AI Blood Test Interpretation

vitalos.ro/interpretare-analize

Age	41
Sex	F
Collection Date	2024-03-12
Results Date	2024-03-21
Laboratory	-

95

General Score

22 | 8 | 2 | 0 | 1

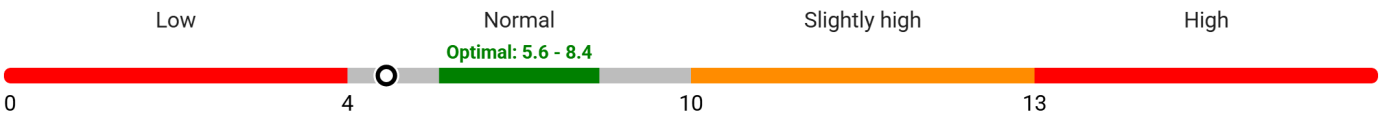
This interpretation performed with artificial intelligence is strictly for informational and educational purposes. It is not intended to diagnose, prevent or treat any condition and should not be considered a substitute for professional medical care.

Complete Blood Count

WBC

Leukocyte Count

4.68 10^9/1 — Normal



Leukocytes, or white blood cells, are crucial for fighting infections.

Leukocytes, commonly known as white blood cells, are a vital component of the immune system. They play a critical role in defending the body against infections and foreign invaders.

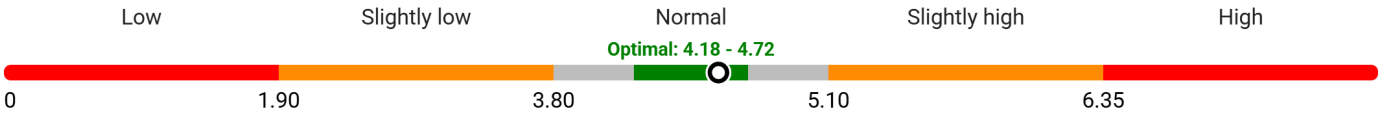
An abnormal count can indicate various health conditions, including infections, inflammation, or immune system disorders.

Complete Blood Count

RBC

Erythrocyte Count

4.58 10^12/1 — Optimal



Erythrocytes, or red blood cells, are responsible for oxygen transport.

Erythrocytes, also known as red blood cells, are responsible for carrying oxygen from the lungs to the body's tissues and transporting carbon dioxide back to the lungs.

An adequate red blood cell count is essential for maintaining energy levels and overall bodily function.

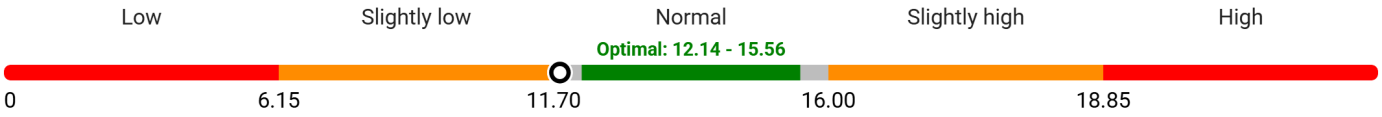
Complete Blood Count

HGB

Hemoglobin

11.8 g/dl

Normal



Hemoglobin is the protein in red blood cells that carries oxygen.

Hemoglobin is a protein found in red blood cells that binds to oxygen in the lungs and transports it to the body's tissues. It also helps in the removal of carbon dioxide.

Adequate hemoglobin levels are crucial for preventing anemia and ensuring efficient oxygen delivery throughout the body.

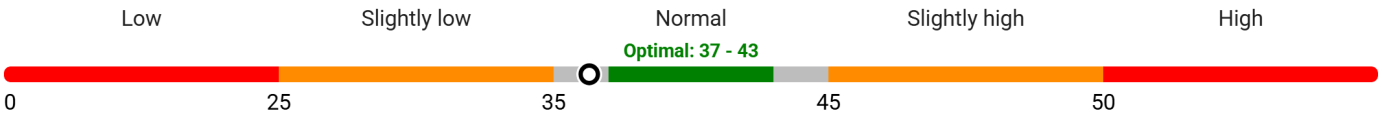
Complete Blood Count

HCT

Hematocrit

36.3 %

Normal



Hematocrit represents the percentage of red blood cells in the blood.

Hematocrit is the proportion of red blood cells to the total volume of blood. It is a key indicator of oxygen-carrying capacity.

Deviations from the normal range can suggest conditions such as anemia or polycythemia.

