

The Importance of Complete Blood Count (CBC)

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The Complete Blood Count (CBC) is an essential diagnostic tool used to assess overall patient health and direct further testing for various disease processes. This comprehensive test measures multiple components of blood, providing valuable insights into a patient's condition.

Key Components of CBC:

- **Hematocrit:** Measures the percentage of Red Blood Cells (RBCs) in the blood, indicating oxygen-carrying capacity.
- **Hemoglobin:** The molecule in RBCs that binds oxygen. Low hemoglobin means less oxygen can be delivered to cells throughout the body for normal metabolism.
- **White Blood Cells (WBCs):** Quantification and differentiation of WBCs into specific types, each with unique functions. WBCs are immune cells that are important in fighting infection. Knowledge of a patient's WBC count is important to understand infectious, immune, and autoimmune disorders.

Differential:

1. **Neutrophils:** Largest volume of WBCs, responsible for destroying bacteria with enzymes.
2. **Lymphocytes:** Increase during chronic infections and viral responses, producing antibodies.
3. **Monocytes:** Engulf dead cells and bacteria.
4. **Eosinophils:** Elevated in allergic responses, kill cancer cells and parasites.
5. **Basophils:** Indicate parasites and release histamine in allergic reactions.

The AlphaCyte module of the AlphaION System produces a six-part differential to include measurement of immature WBCs, providing insights into the patient's response to infection or other insults.

Additional Parameters:

- **Cell Size:** Indicates RBC production efficiency.
- **Hemoglobin Density:** Assesses oxygen-carrying capacity.
- **Polychromasia:** Reflects uneven hemoglobin packaging, potentially indicating bone marrow issues.
- **Reticulocyte Count:** Evaluates bone marrow response to blood loss or production issues.

Advances in Technology:

Historically, blood smears were examined manually under a microscope, a labor-intensive process with potential chemical hazards. Modern automated analyzers have revolutionized this process, enhancing speed and reducing variability. Technologies like flow cytometry and impedance measurements provide precise differentiation of blood cells. Automated CBC analyzers have improved lab operations but have not eliminated the need for inspection of manual smears. As innovative technologies enter the market, the need to perform a labor-intensive blood smear will continually be reduced. Follow us to learn about the latest updates!