Department of Mathematics and Natural Sciences

Fall Semester 2022

Course No: BIO 101

Course Title: Introduction to Biology

Name of the experiment: ABO Blood Grouping

Purpose: The main purpose of conducting this experiment is to understand the basic concept of the ABO blood group system and to know our blood group and type.

Principle

Human blood cell includes red blood cells, white blood cells, and platelets. All these blood cells play a significant role in transportation, protection and regulation. Blood groups are mainly determined by the presence or absence of antigens and antibodies on the surface of our red blood cells or erythrocytes. The blood grouping system was discovered in the year 1901 by Karl Landsteiner- an Austrian biologist and immunologist. Blood group is identified by antibodies and antigens in the blood. Antibodies are proteins found in plasma. They are part of our body's natural defenses. They recognize foreign substances, such as germs, and alert their immune system, which destroys them. Antigens are protein molecules that are found on the surface of red blood cells. The four major blood groups are: A, B, AB and O. The ABO and Rh blood grouping system is based on agglutination reaction. When red blood cells carrying one or both the antigens are exposed to the corresponding antibodies they interact with each other to form visible agglutination or clumping.

The ABO system

There are four main blood groups defined by the ABO system:

- **blood group A –** has A antigens on the red blood cells with anti-B antibodies in the plasma
- **blood group B** – has B antigens with anti-A antibodies in the plasma
- **blood group O** – has no antigens, but both anti-A and anti-B antibodies in the plasma
- **blood group AB** – has both A and B antigens, but no antibodies

The Rh system

Red blood cells sometimes have another antigen, a protein known as the RhD antigen. If this is present, your blood group is RhD positive. If it's absent, your blood group is RhD negative. This means you can be one of eight blood groups:

- A positive (A+)
- A negative (A-)

- B positive (B+)
- B negative (B-)
- O positive (O+)
- O negative (O-)
- AB positive (AB+)
- AB negative (AB-)

Apparatus and Reagents

- Toothpicks
- Blood sample
- Alcohol Swabs
- Lancet
- Clean glass slide
- Sterile cotton balls
- Biohazard disposal container
- Blood Grouping Reagent:
  Anti-A (Blue color)
  Anti-B (Yellow color)
  Anti-D (Clear)

Procedure

- First, take a glass side and after cleaning the slide mark the slide into three parts
- Keep the slide aside safely without disturbing.
- Clean the fingertip to be pierced with spirit or 70% alcohol (usually ring or middle finger) and gently massage the finger to increase blood flow.
- Prick the fingertip and as blood starts oozing out, allow it to fall on the three circles of the glass slide by gently pressing the fingertip.
- Now with the help of a dropper, add the Anti-A, Anti-B and Anti-D in the first, second and third circle respectively in a sequential order.
- Mix the blood sample gently with the help of a toothpick and wait for a minute to observe the agglutination in the form of fine red granules.

Observation and Result

Sample No	Antibodies	Agglutination	Result Interpretation	Final Result
	anti A			
	anti B			
	anti D			

Discussion

Precautions

YouTube link for the experiment : https://www.youtube.com/watch?v=3oUvqNuWzPg