

The CRIB Blood Group: Newly Identified Blood Type

A new and rare blood group antigen named CRIB has been discovered in a woman from Karnataka, India, marking the world's first documented instance of this antigen, which belongs to the Cromer blood group system. The discovery, occurred after her O Rh+ blood was incompatible with normal blood donors, leading to extensive testing by the Rotary Bangalore TTK Blood Centre and the International Blood Group Reference Laboratory (UK). This finding has significant implications for transfusion medicine and has prompted the launch of a Rare Donor Registry in India to help patients with rare blood groups.

Key points on the discovery

- **The initial discovery:** During preparations for the woman's heart surgery in 2024, doctors found that despite having the common O Rh+ blood type, her blood was incompatible with all available O-positive blood units.
- **Collaboration and research:** The Rotary Bangalore TTK Blood Centre, which found the incompatibility, referred samples to the International Blood Group Reference Laboratory (IBGRL) in the UK for deeper analysis. Over 10 months, researchers there performed extensive molecular testing.
- **Identification of CRIB antigen:** The analysis confirmed a previously unknown antigen within the Cromer blood group system. In recognition of its origin, the antigen was named CRIB ("CR" for Cromer and "IB" for India, Bengaluru).
- **No family match:** Samples from 20 of her family members were also tested, but none of them were a match, confirming the exceptional rarity of her blood type.
- **Successful surgery:** The woman underwent and successfully recovered from her cardiac surgery, which proceeded without a blood transfusion due to the unique blood type.

Explanation of Exam Oriented Key Terms

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CRIB Blood Group

The CRIB blood group is a newly discovered, extremely rare blood type belonging to the Cromer (CR) blood group system and is officially part of the INRA (Indian Rare Antigen) system. A significant characteristic of CRIB is the absence of a high-prevalence antigen found in most people, making transfusions incredibly complex and requiring exceptionally rare, CRIB-negative blood.

The discovery

- **Origin:** The CRIB blood group was identified in a 38-year-old woman from Kolar, near Bengaluru, Karnataka.
- **Acronym:** The name "CRIB" stands for Cromer India Bengaluru, referencing the blood group system it belongs to and the location of the discovery.
- **Discovery date:** The discovery was officially announced in June 2025 at the 35th Regional Congress of the International Society of Blood Transfusion (ISBT).
- **Identification process:** The woman's blood was initially classified as O Rh+ but was found to be "pan reactive," meaning it was incompatible with all normal donor samples. A specialized molecular analysis at the International Blood Group Reference Laboratory (IBGRL) in the UK confirmed the new antigen.

Scientific and medical significance

- **Classification:** CRIB is a new antigen within the existing Cromer blood group system. It was previously undocumented worldwide.
- **Antigenic feature:** A person with the CRIB blood type lacks a common, high-prevalence antigen present in most people. This causes their immune system to produce antibodies that react against almost all other blood types.
- **Transfusion challenge:** Because of the incompatibility, a person with CRIB blood can only receive a transfusion from a donor who is also CRIB-negative. This makes finding a matching donor extremely difficult, particularly during medical emergencies.

- **Pregnancy and fetal health:** The discovery has implications for managing Hemolytic Disease of the Fetus and Newborn (HDFN), which occurs when a mother's antibodies attack an incompatible fetus's red blood cells.
- **Rare Donor Registry:** Following the discovery, a "Rare Donor Registry" was launched in Bengaluru to identify and register donors with rare blood groups, highlighting the importance of specialized donor programs.

Comparison with other rare Indian blood groups

- **Context:** The discovery places India at the forefront of global hematology research and highlights the country's diverse gene pool.
- **Bombay blood group (Oh):** This is another rare blood group first identified in Mumbai in 1952. People with this group lack the H antigen, the precursor for A and B antigens. They can only receive blood from other Bombay donors. Unlike the Bombay group, CRIB is part of the Cromer system, not the ABO system.
- **Rh-null ("Golden Blood"):** This is one of the world's rarest blood types, lacking all Rh antigens. It is a universal donor for other rare Rh-negative types but poses a huge challenge for the patient needing a transfusion.

International recognition

- **ISBT:** The CRIB antigen was officially classified and recognized by the International Society of Blood Transfusion (ISBT), which establishes the international nomenclature for blood groups. This ensures that the discovery is recorded and standardized for global transfusion safety.

Practice Questions:

1. Regarding the scientific context and implications of the CRIB blood group discovery, consider the following statements:

- I. CRIB is a new antigen that belongs to the Cromer blood group system, which is defined by antigens on the DAF (Decay-Accelerating Factor) protein on red blood cells.
- II. The discovery of CRIB highlights the need for advanced molecular screening, especially in genetically diverse populations like India.
- III. The identification of rare blood groups like CRIB has implications not only for transfusion medicine but also for areas like organ transplantation and prenatal diagnostics.

How many of the above statements are correct?

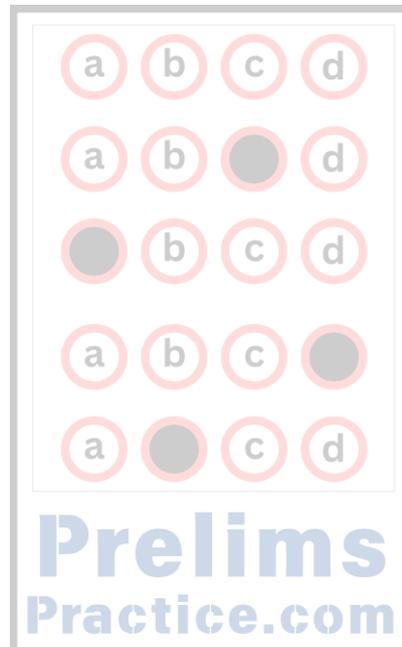
- a) Only one
- b) Only two
- c) All three
- d) None

Answer: c

Explanation: Statement I is correct: CRIB stands for Cromer India Bengaluru and is a newly identified antigen within the existing Cromer (CR) blood group system. The antigens of the Cromer system are indeed located on the Decay-Accelerating Factor (DAF) protein (also known as CD55) found on the surface of red blood cells. **Statement II is correct:** The unique genetic diversity of the Indian population has led to the discovery of other rare blood groups (like the INRA system), and the CRIB finding emphasizes the critical need for advanced genetic blood typing and molecular diagnostics to identify such rare variants, which traditional serological methods might miss. **Statement III is correct:** The presence of a rare antigen like CRIB can cause severe complications like hemolytic transfusion reactions if mismatched blood is used. It also has major implications for prenatal diagnostics (specifically Hemolytic Disease of the Fetus and Newborn, HDFN) and organ transplantation, where antigen compatibility is crucial for preventing immune rejection.

For More Practice Questions, visit:

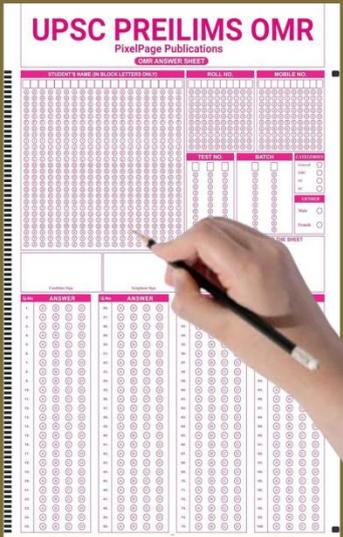
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