

**RANDOX**




**HEALTH**

# RANDOX

## HEALTH

PID	XXXXXX
Forename	Example
Surname	Report
Fasted For	Non-fasting Sample
DOB	dd-Mmm-yyyy

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# Your Results of Interest

The results presented in this section are a summary of all the tests that are either positive or fall outside the reference ranges. What does this mean? A reference range is a term used to determine if your results are within what is considered to be the 'normal' range of the population. If your results are outside the range for a test, it does not automatically mean the result is abnormal. Depending on each person's individual medical history, current medications and ongoing conditions or diseases, the results must be interpreted in this context to fully understand what these results mean to you. Therefore, in this section those results that are either positive or fall outside the reference range are highlighted so that they can be reviewed by a GP / Consultant to understand the relevance to your health. These results will also appear again throughout the report alongside the other results for that profile.



## Nutritional Health

### Vitamin D

Vitamin D regulates calcium and phosphate levels in the blood and is important for good health, growth and strong bones. Low vitamin D levels are commonly due to inadequate sunlight exposure or dietary intake but may occur with malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients, e.g. Crohn's disease), liver disease or kidney disorders. Low vitamin D levels can increase the risk of bone disorders such as osteoporosis (weakening of the bones) and osteomalacia (softening of the bones), and may increase the risk of certain cancers, immune diseases and cardiovascular disease. Increased vitamin D levels may be associated with excessive supplementation, hyperparathyroidism (increased production of parathyroid hormone) or sarcoidosis (a rare disease in which areas of the body are inflamed). High levels of vitamin D can cause calcium levels in the blood to rise, which can be damaging to the body.



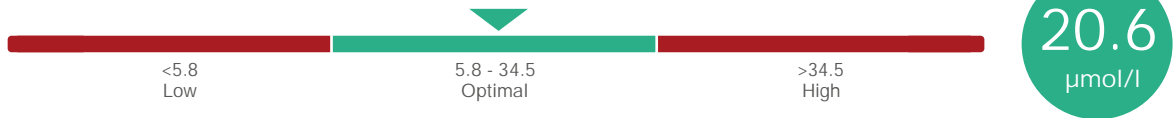
32  
nmol/l



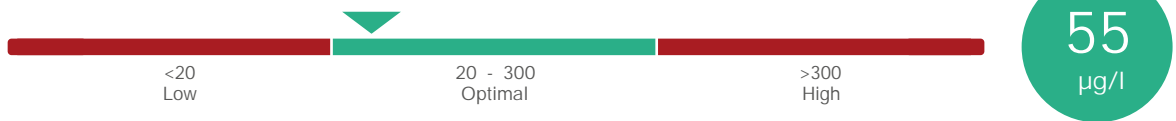
# Iron Status

Iron is essential for red blood cell formation. Most of the body's iron, approximately 70%, is present in red blood cells, where its primary role is to carry oxygen from the lungs to all the tissues of the body. Additionally, iron facilitates energy production and release from cells and participates in the functioning of the immune and central nervous systems. Iron Status is useful for evaluating conditions such as iron-deficiency, which can cause anaemia, and iron overload, which can cause organ damage, particularly to the liver.