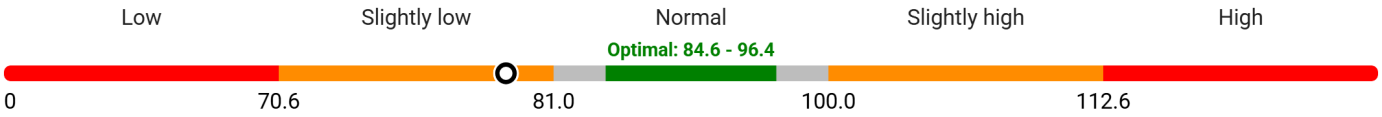
Complete Blood Count

MCV

Mean Corpuscular Volume

79.2 fl

Slightly low



MCV measures the average size of red blood cells.

Mean Corpuscular Volume (MCV) indicates the average volume of a red blood cell. It helps in classifying different types of anemia.

An MCV outside the normal range can suggest nutritional deficiencies or other blood disorders.

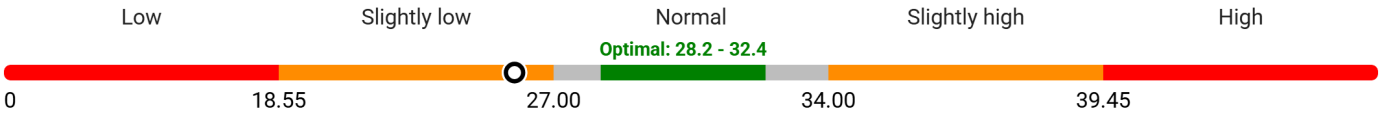
Complete Blood Count

MCH

Mean Corpuscular Hemoglobin

25.8 pg

Slightly low



MCH measures the average amount of hemoglobin in red blood cells.

Mean Corpuscular Hemoglobin (MCH) represents the average amount of hemoglobin per red blood cell. It is often evaluated alongside MCV.

Low MCH values can indicate hypochromic red blood cells, often seen in iron deficiency anemia.

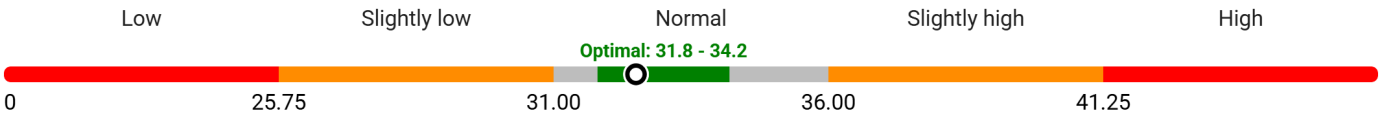
Complete Blood Count

MCHC

Mean Corpuscular Hemoglobin Concentration

32.5 g/dl

Optimal



MCHC measures the average concentration of hemoglobin in red blood cells.

Mean Corpuscular Hemoglobin Concentration (MCHC) reflects the average concentration of hemoglobin within red blood cells. It is a measure of hemoglobin density.

Abnormal MCHC levels can be associated with various types of anemia, particularly iron deficiency anemia.

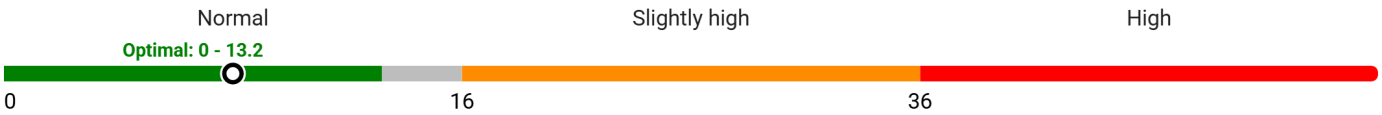
Complete Blood Count

RDW

Red Blood Cell Distribution Width

14.5 %

Normal



RDW measures the variation in red blood cell size.

Red Blood Cell Distribution Width (RDW) quantifies the variation in the size of red blood cells. An elevated RDW indicates anisocytosis, meaning red blood cells vary significantly in size.

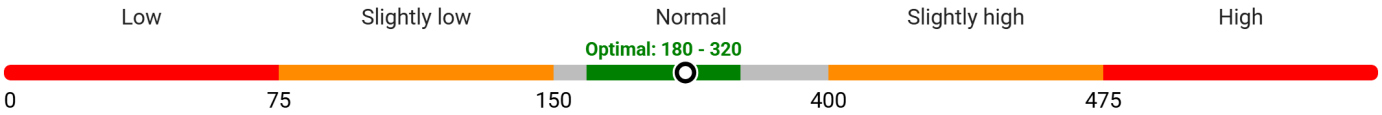
This parameter is useful in the differential diagnosis of anemia.

Complete Blood Count

PLT

Platelet Count

270 10^9/1 **Optimal**



Platelets are essential for blood clotting.

Platelets, also known as thrombocytes, are small blood cells that play a crucial role in hemostasis, the process of stopping bleeding.

