus fruits, peppers, broccoli, kiwi) enhances absorption.

✓ Iron Intake Control:

- If at risk of **iron overload (hemochromatosis) > Limit high-iron foods** and avoid iron supplements unless medically necessary.
- If at risk of **iron deficiency** → **Ensure sufficient dietary iron intake** and consider supplementation under medical guidance.

3. Using Iron Supplements with Caution

The need for iron supplements depends on how the TMPRSS6 mutation affects iron levels:

- If causing iron deficiency (high hepcidin production) → Iron supplements may be required, preferably in a bioavailable form (e.g., chelated iron), under medical supervision.
- If causing iron overload (low hepcidin production) → Iron supplements should be avoided, and treatments such as phlebotomy (blood removal) or iron-chelating medications may be necessary.

4. Managing Hepcidin Levels

Since **TMPRSS6 regulates hepcidin production**, it is beneficial to monitor this hormone, particularly if iron metabolism is unbalanced. In severe cases, **medical treatments that modulate hepcidin levels** may be required.

5. Avoiding Excess Intake of Certain Minerals

To prevent further iron imbalances:

- If at risk of iron overload:
 - Avoid excessive **vitamin C intake**, as it enhances iron absorption.
 - Avoid iron-fortified foods and iron supplements unless prescribed.

• If at risk of iron deficiency:

• Avoid taking **calcium or zinc supplements** at the same time as iron, as they can interfere with absorption.

6. Maintaining a Healthy Lifestyle

Lifestyle factors can influence iron metabolism and overall well-being: ✓ Regular Exercise – Supports cardiovascular health and boosts the immune system. ✓ Stress Management – Practices like meditation, yoga, and deep breathing help regulate metabolic functions.

✓ Infection Monitoring – Since iron is crucial for immune function, individuals with iron imbalances should be attentive to infection risks.

7. Consulting a Geneticist or Haematologis

A specialist consultation is essential for those with a TMPRSS6 mutation. A geneticist or hematologist can:

- Assess iron regulation status
- Prescribe appropriate tests and treatments
- Develop a personalized management plan based or individual iron metabolism

8. Continuing Education and Awareness

Understanding the implications of a **TMPRSS6 gene variant** enables better decision-making regarding **diet**, **supplements**, **and health monitoring**. Staying informed **bei**ps prevent potential complications and ensures proactive management.

CONCLUSION:

Managing an **unfavourable TMPRSS6 gene variant** requires a **personalized strategy** that includes **regular iron monitoring, dietary adjustments, lifestyle modifications, and medical supervision**. Consultation with healthcare professionals ensures **accurate diagnosis, proper treatment, and long-term health stability**.