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# SN Blood Grouping Teaching Kit

Solution Based

Innovation Speaks

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# SN Blood Grouping Teaching Kit

## Product Code: SNLS –TK217

## Number of experiments that can be performed: 100

## Duration of Experiment:

**Protocol: 15 minutes**

**Storage Instructions:**

- The kit is stable for 12 months from the date of manufacture
- Store Anti A, Anti B and Anti Rh D at 2-8$^{o}$C
- Other kit contents can be stored at room temperature (15-25$^{o}$C)

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## Aim:

To determine the blood group and Rh factor of an individual.

## Introduction:

Blood grouping is the classification of blood based on the presence or absence of two inherited antigenic substances found on the surface of red blood cells (RBCs). The ABO and Rh systems are the major and most clinically significant blood group systems, and they are considered the most important of all the blood group systems. The ABO blood group system was first discovered by Karl Landsteiner in 1900.
The human ABO blood group system is categorized into four major groups based on the antigens present on the surface of RBCs:

1. "A" group
2. "B" group
3. "AB" group
4. "O" group

**Table 1: ABO Blood Group System**

| Antigens on the surface of Red Blood Cells | Antibodies in the Serum | ABO Blood Group | Genotype |
|---|---|---|---|
| A | Anti B | A | AA or AO |
| B | Anti A | B | BB or BO |
| A and B | Neither Anti A nor Anti B | AB | AB |
| Neither A nor B | Anti A, Anti B, Anti AB | O | OO |

The associated Anti A and Anti B antibodies usually belong to IgM class of immunoglobulins.
The Rhesus system (Rh) is the second most important blood group system in humans. The most significant and immunogenic Rhesus antigen is the RhD antigen. The individuals carrying the Rh antigen are considered to have positive blood group whereas those individuals that lack this antigen are considered to have negative blood group.

## Principle:

The ABO and Rh blood grouping systems are based on agglutination reactions. When red blood cells (RBCs) carrying specific antigens are exposed to their corresponding antibodies, they interact to form visible agglutination or clumping. In the ABO system, the antigens are O-linked glycoproteins, with the terminal sugar residues on the surface of RBCs determining whether the antigen is A or B. Individuals with blood group A have A antigens on their RBCs and anti-B antibodies in their serum. Similarly, individuals with blood group B have B antigens on their RBCs and anti-A antibodies in their serum. Blood group AB individuals express both A and B antigens on their RBCs and lack anti-A or anti-B antibodies in their serum. In contrast, blood group O individuals do not have A or B antigens on their RBCs but possess both anti-A and anti-B antibodies in their serum. The Rh blood group system involves transmembrane proteins, where the exposed loops on the surface of RBCs interact with corresponding antibodies.



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## Kit Contents:

SN Blood Grouping Teaching Kit enables rapid identification of ABO blood group and Rh factor depending upon the antigen present on the surface of red blood cells.

**Table 2: Enlists the materials provided in this kit with their quantity and recommended storage**

| Sr. No. | Materials Provided | Quantity | Storage |
|---|---|---|---|
| | | 100 expts | |
| 1 | Anti A Sera | 5 ml | 2-8°C |
| 2 | Anti B Sera | 5 ml | 2-8°C |
| 3 | Anti RhD Sera | 5 ml | 2-8°C |
| 4 | Cavity slide | 10 Nos. | RT |
| 5 | Disposable Mixing Stick | 300 Nos. | RT |
| 6 | Blood Lancet | 100 Nos. | RT |

## Materials Required But Not Provided:

**Reagents:** 70% Alcohol/ Spirit
**Other requirements:** Cotton

## Storage:

SN Blood Grouping Teaching Kit is stable for 12 months from the date of manufacture without showing any reduction in performance. Store the Anti A Sera, Anti B Sera and Anti RhD Sera at 2-8°C. Other contents can be stored at room temperature (15-25°C).

## Important Instructions:

1. Before starting the experiment the entire procedure has to be read carefully.
2. Always wear gloves while performing the experiment.
3. Ensure the slide is clean and dry prior to use.
4. Do not allow the antisera reagent dropper to touch the blood sample.
5. The result of the reaction should be interpreted immediately after mixing.
6. Avoid intermixing of the antisera reagents while performing the experiment as it may give false result.