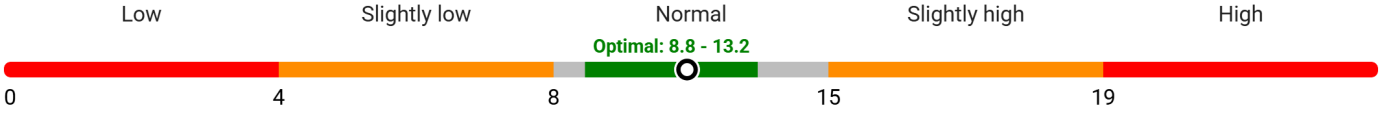
An abnormal platelet count can indicate bleeding disorders or other underlying medical conditions.

Complete Blood Count

MPV

Mean Platelet Volume

11.4 fl **Optimal**



MPV measures the average size of platelets.

Mean Platelet Volume (MPV) is a measure of the average size of platelets. It can provide insights into platelet production and destruction.

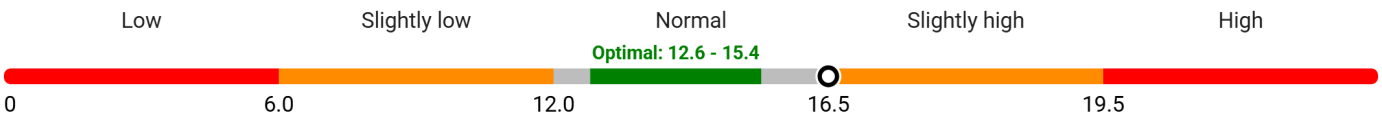
An elevated MPV may suggest increased platelet production, while a low MPV might indicate impaired platelet formation.

Complete Blood Count

PDW

Platelet Distribution Width

16.5 % **Normal**



PDW measures the variation in platelet size.

Platelet Distribution Width (PDW) reflects the variation in the size of platelets in the blood. An increased PDW suggests a greater heterogeneity in platelet size.

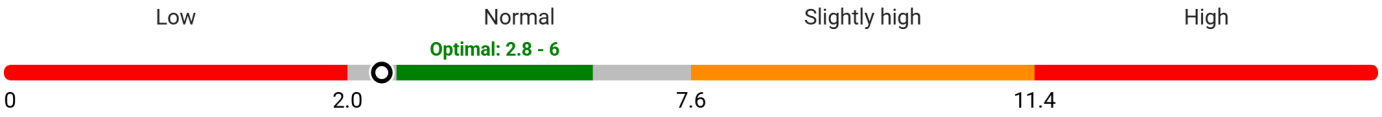
This parameter can be useful in assessing platelet function and in the diagnosis of certain hematological conditions.

Complete Blood Count

Neutrophils

Neutrophil Count

2.56 10^9/1 Normal



Neutrophils are a type of white blood cell that fights bacterial infections.

Neutrophils are the most abundant type of white blood cell and are crucial for the innate immune system, particularly in combating bacterial and fungal infections.

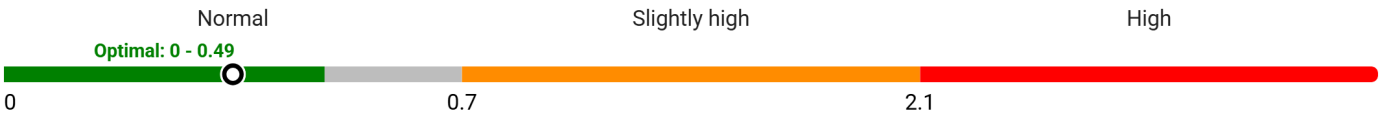
Their count can increase during infections or inflammation and decrease in certain conditions like bone marrow suppression.

Complete Blood Count

Eosinophils

Eosinophil Count

0.1 10^9/1 Optimal



Eosinophils are involved in allergic reactions and fighting parasites.

Eosinophils are a type of granulocyte that plays a role in the immune response, particularly against parasites and in modulating allergic inflammatory responses.

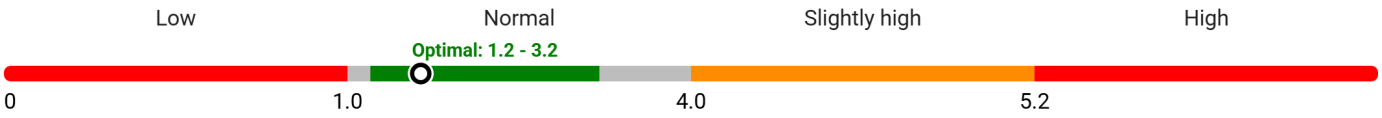
Elevated levels can indicate allergies, asthma, or parasitic infections.

Complete Blood Count

Lymphocytes

Lymphocyte Count

1.64 10^9/1 Optimal



Lymphocytes are key cells of the adaptive immune system.

Lymphocytes are a type of white blood cell that are central to the adaptive immune system. They include T cells, B cells, and natural killer cells, which are responsible for recognizing and fighting specific pathogens.

