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GENERAL BLOOD ANALYSIS

Yakubova D. M.
Assistant of the Department of Clinical Laboratory Diagnostics,

Narzullaeva M. A.
Assistant of the Department of Pharmaceutical Organization,

Juraeva S. O.
Cadet of the Department of Clinical Laboratory Diagnostics,
Samarkand State Medical University

Abstract:
The general blood analysis (GBA) is one of the important, widespread, and informative methods of laboratory diagnostics that allows assessing a person's health status, identifying the presence of inflammatory processes, anemia, infections, and other pathologies. This analysis is prescribed for both preventive examinations and disease diagnosis, as well as for monitoring treatment effectiveness.

Keywords: hemoglobin, erythrocytes, leukocytes, leukocyte formula, ESR.

Main Laboratory Indicators of General Blood Analysis:

1. Hemoglobin (Hb) is a protein found in erythrocytes responsible for transporting oxygen from the lungs to tissues and organs and for removing carbon dioxide. Normal hemoglobin levels for men are 130–160 g/L, and for women, 120–140 g/L. A decrease in hemoglobin levels may indicate anemia, blood loss, or iron deficiency. An increase is observed in dehydration, heart, and lung diseases.
2. Erythrocytes (RBC) are red blood cells that participate in oxygen transport. Normal erythrocyte levels for men are 4.0–5.0 × 10^{12}/L, and for women, 3.5–4.7 × 10^{12}/L. A decrease in erythrocyte count may indicate anemia, while an increase may suggest dehydration and blood diseases.
3. Leukocytes (WBC) are white blood cells that play a key role in the body's immune defense. Normal leukocyte levels are 4.0- 9.0 × 10^{9}/L. An increase in leukocyte

levels is called leukocytosis and may indicate inflammation, infection, allergy, or oncological diseases. A decrease is called leukopenia and is observed in some viral infections, autoimmune diseases, and after chemotherapy.

4. Platelets (PLT) are responsible for blood clotting and stopping bleeding.

Platelets are blood cells that help form clots and stop bleeding. They are produced in the bone marrow, the soft, spongy center of most of your large bones. Normally, the platelet count ranges from 150,000 to 400,000 cells per microliter (µL) of blood.

- Normal platelet levels are 180–320 × 10^9/L.
- A decrease in platelet levels can lead to bleeding, while an increase may pose a risk of thrombosis.

5. Hematocrit (HCT) Hematocrit shows the ratio of the volume of erythrocytes to the total blood volume. Normal levels: for men - 40–48%, for women- 36–42%. A decrease in hematocrit may indicate anemia, while an increase may suggest dehydration or erythrocytosis.

6. ESR (Erythrocyte Sedimentation Rate) is a nonspecific indicator that reflects the presence of inflammation in the body. Normal levels: for men - up to 10 mm/h, for women- up to 15 mm/h. An increase in ESR may be observed in infections, inflammations, autoimmune diseases, and oncology.

7. Leukocyte formula represents the percentage ratio of different types of leukocytes: neutrophils, lymphocytes, monocytes, eosinophils, and basophils. Changes in the leukocyte formula help determine the nature of the disease (bacterial, viral, or allergic).

Preparation for the analysis.

To obtain reliable results of the general blood analysis, it is recommended to:

- Take blood on an empty stomach (the last meal should be 8–12 hours before the analysis);
- Avoid physical exertion and stress before the analysis;
- Refrain from alcohol consumption for 24 hours before the study;
- Inform the doctor about any medications taken, as they may affect the results.

Interpretation of Results

The interpretation of the results of the general blood analysis should be conducted only by a physician, as indicators may vary depending on age, gender, physiological state, and the presence of comorbidities. Deviations from the norm do not always indicate pathology; they may be caused by temporary factors such as stress, physical exertion, or menstruation in women.

The leukocyte formula, or leukocyte count, is the percentage ratio of different types of leukocytes (white blood cells) in the blood. Leukocytes play a crucial role in the immune system, protecting the body from infections, viruses, bacteria, and other pathogens. The leukocyte formula is an important part of the general blood analysis (GBA) and helps doctors determine the nature of the disease (e.g., bacterial or viral infection), assess the state of the immune system, and identify possible pathologies.

