# Breakthrough Discovery: New Blood Group Solves 50-Year Mystery

## Description

In a serendipitous medical revelation from 1972, a blood sample taken from a pregnant woman revealed an unprecedented absence of a surface molecule typically found on all known red blood cells. This peculiar observation, which went unexamined for decades, ultimately culminated in 2024 in the formal identification of a novel human blood group system, as delineated by a collaborative research initiative between scholars in the United Kingdom and Israel.

Dr. Louise Tilley, a hematologist with the UK National Health Service, proclaimed this discovery a landmark achievement following nearly two decades of diligent inquiry into this enigmatic hematological anomaly. "It represents a monumental achievement and the culmination of extensive teamwork, enabling us to provide optimal care for rare yet significant patients," she remarked last September.



While most individuals are well-acquainted with the ABO blood group system and the Rh factor, humans in fact possess a multitude of diverse blood group systems, characterized by a rich assortment of cell-surface proteins and carbohydrates that adorn our erythrocytes. These antigenic molecules serve, among other functions, as vital identifiers, distinguishing 'self' from potentially harmful external invaders.


Image and normal type and group

Diagram of ABO blood groups and the IgM antibodies present in each.
Blood type, or blood group, is influenced, in part, by the ABO blood group antigens present on red blood cells. Antibodies in our plasma can detect foreign antigenic markers. ( InvictaHOG/Public Domain/Wikimedia Commons)

A mismatch in these markers during a blood transfusion can elicit catastrophic reactions, potentially leading to life-threatening complications.

The majority of recognized blood groups were elucidated in the early 20th century, with subsequent discoveries, such as the Er blood system unveiled in 2022, affecting only a limited subset of the population. Indeed, the newly characterized blood group follows this trend.

Dr. Tilley elaborated on the challenges faced during this research, noting the rarity of the genetic cases involved. A subsequent investigation revealed that over 99.9 percent of individuals possess the AnWj antigen, which was intriguingly absent in the 1972 sample. As a result, this novel blood group system has been designated the MAL blood group.

Individuals with mutations in both copies of their *MAL* genes present with the AnWj-negative phenotype, akin to the aforementioned patient. Remarkably, Tilley and her colleagues identified other patients lacking this mutation, suggesting that certain blood disorders may suppress the antigen's expression.

Identifying the correct gene after extensive experimentation was no small feat; the research team successfully introduced the normal *MAL* gene into AnWj-negative blood cells, effectively restoring the

presence of the AnWj antigen.

The MAL protein plays a critical role in cellular membrane stability and nutrient transport within cells. Notably, previous studies indicate that the AnWj antigen is absent at birth but manifests shortly thereafter.

Intriguingly, all AnWj-negative patients in the study exhibited the same mutation, yet no additional cellular anomalies or diseases were associated with this genetic alteration.

With the identification of the genetic markers linked to the *MAL* mutation, patients can now undergo testing to ascertain whether their AnWj-negative status is hereditary or a result of suppression, which may indicate an underlying medical concern.

Understanding these rare hematological variations holds profound implications for patient care, as enhanced comprehension may lead to improved outcomes and lives saved.

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## Vocabulary List:

1. **Serendipitous** /ˌsɛr.ənˈdɪp.ɪ.təs/ (adjective): Occurring or discovered by chance in a happy or beneficial way.
2. **Culminated** /ˈkʌl.mɪ.neɪ.tɪd/ (verb): Reached a climax or point of highest development.
3. **Diligent** /ˈdɪl.ɪ.dʒənt/ (adjective): Showing careful and persistent effort or work.
4. **Antigenic** /ˌæn.tɪˈdʒɛn.ɪk/ (adjective): Relating to an antigen which is a substance that prompts the generation of antibodies.
5. **Phenotype** /ˈfiː.nə.taɪp/ (noun): The set of observable characteristics of an individual resulting from the interaction of its genotype with the environment.
6. **Elucidated** /ɪˈluːsɪdeɪtɪd/ (verb): Made something clear; explained.



## Comprehension Questions

### Multiple Choice

1. What was the serendipitous medical revelation from 1972 regarding human blood?

   Option: Discovery of a novel blood group system
   Option: Detection of a common gene mutation
   Option: Identification of a new infectious disease
   Option: Unusual blood cell morphology

2. Where was the collaborative research initiative conducted to identify the novel human blood group system in 2024?

Option: United Kingdom and Australia
Option: United States and Canada
Option: United Kingdom and Israel
Option: Germany and France

3. What is the designation of the novel blood group system identified in 2024?

Option: ER blood group
Option: ABO blood group
Option: MAL blood group
Option: Rh blood group

4. What vital function do antigenic molecules on blood cells serve?

Option: Nutrient transport
Option: Immune response suppression
Option: Cell replication
Option: Identifiers against external invaders

5. What insight did Dr. Tilley provide regarding the AnWj antigen in the research?

Option: 99.9 percent possess the antigen
Option: It is inert in the blood cells
Option: It was absent in the 1972 sample
Option: It is a catalyst for mutation



6. What was the significance of introducing the normal MAL gene into AnWj-negative blood cells?

Option: Inducing cell apoptosis
Option: Triggering an immune response
Option: Restoring AnWj antigen presence
Option: Causing further mutation

**True-False**

7. Humans possess only the ABO blood group system and the Rh factor.

8. The MAL blood group system was uncovered in 1972.

9. Mutations in the MAL genes result in the AnWj-negative phenotype.

10. AnWj antigen is present in all human blood samples.

11. Identification of the MAL mutation allows for testing hereditary AnWj-negative status.

12. The MAL protein is insignificant in cellular function.

**Gap-Fill**

13. The Erblood system was unveiled in _____.

14. Dr. Louise Tilley is a hematologist with the UK National Health Service, and she embarked on this research nearly two decades ago, highlighting the rarity of the _____ cases involved.

15. The novel MAL blood group system was designated after the absence of the _____ antigen in a 1972 sample.

16. The successful introduction of the normal MAL gene into AnWj-negative blood cells resulted in the restoration of the presence of the _____ antigen.

17. Understanding these rare hematological variations may lead to improved outcomes and _____ saved.

18. The research on the novel human blood group system was published in the journal _____.



## Answer

**Multiple Choice:** 1. Discovery of a novel blood group system 2. United Kingdom and Israel 3. MAL blood group 4. Identifiers against external invaders 5. It was absent in the 1972 sample 6. Restoring AnWj antigen presence
**True-False:** 7. False 8. False 9. True 10. False 11. True 12. False
**Gap-Fill:** 13. 2022 14. genetic 15. AnWj 17. lives 18. Blood

**CATEGORY**

1. Health - LEVEL6

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