Changes in lymphocyte counts can indicate viral infections, autoimmune diseases, or immune deficiencies.

Complete Blood Count

Basophils

Basophil Count

0.07 10^9/1 **Optimal**

Basophils are involved in allergic responses and inflammation.

Basophils are a type of white blood cell that release histamine and other mediators during inflammatory and allergic reactions. They play a role in modulating the immune response.

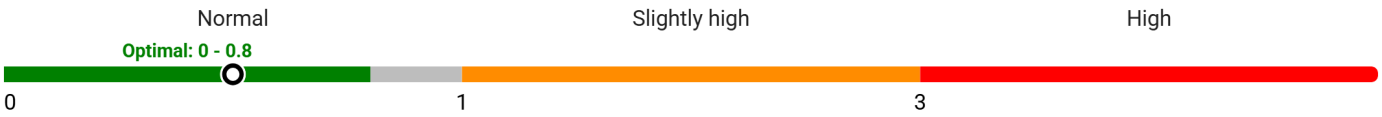
While typically present in low numbers, significant deviations can be associated with certain allergic or inflammatory conditions.

Complete Blood Count

Monocytes

Monocyte Count

0.31 10^9/1 **Optimal**



Monocytes are large white blood cells that differentiate into macrophages.

Monocytes are the largest type of white blood cell and play a role in phagocytosis, engulfing pathogens and cellular debris. They can differentiate into macrophages and dendritic cells in tissues.

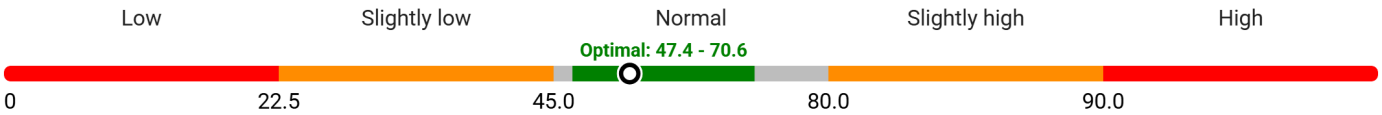
Elevated monocyte counts may suggest chronic infections, inflammatory conditions, or certain types of leukemia.

Complete Blood Count

Neutrophils %

Neutrophil Percentage

54.7 % **Optimal**



Percentage of neutrophils among total white blood cells.

This value represents the proportion of neutrophils relative to the total count of white blood cells. It is often evaluated alongside the absolute neutrophil count.

Changes in this percentage can provide additional context for interpreting immune status.

Complete Blood Count

Eosinophils %

Eosinophil Percentage

2.1 % **Optimal**

Percentage of eosinophils among total white blood cells.

This measurement indicates the proportion of eosinophils within the total white blood cell population. It is often considered in conjunction with absolute eosinophil counts.

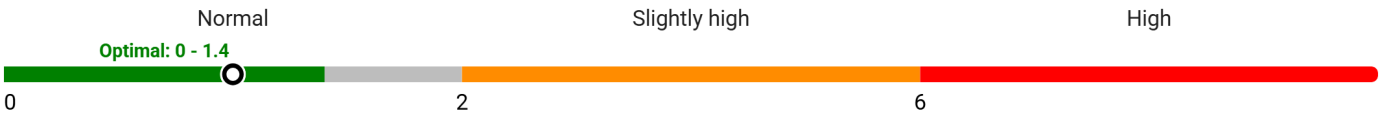
An elevated percentage may suggest allergic conditions or parasitic infections.

Complete Blood Count

Basophils %

Basophil Percentage

1.5 % **Normal**



Percentage of basophils among total white blood cells.

This value represents the proportion of basophils within the total white blood cell count. Basophils are involved in allergic responses.

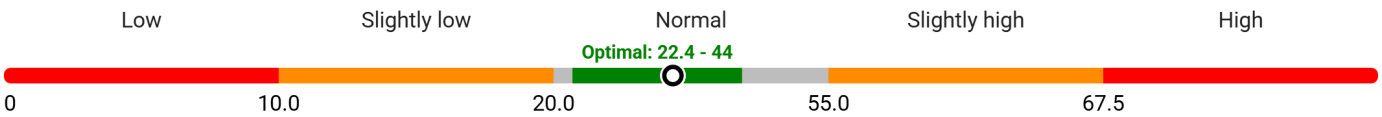
While typically low, significant increases can be associated with certain inflammatory or allergic conditions.

Complete Blood Count

Lymphocytes %

Lymphocyte Percentage

35.2 % **Optimal**



Percentage of lymphocytes among total white blood cells.

This measurement indicates the proportion of lymphocytes within the total white blood cell population. It is a key indicator of immune system activity.

Variations can reflect viral infections, immune deficiencies, or other systemic conditions.

