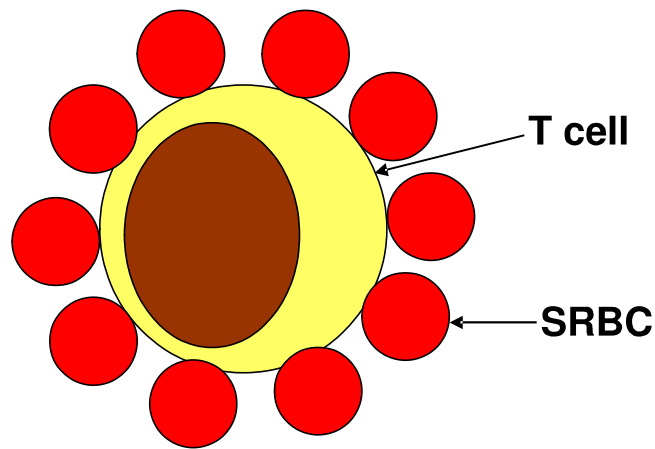


Experiment 4

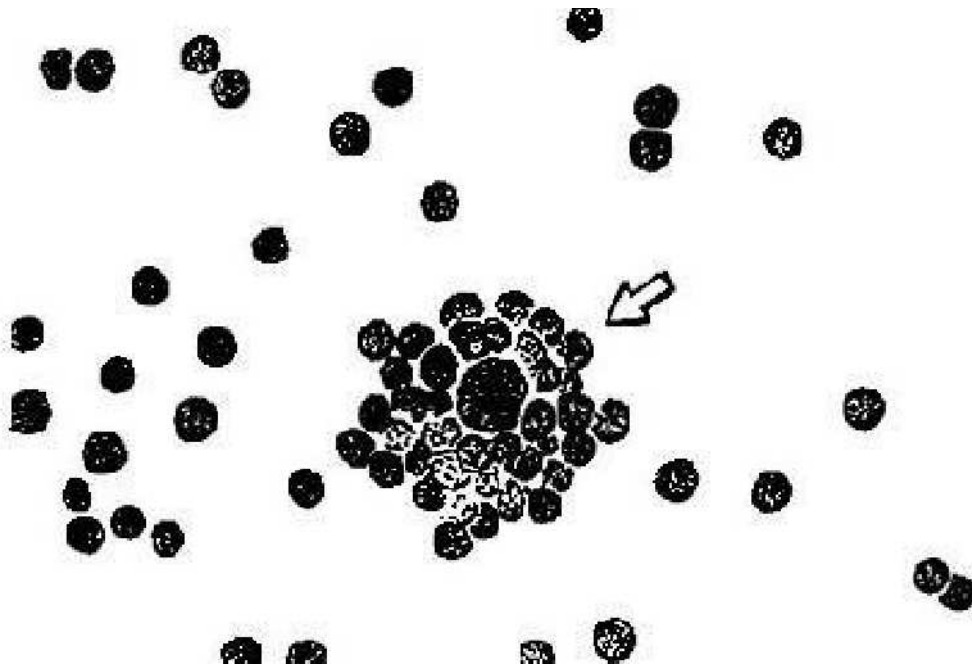
Demonstrations for E- rosette, lymphocyte transformation and phagocytosis

E- rosette

- E---erythrocyte
- CD2 on the surface of human T lymphocyte is the receptor of sheep erythrocyte----E receptor
- When human T cells are mixed with suspension of sheep red blood cells (SRBC), the T cells will bind the SRBC.