## Procedure:

1. Dangle the hand down to increase the flow of blood in the fingers.
2. Clean the fingertip to be pierced with spirit or 70% alcohol (usually ring or middle finger).
3. With the help of the sterile lancet, pierce the fingertip and place one drop of blood in each of the cavities.



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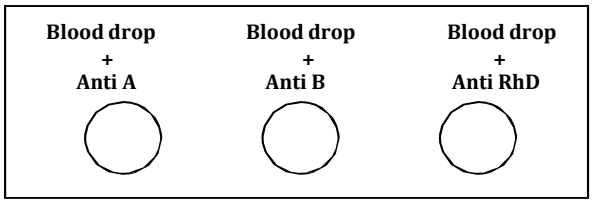
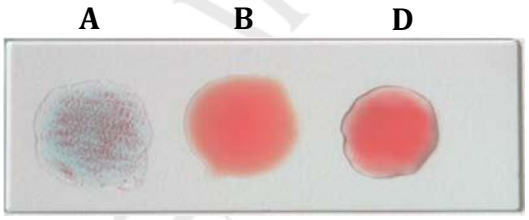
4. Add one drop of antiserum into each cavity as shown below:



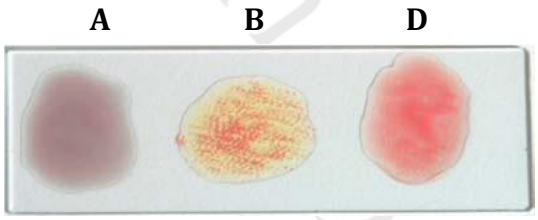

5. Mix each blood drop and the antiserum using a fresh mixing stick.
6. Observe agglutination in the form of fine red granules within 30 seconds. Anti RhD takes slightly longer time to agglutinate compared to Anti A and Anti B.

Note: Proper care should be taken while disposing the lancet and mixing sticks.

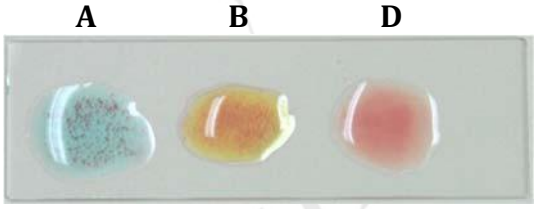
## Observation and Result:



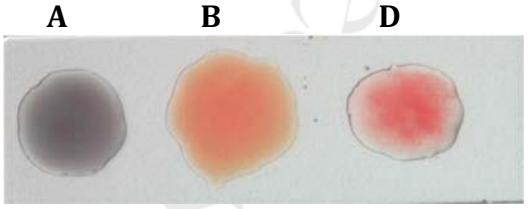

Slide 1




Slide 2




Slide 3




Slide 4

**Table 3: Determination of blood group and Rh factor based on agglutination seen**

| Sr. No. | Anti A | Anti B | Anti RhD | Blood Group |
|---|---|---|---|---|
| Slide 1 | ✓ | × | ✓ | A +ve |
| Slide 2 | × | ✓ | ✓ | B +ve |
| Slide 3 | ✓ | ✓ | ✓ | AB +ve |
| Slide 4 | × | × | ✓ | O +ve |

✓ : Agglutination

× : No agglutination



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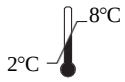
## Interpretation:

- If agglutination is observed when blood is mixed with Anti A reagent, then the individual is said to have blood group "A".
- If agglutination is observed when blood is mixed with Anti B reagent, then the individual is said to have blood group "B".
- If agglutination is observed when blood is mixed with Anti A and Anti B reagent, then the individual is said to have blood group "AB".
- If no agglutination is observed when blood is mixed with Anti A and Anti B reagent, then the individual is said to have blood group "O".
- If agglutination is observed when blood is mixed with Anti RhD reagent, then the individual is said to have "+ve" Rh factor.
- If no agglutination is observed when blood is mixed with Anti RhD reagent, then the individual is said to have "-ve" Rh factor.

## Troubleshooting Guide:

| Sr.No | Problem | Possible Cause | Solution |
|---|---|---|---|
| 1. | False positive result | The antisera reagents mix with each other | Ensure that the antisera reagents are added properly onto the respective cavity without spilling to the sides |
| | | Incubated for a longer time | The results should be read within the time period mentioned in the brochure |
| 2. | No agglutination observed | Antisera not stored under proper conditions | Ensure that the antisera is stored in refrigerator (2-8°C) |




Storage temperature

Do not use if package is damaged



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