Complete Blood Count

Monocytes %

Monocyte Percentage

6.5 % **Optimal**

Percentage of monocytes among total white blood cells.

This value represents the proportion of monocytes within the total white blood cell count. Monocytes are important for phagocytosis and immune regulation.

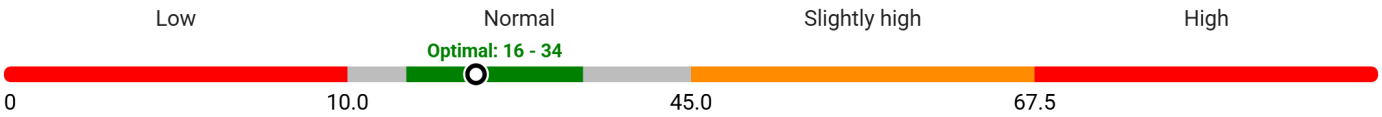
An increased percentage may suggest chronic inflammation or certain types of infections.

Biochemistry

Urea

Serum Urea

23.1 mg/dl **Optimal**



Urea is a waste product filtered by the kidneys.

Serum urea is a metabolic byproduct of protein metabolism, primarily excreted by the kidneys. Elevated levels can indicate impaired kidney function or dehydration.

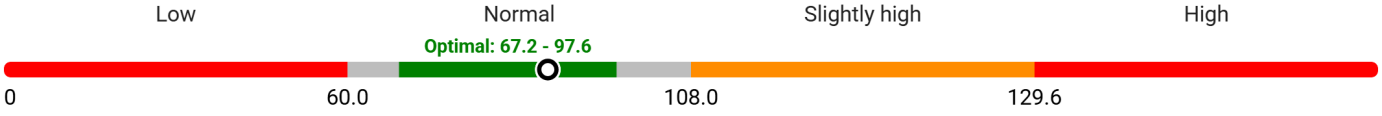
Monitoring urea levels is important for assessing renal health.

Biochemistry

Glucose

Blood Glucose

88 mg/dl **Optimal**



Blood glucose measures the sugar level in the blood.

Blood glucose, or blood sugar, is the main source of energy for the body's cells. It is regulated by hormones like insulin and glucagon.

Maintaining blood glucose within the normal range is crucial for preventing diabetes and related complications.

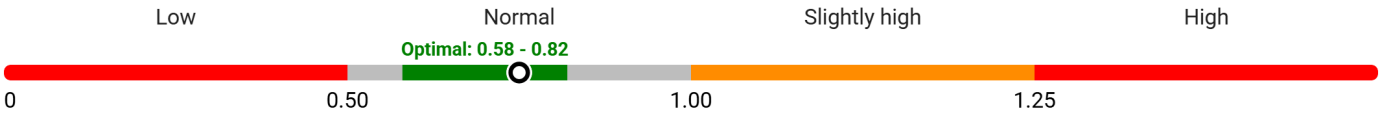
Biochemistry

Creatinine

Serum Creatinine

0.75 mg/dl

Optimal



Creatinine is a waste product produced by muscle metabolism, filtered by the kidneys.

Serum creatinine is a waste product generated from muscle activity. Its levels are primarily determined by kidney function, as the kidneys filter it out of the blood.

Elevated creatinine levels often indicate reduced kidney function.

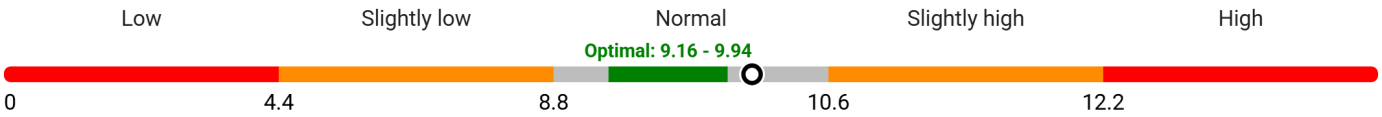
Biochemistry

Calcium

Total Serum Calcium

10.1 mg/dl

Normal



Total serum calcium is important for bone health and various bodily functions.

Total serum calcium is a vital mineral that plays a role in bone structure, muscle contraction, nerve function, and blood clotting. Its levels are tightly regulated by parathyroid hormone and vitamin D.

Abnormal calcium levels can be associated with parathyroid disorders, kidney disease, or vitamin D deficiency.

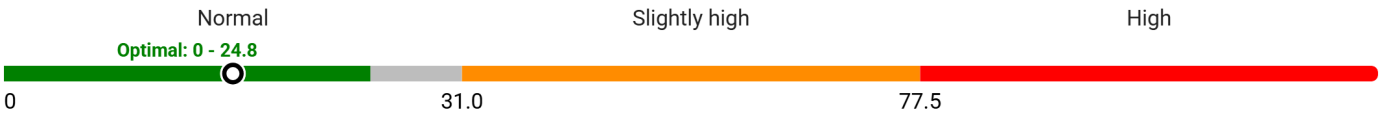
Biochemistry

AST

Aspartate Aminotransferase (AST/TGO)

24.14 U/l

Optimal



AST is an enzyme found in various tissues, including the liver and heart.