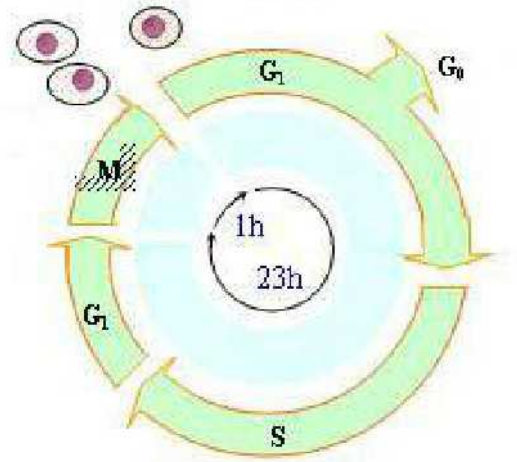
E rosette under a microscope



- E receptor is one specific surface marker of human T cells, so this test can be used in the identification and count of T lymphocytes from human peripheral blood;
- It is also one of the methods in common use for the separation of T lymphocytes.

Lymphocyte transformation

- Antigens or mitogens (PHA, Con A, PWM)
- Lymphocytes prior to antigenic stimulation: small, in state of rest (G_0 stage)
- After antigenic stimulation, the small lymphocytes are activated and become larger.
- Large lymphocytes: metabolize actively, enter the S phase of the cell cycle, mitosis, product much mRNA, DNA and ribosomes.



- **Morphological changes**

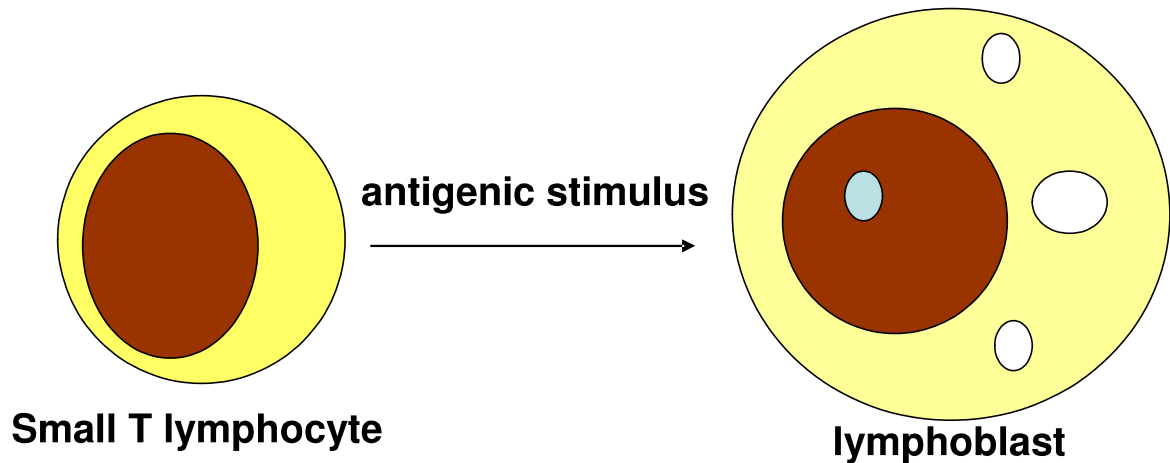
cell: larger;

nucleus: larger and loose;

nucleolus: visible;

cytoplasm: wider rim, vacuoles;

endoplasmic reticulum and microtubules: more rough



	Resting lymphocyte	lymphoblast
Cell size	small	large(2-3 folds)
nucleus size	Relative small	Relative large
chromatin	loose	dense
nucleolus	invisible	Visible, 1-4
mitosis	-	+/-
cytoplasm	less	rich
vacuole	-	+/-

Detecting methods:

- **morphologic counting:**
 - lymphocyte transformation rate**
= (transferred lymphocytes ÷ 200) × 100%
- ³H-thymidine incorporation
- MTT colorimetry

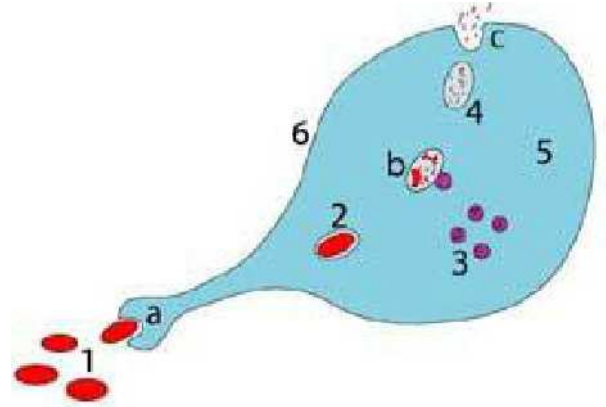
The lymphocyte transformation rate can reflect the function of cellular immunity.