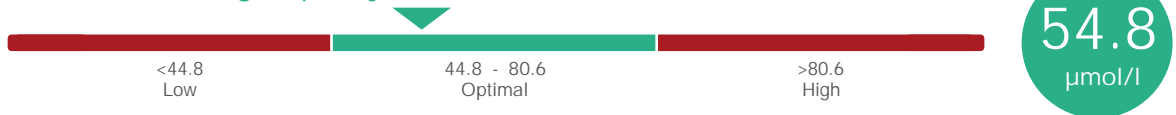
## Iron



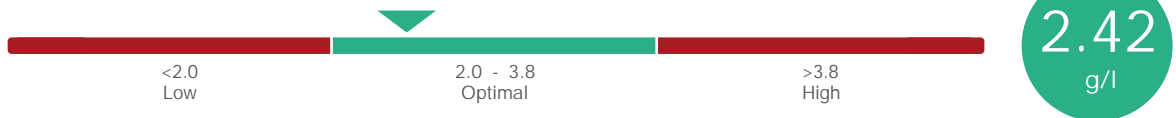
## Ferritin



## Total Iron Binding Capacity (TIBC)



## Transferrin



## Transferrin Saturation





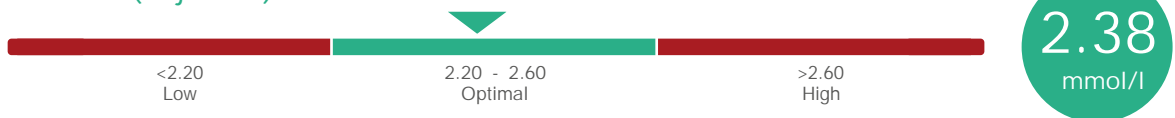
# Nutritional Health

Nutrition is the supply of materials (in the form of food), which are necessary to allow the body to function normally. Vitamins and minerals support normal growth, and help organs and cells to function. Therefore, good nutrition is vital for health and wellbeing. A poor diet or malabsorption disorders (conditions caused by an impaired ability to digest and/or absorb nutrients from food) may lead to nutritional deficiency. The Nutritional Health panel evaluates the levels of various nutrients and can help identify whether an individual's nutritional status is adequate.

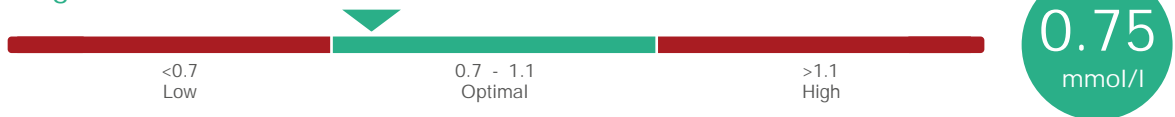
## Albumin



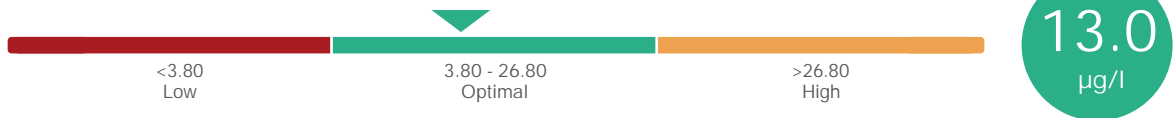
## Calcium (adjusted)



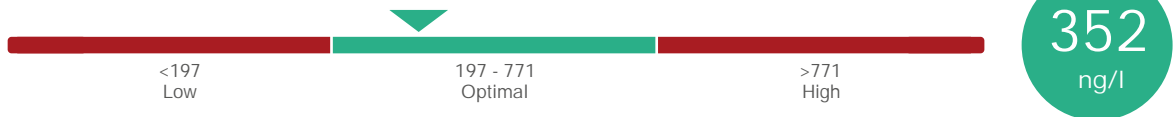
## Magnesium



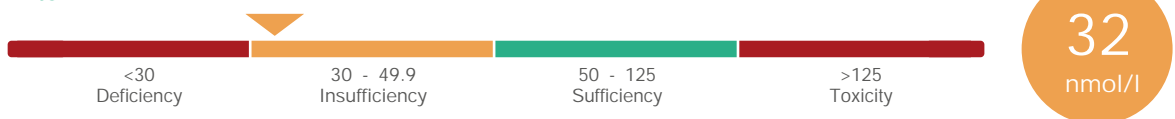
## Folic acid



## Vitamin B12



## Vitamin D



Your Vitamin D test result shows you have insufficient vitamin D. Vitamin D is generated by the skin following exposure to sunlight. Few dietary sources of vitamin D are available; therefore, when sun exposure is limited, deficiency is common. To prevent deficiency, guidelines recommend a daily intake of 10 micrograms of vitamin D. However, as your results show insufficient vitamin D, you may require a higher strength supplement to bring your vitamin D up to a sufficient level. We recommend that you speak to a pharmacist or doctor regarding an appropriate strength vitamin D supplement.

## Results for your Doctor

This section contains all your test results. Your doctor may prefer to see your test results in this format. The results that are either positive or fall outside the reference range are highlighted in red.