Aspartate Aminotransferase (AST), also known as SGOT, is an enzyme found in the liver, heart, muscles, and other tissues. Elevated levels in the blood can indicate tissue damage.

It is commonly used as a marker for liver health and cardiac function.

Biochemistry

ALT

Alanine Aminotransferase (ALT/TGP)

21 UI/l

Optimal

ALT is an enzyme primarily found in the liver.

Alanine Aminotransferase (ALT), also known as SGPT, is an enzyme predominantly found in the liver. Elevated ALT levels are a sensitive indicator of liver damage or inflammation.

It is a key marker for assessing liver function and diagnosing liver diseases.

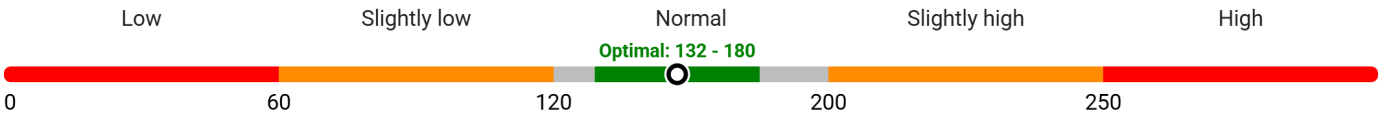
Lipid Profile

Cholesterol

Total Serum Cholesterol

156 mg/dl

Optimal



Total cholesterol measures all cholesterol in the blood.

Total serum cholesterol is a measure of all the cholesterol in your blood, including LDL (low-density lipoprotein) and HDL (high-density lipoprotein) cholesterol. High levels are associated with an increased risk of heart disease.

Maintaining cholesterol within the optimal range is important for cardiovascular health.

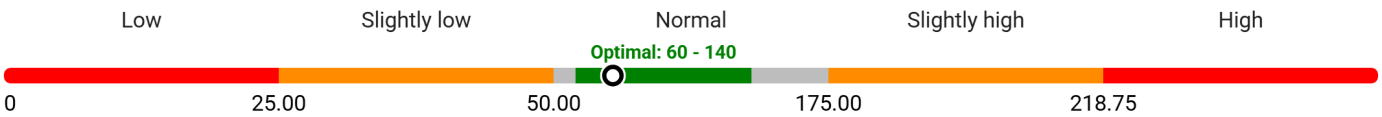
Lipid Profile

Triglycerides

Serum Triglycerides

77 mg/dl

Optimal



Triglycerides are a type of fat found in the blood.

Triglycerides are a type of fat that the body uses for energy. High levels of triglycerides in the blood are associated with an increased risk of heart disease and metabolic syndrome.

Lifestyle modifications can help manage triglyceride levels effectively.

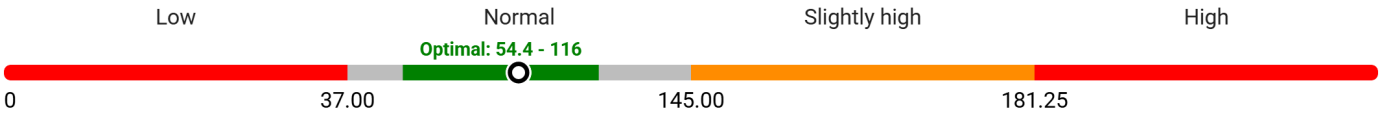
Iron Studies

Iron

Serum Iron

90.8 ug/dl

Optimal



Serum iron measures the amount of iron circulating in the blood.

Serum iron refers to the amount of iron present in the blood serum. It is transported by transferrin and is essential for hemoglobin synthesis.

Levels can be affected by iron intake, absorption, and utilization, and are important for diagnosing iron deficiency or overload.

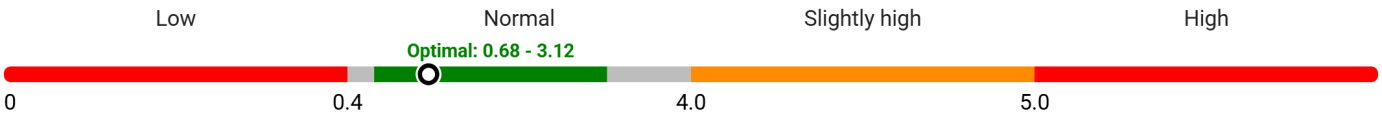
Endocrine Markers

TSH

Thyroid-Stimulating Hormone (TSH)

1.25 mUI/ml

Optimal



TSH is a hormone produced by the pituitary gland that stimulates the thyroid gland.