T lymphocyte transformation rate \uparrow : Down's syndrome

T lymphocyte transformation rate \downarrow : malignant tumor; lymphogranuloma; severe tuberculosis; use of immunosuppressant, etc.

Phagocytosis

- **Phagocytosis** is the cellular process of engulfing solid particles by the cell membrane to form an internal phagosome, or "food vacuole."
- In the immune system it is a major mechanism used to remove pathogens and cell debris.
(an important part of innate immunity)
- Bacteria, dead tissue cells, and small mineral particles are all examples of objects that may be phagocytosed.

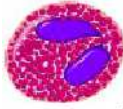


Phagocyte

- Neutrophil



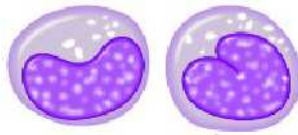
- Eosinophil



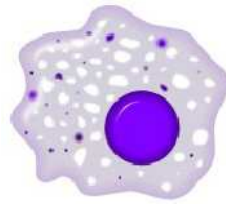
- Basophil



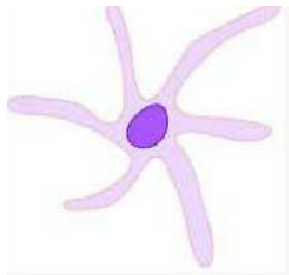
- Monocyte



- Macrophage



- Dendritic cell



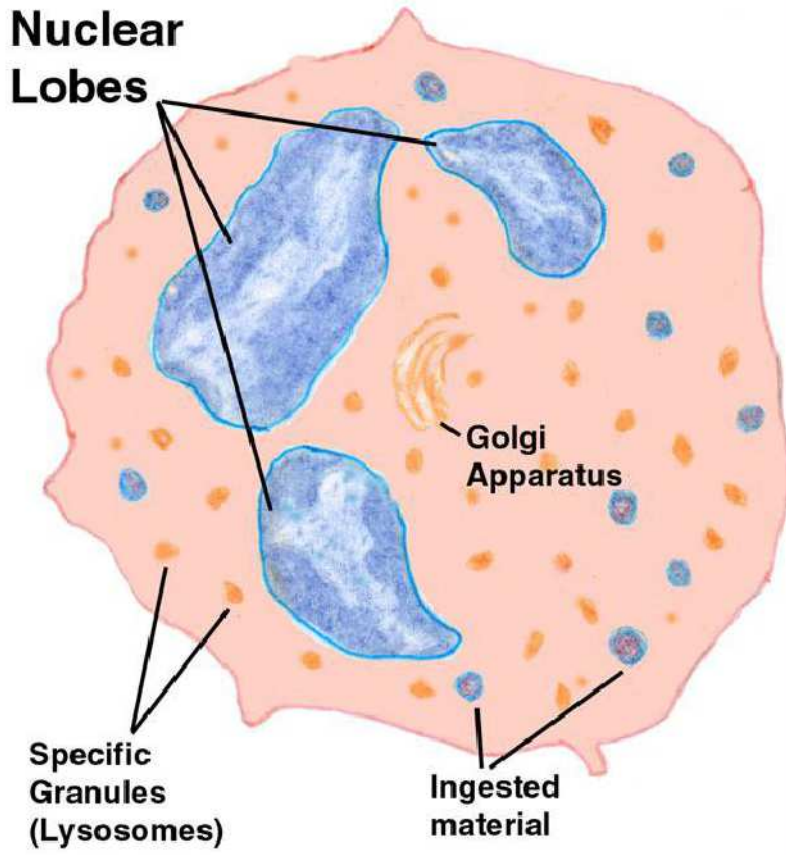
- The neutrophil granules are of major importance for neutrophil function.

