

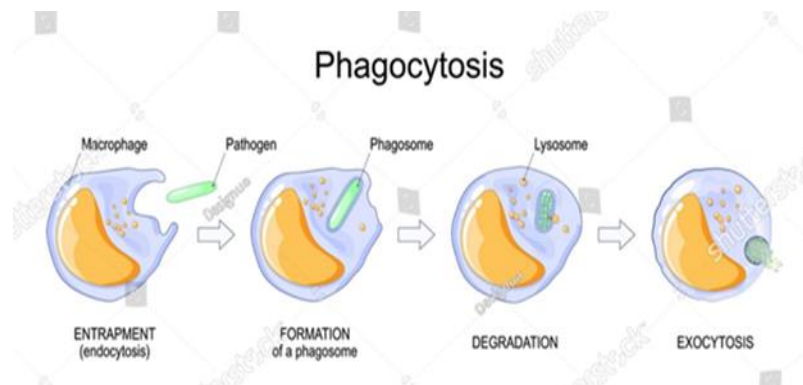
Phagocytosis: is a key process in the immune response, where specialized immune cells, called phagocytes, engulf and digest pathogens, dead cells, and other harmful particles. It plays an essential role in the innate immune system, helping to eliminate infectious agents.

Phagocytic Cells:

- 1- Macrophages
- 2- Neutrophils
- 3- Dendritic cells
- 4- Monocytes.

Phagocytosis Steps:

1. Chemotaxis - Movement in response to chemical stimulation.
2. Adherence. - Attachment to a microbe.
3. Ingestion. - engulfing pathogen with pseudopodia wrapping around pathogen.
4. Digestion. - Phagosome maturation.
5. Elimination. - Phagocytes eliminate remaining pieces of microbe via exocytosis.



Phagocytosis procedure:

To study phagocytosis in mice with *Saccharomyces cerevisiae*, a typical procedure would involve isolating immune cells from mouse tissue, exposing them to the yeast, and then analyzing the ingestion and killing of the yeast.

1. Preparation of Yeast suspension (*Saccharomyces cerevisiae*):

- (10 g) Yeast with 150 ml PBS (phosphate-buffered saline).
- Add suspension to water bath for 60 min, boiling temperature.
- Divide the suspension into equal volumes (5ml) and store at 20°C.

2. Collected of peritoneal Cells from Mice:

- Perform a peritoneal lavage with sterile - PBS to collect peritoneal cells. Gently inject 3 mL of PBS into the peritoneal cavity and aspirate the fluid.
- Centrifuge the collected lavage fluid to pellet the cells (usually at 2000 x g for 5 minutes).
- The pellet was washed with Hanks solution (3 times) and suspended in (1 ml) of Hanks solution.
- Add 0.25 ml of (pellet suspension) to the 0.25 ml serum AB group and 0.25 ml of Yeast suspension. Mix the solution then Add to water bath 37 c, for 30 min.
- Add (0.1 ml) of solution with drope Triban blue, then examination under microscope.

$$\text{Phagocytosis coefficient \%} = (\text{Number of phagocytic cells} \div \text{Number of Total cells}) \times 100$$

The Rosette Test: is a laboratory technique used to detect the presence of antibodies, specifically in the context of identifying certain types of antibodies or autoimmune diseases.

Principle of the Rosette Test: The Rosette test involves mixing a sample of a patient's serum (the liquid portion of blood) with red blood cells (RBCs) from a species that is not the patient's own (sheep RBCs). If there are antibodies present in the serum that are specific to the antigens on the surface of these red blood cells, the antibodies will bind to the RBCs. The result is the formation of a rosette pattern, where the red blood cells surround the antibodies.

Common Applications:

- 1- Blood Grouping
- 2- Identification of Rh incompatibility
- 3- Detection of autoimmune conditions

Procedure for the Rosette Test:

Materials Needed:

1. Maternal blood sample (from the mother)
2. Anti-D antibody reagent (anti-D immunoglobulin)
3. RBCs from a Rh-positive individual (used to detect the presence of anti-D antibodies)
4. Saline solution
5. Glass slides and cover slips (for mounting)
6. Microscope

Procedure:

- 1. Blood collection:** A small amount of the maternal blood (usually 1–2 drops) is drawn and placed on a glass slide. The blood is gently mixed with a saline solution to dilute it.
- 2. Mix with Rh-positive Red Blood Cells:** Add a small amount of Rh-positive red blood cells (usually from a donor of known Rh-positive blood type) to the maternal blood sample. Gently mix to allow the red blood cells to interact with any anti-D antibodies that might be present in the maternal blood.
- 3. Add Anti-D Antibody Reagent:** Introduce the anti-D reagent (which contains anti-D antibodies) to the mixture of maternal blood and Rh-positive red blood cells. This will bind to any anti-D antibodies in the maternal blood if present, causing agglutination.
- 4. The Results:** Rosette formation (+ve).
No Rosette formation (-ve).