Thyroid-Stimulating Hormone (TSH) is produced by the pituitary gland and regulates the production of thyroid hormones (T3 and T4). It is a primary indicator of thyroid function.

Abnormal TSH levels can suggest hypothyroidism or hyperthyroidism.

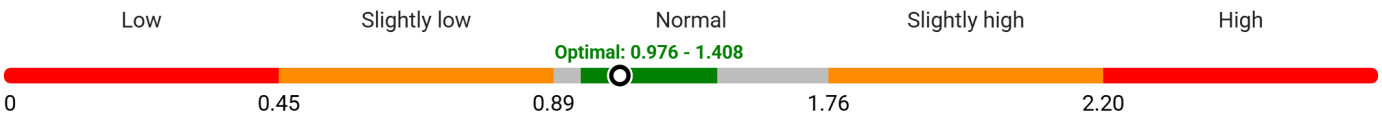
Endocrine Markers

Free T4

Free Thyroxine (Free T4)

1.1 ng/dl

Optimal



Free T4 is the unbound form of thyroxine, an active thyroid hormone.

Free Thyroxine (Free T4) is the biologically active form of thyroxine, a thyroid hormone that regulates metabolism. It is not bound to proteins in the blood.

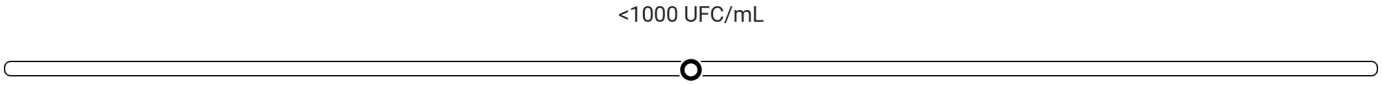
Measuring Free T4 is important for diagnosing thyroid disorders, especially when TSH levels are abnormal.

Bacteriology

Urine Culture

Urine Culture

<1,000 UFC/mL



Urine culture tests for the presence of bacteria in the urine.

A urine culture is a laboratory test used to detect and identify bacteria in a urine sample. It helps diagnose urinary tract infections (UTIs).

The presence of bacteria, especially in significant amounts, can indicate an infection that requires treatment.

Introduction

General Summary of Blood Test

- The blood panel reveals a microcytic, mildly hypochromic anemia with low MCV (79.2 fL), low MCH (25.8 pg), and hemoglobin at the lower end of normal (11.8 g/dL).
- Red cell and platelet counts, renal function (urea and creatinine), liver enzymes (AST and ALT), lipids, serum calcium, thyroid hormones (TSH and free T4), and markers of infection or inflammation are all within reference ranges.
- Iron status appears adequate with serum iron (sideremie) within normal limits, and there is no biochemical evidence of infection or chronic disease affecting the white blood cell (WBC) or differential counts.

Purpose and Importance of the Analysis

- This analysis provides a comprehensive health assessment, focusing on hematological, metabolic, thyroid, and renal function to uncover early pathophysiological changes.
- Findings assist in detecting anemia types, underlying iron metabolism disturbances, and screen for organ dysfunction or occult systemic disease.
- Early detection through laboratory parameters guides targeted intervention and follow-up to prevent progression of subclinical pathologies.

Overall Health Assessment

Comprehensive Overview of Patient's Health Status

- Overall, the patient shows no evidence of acute infection, overt metabolic, hepatic, or renal dysfunction, with normal inflammatory, renal, hepatic, and lipid parameters.
- The presence of a mild microcytic anemia is the key finding, with otherwise preserved erythrocyte, leukocyte, and platelet counts.
- Thyroid function (TSH 1.25 mIU/mL, free T4 1.10 ng/dL) is normal, excluding hypothyroidism or hyperthyroidism as a contributing factor for anemia.

Key Findings and Their Implications

- MCV (79.2 fL) and MCH (25.8 pg) are below reference, suggesting microcytic, hypochromic anemia; iron studies are normal, which lowers the likelihood of classic iron deficiency.
- WBC and differential are within normative limits, indicating no current infection or immunological pathology.
- Kidney and liver markers are normal, excluding renal or hepatic origins of secondary anemia.

Detailed Health Analysis

Analysis of Health Trends and Patterns

- The conjunction of microcytic indices (low MCV, low MCH) with preserved serum iron suggests anemia of chronic disease or early thalassemia trait over overt iron deficiency, although iron deficiency cannot be fully excluded without ferritin and TIBC.
- Absence of leukocytosis, thrombocytosis, or significant RDW elevation militates against ongoing inflammation, acute blood loss, or hemolytic process.
- Normal renal and hepatic values, along with physiological TSH and free T4, rule out systemic contributors such as CKD, chronic liver disease, and thyroid dysfunction as causative for anemia.