Test	Result	Units	Reference Range
<b>Iron Status</b>			
Iron	20.6	µmol/l	5.8 - 34.5 Optimal
Ferritin	55	µg/l	20 - 300 Optimal
Total Iron Binding Capacity (TIBC)	54.8	µmol/l	44.8 - 80.6 Optimal
Transferrin	2.42	g/l	2.0 - 3.8 Optimal
Transferrin Saturation	37.6	%	20 - 50 Optimal
<b>Nutritional Health</b>			
Albumin	44.4	g/l	35 - 50 Optimal
Calcium (adjusted)	2.38	mmol/l	2.20 - 2.60 Optimal
Magnesium	0.75	mmol/l	0.7 - 1.1 Optimal
Folic acid	13.0	µg/l	3.80 - 26.80 Optimal
Vitamin B12	352	ng/l	197 - 771 Optimal
Vitamin D	32	nmol/l	<30 Deficiency 30 - 49.9 Insufficiency 50 - 125 Sufficiency >125 Toxicity

## Understanding Your Results

**Albumin** produced by the liver, is the most abundant protein found in the blood. Albumin plays an important role in maintaining plasma pressure (preventing fluid leaking from blood vessels) and transporting a wide variety of small molecules, such as hormones, vitamins and drugs, throughout the body. Various conditions are associated with decreased albumin levels, including kidney and liver diseases, inflammation, malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients, e.g. Crohn's disease and coeliac disease), prolonged diarrhoea and malnutrition. Low albumin levels are also associated with pregnancy. In individuals suffering from dehydration, albumin levels may be elevated.

**Calcium (adjusted)** is a mineral with many important roles in the body including bone and teeth formation, muscle contraction, heart function and nerve conduction. Hypercalcaemia, or an elevated calcium level may be associated with hyperparathyroidism (increased production of parathyroid hormone, which regulates calcium levels), hyperthyroidism (an overactive thyroid gland), bone cancer, vitamin D excess and Addison's disease (a rare disorder in which the adrenal glands are underactive). Hypocalcaemia, or a low calcium level, may be associated with malnutrition, malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients), hypoparathyroidism (decreased production of parathyroid hormone) and vitamin D deficiency. Hypocalcaemia may increase the risk of developing osteomalacia (softening of the bones) and osteoporosis (weakening of the bones). Approximately half of the body's calcium circulates in the bloodstream bound to the protein albumin. Therefore, calcium levels may appear falsely low or high when blood albumin levels are abnormal. To compensate for this, the calcium level is adjusted according to albumin level.

**Ferritin** is a major iron-storage protein and provides a good indication of available iron stores. Increased ferritin levels can be associated with disorders of excessive iron storage (e.g. haemochromatosis), iron poisoning, recent blood transfusions, megaloblastic anaemia (anaemia due to vitamin B12 or folic acid deficiency) or haemolytic anaemia (anaemia caused by premature destruction of red blood cells). However, ferritin is an acute phase protein, which can non-specifically increase with acute inflammatory disease, infection, liver disease or cancer, regardless of iron stores, due to leakage of ferritin from damaged organs (especially the liver, spleen and bone marrow). Decreased ferritin levels may be associated with iron-deficiency anaemia and very low protein levels.

**Folic Acid** along with vitamin B12 is important for the normal development red blood cells. Decreased folic acid levels are associated with megaloblastic anaemia (anaemia due to folic acid or vitamin B12 deficiency). Low folic acid levels may be due to decreased dietary intake, alcoholism, pregnancy or malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients, e.g. Crohn's disease or coeliac disease). Increased folic acid levels generally are not cause for concern but may occur in individuals who consume a vegetarian diet or suffer from pernicious anaemia (anaemia due to impaired absorption of vitamin B12 by the intestine).

**Iron** is an essential trace element supplied by the diet, which is necessary for the formation of red blood cells (RBCs). This test measures the quantity of iron bound to the transport protein transferrin in the blood. Low iron levels are associated with iron-deficiency anaemia, which may be caused by poor dietary iron intake, inadequate absorption, increased requirement (e.g. in growing children and during late pregnancy) or blood loss (e.g. heavy menstrual or digestive tract bleeding). Increased iron levels may be associated with disorders of excessive iron storage (e.g. haemochromatosis), excessive use of iron supplements, blood transfusions, haemolytic anaemia (anaemia caused by premature destruction of RBCs), lead toxicity, and liver or kidney disease.