When referring to phagocytes or leukocytes in general, the term granule is used more often than *lysosome*.

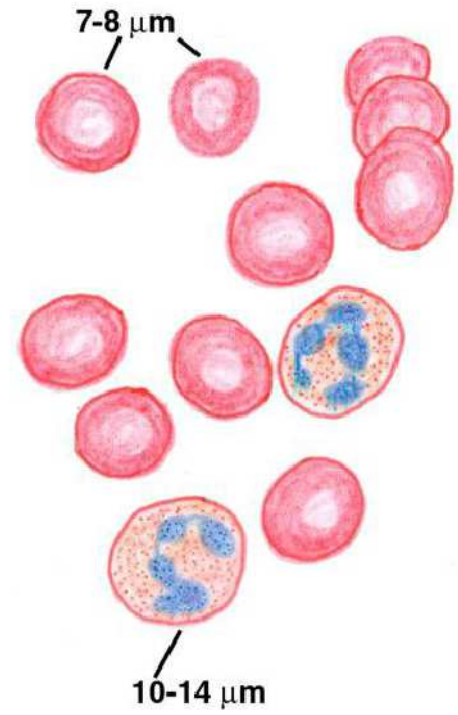
The terms are not fully equivalent; the term granules was originally derived from morphological observations whereas the term lysosomes is based on functional and biochemical characteristics of these cell organelles.

The difference between the neutrophil granules and the bacteria granules

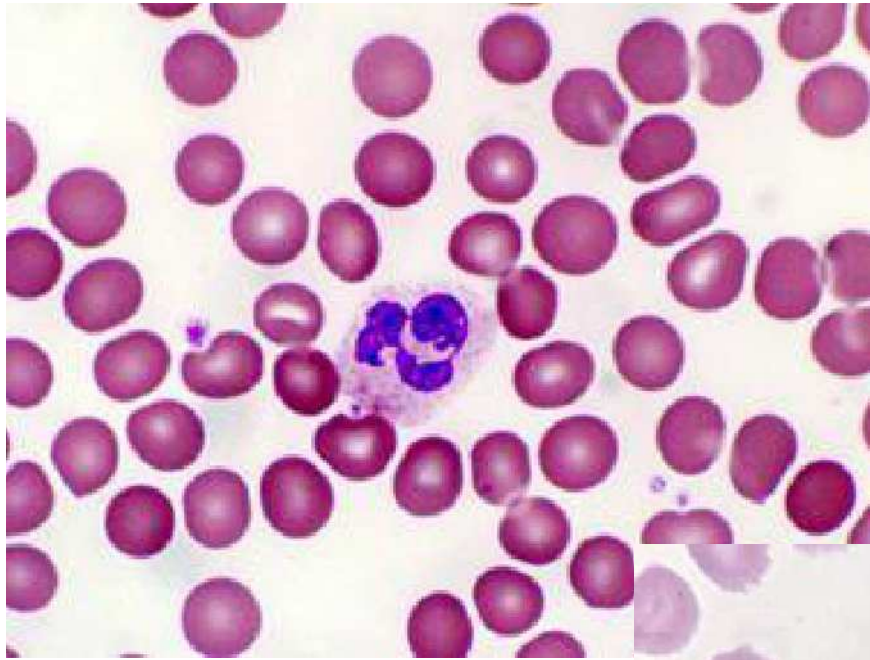
	neutrophil granules	bacteria granules
size	small	big
shape	irregular	round (coccus)
color	light red	deep violet



Size in relation to erythrocytes



neutrophil



Neutrophil in the blood

**Neutrophils with
ingested cocci**