Correlations Between Different Test Results

- Microcytic anemia with normal iron and sideremia is more consistent with mild anemia of chronic inflammation or a genetic hemoglobinopathy than with dietary iron deficiency.
- Stable platelet counts and MPV indicate no active marrow stress or compensatory thrombocytosis, which would be atypical in iron deficiency anemia with chronic blood loss.
- Normal WBC and CRP (by inference from normal WBC and absence of left shift) indicate no underlying acute or chronic inflammatory process impacting red cell production.

Risk Factors

Identification of Potential Health Risks

- Persistent mild anemia may predispose to fatigue, cognitive impairment, and, if uncorrected, can impact quality of life especially in women of childbearing age.
- Normal lipid and glucose values reduce near-term cardiovascular risk.
- No evidence of infectious or systemic inflammatory disease on current laboratory parameters.

Analysis of Risk Severity and Probabilities

- Risk of classic iron deficiency anemia is present but low due to normal sideremia; probable early anemia of chronic disease or mild thalassemia trait is higher.
- Risk of undiagnosed chronic inflammatory or hematological disease is low with normal leukocyte, platelet, renal, hepatic, and thyroid function markers.
- Risk of progression to more severe anemia will depend on underlying etiology and should be clarified with further iron studies and clinical correlation.

Probabilities of Diseases

- Mild microcytic anemia of uncertain etiology: 40% – Based on low MCV/MCH with normal iron and preserved cellular indices.
- Mild thalassemia trait: 25% – Consistent with persistent microcytosis and normal iron; probability factored by absence of overt erythrocytosis.
- Early iron deficiency anemia: 20% – Given that ferritin and TIBC are not present, and in women of reproductive age, occult loss cannot be excluded.
- Anemia of chronic disease: 10% – Low probability due to lack of laboratory or clinical inflammation but cannot be ruled out.
- Other causes (including chronic renal or endocrine pathology): 5% – Least likely as renal, liver, and thyroid function are well within reference ranges.

Explanations of Percentiles

- The 40% probability for non-specific microcytic anemia reflects population data showing that many women of reproductive age have unexplained mild anemia with normal iron parameters.
- 25% for thalassemia trait is derived from epidemiological prevalence of minor hemoglobinopathies presenting as persistent microcytosis with normal iron, particularly in Mediterranean populations.
- 20% chance for occult iron deficiency considers the absence of definitive low ferritin and the subject's demographic.
- The 10% likelihood of anemia of chronic disease is much lower than in populations with known comorbidities due to the absence of clinical or biochemical inflammation.
- Other causes collectively account for only 5%, consistent with clinical and laboratory exclusion of major systemic contributors.

Recommendations

Medical Recommendations Based on Test Results

- Order extended iron studies (ferritin, transferrin/TIBC, reticulocyte count) to clarify the etiology of the microcytic anemia.
- Consider hemoglobin electrophoresis to rule out thalassemia trait given persistent low MCV and normal serum iron.
- Repeat CBC and reticulocyte count in 3 months to monitor the trajectory of anemia and assess for progression.

Lifestyle and Dietary Suggestions

- Ensure adequate dietary iron intake (lean red meats, legumes, leafy greens), and regular vitamin C consumption to enhance absorption.
- Maintain hydration and balanced nutrition to support hematopoietic function.
- Monitor for symptoms such as fatigue, pallor, or palpitations and report any changes promptly.

Further Evaluation

Suggested Follow-up Tests and Procedures

- Request ferritin, transferrin saturation, and TIBC to fully characterize iron stores and transport.
- Perform hemoglobin electrophoresis to evaluate for minor hemoglobinopathies (e.g., thalassemia minor, HbE trait).
- Consider stool testing for occult blood if clinical suspicion for gastrointestinal loss is present.

Referral to Specialists if Necessary

- Refer to Hematology if anemia persists or worsens, or if thalassemia or other hemoglobinopathies are detected.
- Consider referral to Gastroenterology if iron deficiency is confirmed and no clear external bleeding site is found.
- Coordinate with primary care for ongoing monitoring and broadening evaluation if new systemic symptoms arise.

Conclusion

Summary of Findings

- Laboratory evaluation reveals mild microcytic, hypochromic anemia in a woman of reproductive age with otherwise unremarkable renal, hepatic, and thyroid profiles.
- Serum iron is normal, raising the possibility of non-classic iron deficiency, anemia of chronic disease, or hereditary hemoglobinopathies.
- No evidence at this stage for infection, systemic inflammation, or organ dysfunction underlying anemia.

Final Recommendations and Next Steps

- Undertake additional iron studies (including ferritin and TIBC) and hemoglobin electrophoresis as next diagnostic steps.
- Reevaluate in 3 months with repeat CBC and reticulocyte count to monitor anemia progression.
- Maintain a balanced and iron-rich diet, and seek early medical evaluation for any new or worsening symptoms.