## Understanding Your Results

**Magnesium** is a mineral that is essential for energy and protein production, muscle contraction and nerve function, and is important for the activity of many enzymes. Magnesium levels are regulated by how much is absorbed from food by the intestine and how much is removed by the kidneys. Increased magnesium levels may be associated with kidney failure, hypothyroidism (an underactive thyroid gland), hyperparathyroidism (an overactive parathyroid gland), dehydration, Addison's disease (a rare disorder in which the adrenal glands are underactive) and ingestion of magnesium-containing antacids or laxatives. Decreased magnesium levels (hypomagnesaemia) may be associated with chronic kidney disease, malnutrition, malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients) hypoparathyroidism (an underactive parathyroid gland), uncontrolled diabetes or alcoholism.

**Total Iron Binding Capacity (TIBC)** is a measurement of the ability of the blood to transport iron. Transferrin represents the major iron binding protein in the blood and therefore TIBC is an indirect yet accurate measurement of transferrin. Increased TIBC levels can be associated with iron-deficiency, late pregnancy and the use of oral contraceptives. Decreased TIBC levels can be associated with disorders of excessive iron storage (e.g. haemochromatosis), certain types of anaemia in which iron accumulates, poor nutrition, inflammation, liver disease and kidney disease.

**Transferrin** is a protein that binds and transports iron through the blood to tissues where iron is needed (e.g. liver, spleen and bone marrow). Transferrin is largely made in the liver and regulates the body's absorption of iron into the blood. Decreased transferrin levels may be associated with poor production by the liver or excessive loss through the kidneys. Several conditions including infection and malignancy can decrease transferrin levels. Increased transferrin levels may be associated with iron-deficiency anaemia.

**Transferrin Saturation** represents the percentage of transferrin saturated with iron and is determined by dividing the iron level by the total iron binding capacity (TIBC). Calculation of transferrin saturation is helpful in determining the cause of abnormal iron and TIBC levels. A decrease in transferrin saturation can be associated with iron-deficiency anaemia and chronic illnesses. An increase in transferrin saturation can be associated with disorders of excessive iron storage (e.g. haemochromatosis), increased iron intake or other types of anaemia, such as haemolytic anaemia (anaemia caused by premature destruction of red blood cells) and megaloblastic anaemia (anaemia due to vitamin B12 or folic acid deficiency).

**Vitamin B12** along with folic acid is important for the normal development of red blood cells (RBCs). Vitamin B12 is also vital for the normal functioning of nerves. Decreased vitamin B12 levels are associated with megaloblastic anaemia (anaemia due to vitamin B12 or folic acid deficiency) and pernicious anaemia (anaemia due to impaired absorption of vitamin B12 by the intestine). Low vitamin B12 levels may be due to decreased dietary intake, malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients), gastritis (inflammation of the stomach) or liver disorders that affect vitamin B12 storage. Liver injury, myeloproliferative disorders (a group of conditions in which blood cells grow abnormally) and vitamin C, vitamin A or oestrogen supplementation may cause vitamin B12 levels to rise.

## Understanding Your Results

**Vitamin D** regulates calcium and phosphate levels in the blood and is important for good health, growth and strong bones. Low vitamin D levels are commonly due to inadequate sunlight exposure or dietary intake but may occur with malabsorption disorders (conditions that affect the ability of the intestine to absorb nutrients, e.g. Crohn's disease), liver disease or kidney disorders. Low vitamin D levels can increase the risk of bone disorders such as osteoporosis (weakening of the bones) and osteomalacia (softening of the bones), and may increase the risk of certain cancers, immune diseases and cardiovascular disease. Increased vitamin D levels may be associated with excessive supplementation, hyperparathyroidism (increased production of parathyroid hormone) or sarcoidosis (a rare disease in which areas of the body are inflamed). High levels of vitamin D can cause calcium levels in the blood to rise, which can be damaging to the body.