The leukocyte formula is prescribed in the following cases:

- Suspected infection (viral, bacterial, parasitic);
- Diagnosis of inflammatory or autoimmune diseases;
- Monitoring the effectiveness of treatment (e.g., during chemotherapy);
- Assessing the state of the immune system;
- Preventive examinations;

The interpretation of the leukocyte formula should be conducted by a physician, as changes in the ratio of leukocytes can be caused by various reasons. For example:

- A left shift (increase in young forms of neutrophils) may indicate an acute bacterial infection.
- A right shift (increase in mature forms of neutrophils) may be observed in chronic diseases or anemia.
- An increase in lymphocytes is often associated with viral infections.
- An increase in eosinophils may indicate allergy or parasitic infection.

Main types of leukocytes in the leukocyte formula:

1. Neutrophils.
   - The most numerous type of leukocytes (50- 70% of the total number of leukocytes).
   - Main function: fighting bacterial infections.

-An increase in levels (neutrophilia) may indicate bacterial infection, inflammation, stress, or oncological diseases.

-A decrease in levels (neutropenia) may be observed in viral infections, autoimmune diseases, or after chemotherapy.

2. Lymphocytes.

- Comprise 20- 40% of the total number of leukocytes.
- Main function: fighting viral infections and participating in the immune response.
- An increase in levels (lymphocytosis) is characteristic of viral infections (e.g., influenza, COVID-19) and some chronic diseases.
- A decrease in levels (lymphopenia) may be associated with immunodeficiency, autoimmune diseases, or the use of certain medications.

3. Monocytes.

- Comprise 2- 10% of the total number of leukocytes.
- Main function: absorbing and destroying foreign particles, bacteria, and dead cells.
- An increase in levels (monocytosis) may be observed in chronic infections, autoimmune diseases, or oncology.
- A decrease in levels is rare and usually has no clinical significance.

4. Eosinophils.

- Comprise 1–5% of the total number of leukocytes.
- Main function: fighting parasites and participating in allergic reactions.
- An increase in levels (eosinophilia) may indicate allergy, parasitic infections, or autoimmune diseases.
- A decrease in levels (eosinopenia) may be observed in acute infections or stress.

5. Basophils.

- The least numerous type of leukocytes (0–1% of the total number of leukocytes).
- Main function: participating in allergic reactions and inflammatory processes.
- An increase in levels (basophilia) may be observed in allergies, chronic inflammation, or blood diseases.
- A decrease in levels usually has no clinical significance.

The leukocyte formula is an important diagnostic tool that helps doctors determine the nature of the disease, assess the state of the immune system, and

prescribe the correct treatment. However, the results of the analysis should be interpreted in conjunction with other blood indicators, clinical picture, and data from additional studies.

References:

1. Qalandar M., Azizxonovna N. M. MINERAL SUVLARNING SHIFOBAXSH XUSUSIYATLARI //O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI. – 2025. – T. 4. – №. 37. – C. 317-322.
2. Mamadalievna K. Y., Azizxonovna N. M. ZAMONAVIY TIBBIYOTDA FLAVANOIDLARNING O'RNI //O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI. – 2025. – T. 4. – №. 37. – C. 75-81.
3. Umida D., Bobur S., Azizkhanovna N. M. THE ROLE OF MINERAL WATERS IN MODERN MEDICINE //AMERICAN JOURNAL OF MULTIDISCIPLINARY BULLETIN. – 2025. – T. 3. – №. 2. – C. 139-145.
4. Azizkhanovna N. M. et al. INTERACTIVE TEACHING METHODS IN MODERN MEDICINE //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 361-366.
5. Azizkhonovna N. M. et al. PROSPECTIVE PLANS FOR RABBIT BREEDING //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 354-360.
6. Azizkhanovna N. M. et al. INTERESTING ANALYZES ABOUT RABBITS //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 367-372.
7. Azizxonovna N. M., Nafisa D., Dilso'z O. TYPES AND SIGNIFICANCE OF INNOVATIVE TECHNOLOGIES IN MODERN MEDICINE //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 137-142.
8. Нарзуллаева М. А. ФЛАВОНОИДЫ ГЛАЗАМИ ФАРМАКОЛОГА. ОСОБЕННОСТИ И ПРОБЛЕМЫ ФАРМАКОКИНЕТИКИ //O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI. – 2024. – T. 3. – №. 33. – C. 49-60.