

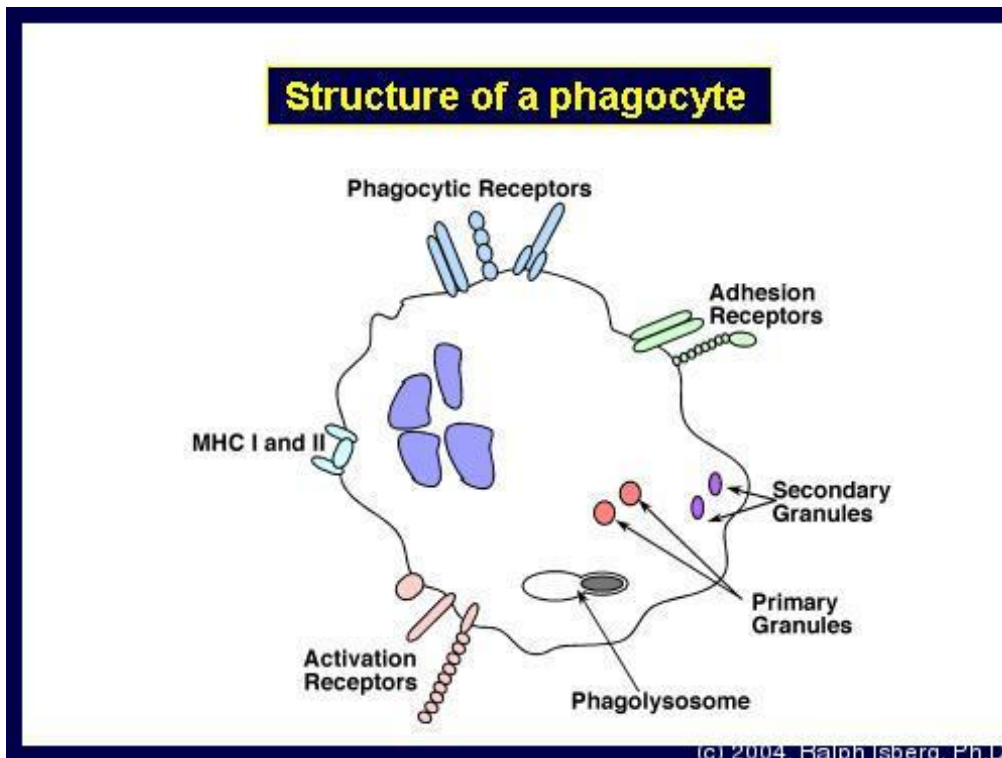
1. Kinds of Phagocytic Cells

Kinds of Phagocytic Cells

1. Neutrophils (polymorphonuclear leukocytes; PMNs)
2. Macrophage/monocytes
3. Eosinophils
4. Basophils
5. Dendritic cells

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2. Structure of a phagocyte

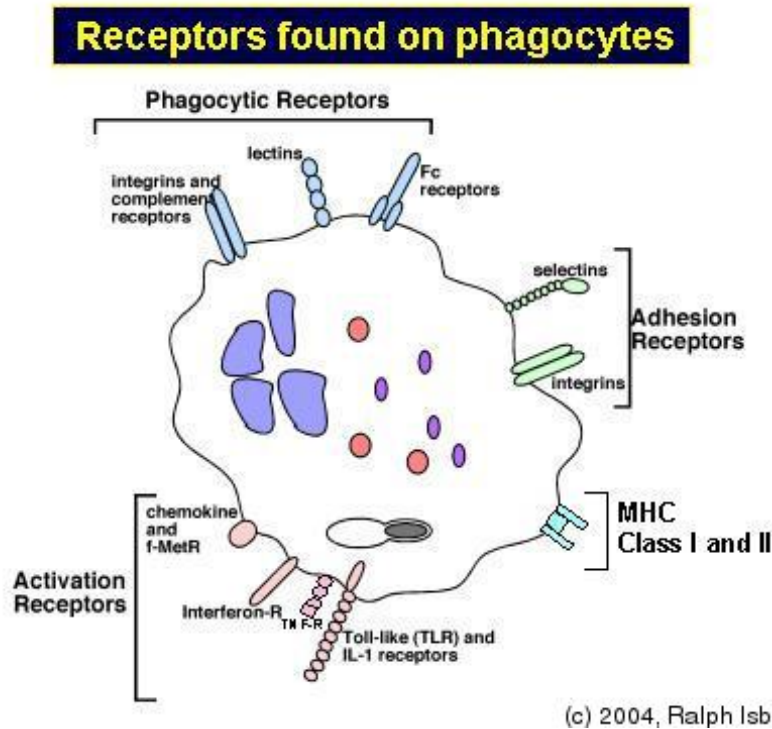


3. Contrast between a Macrophage and a Polymorph

MACROPHAGE	POLYMORPH
<ol style="list-style-type: none"> 1. Long-lived 2. Present in tissues (when mature) 3. Able to migrate from tissues back into lymph nodes, allowing dissemination 4. O₂-dependent killing not vigorous. 5. Conditions can be made amenable for intracellular growth of pathogen 6. Pathogens tactics: <ol style="list-style-type: none"> a) Circumvent respiratory burst b) Break out of phagosome c) Prevent phago-lysosome fusion d) Resist granule contents 	<ol style="list-style-type: none"> 1. Short-lived 2. Circulating 3. Respond to conditions stimulating inflammation, leaving circulation <u>never</u> to return 4. Vigorous respiratory burst during phagocytosis. Oxygen-dependent killing lethal. 5. Extremely hostile environment for intracellular pathogens. 6. Pathogens tactics: <ol style="list-style-type: none"> a) Resist phagocytosis b) Kill or be killed!

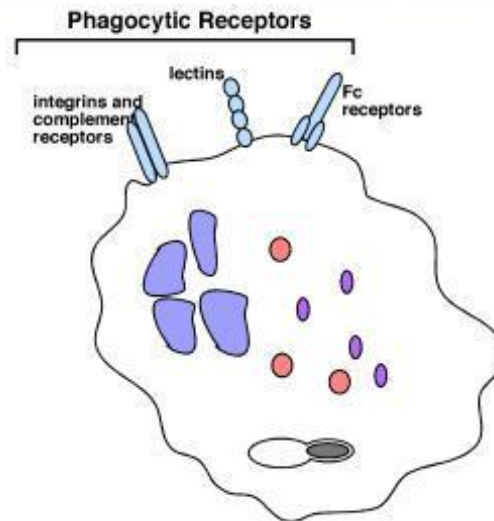
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4. Receptors found on phagocytes



5. Receptors involved in phagocytes

Receptors involved in phagocytosis



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6. Properties of Activated Phagocyte

Properties of Activated Phagocyte

1. Enhanced rate of phagocytosis
2. Enhanced production of toxic reactive oxygen intermediates (antimicrobial)
3. Enhanced production of NO (nitric oxide; antimicrobial)
4. Enhanced phagosome-lysosome fusion.
5. Increased number of MHC class II molecules
6. Secretion of IL-12: differentiation of CD4 T cells.

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7. Tactics used by pathogens

Tactics Used by Pathogens to Avoid Killing by Phagocytes

- A. Kill or be killed (Cytotoxicity)!
 - Streptococcus* Streptolysin O
 - Bordetella pertussis* Adenylate Cyclase

- B. Inhibit opsonization or inactivate phagocytosis
 - 1. Capsule: *S. pneumoniae*
 - 2. M protein: *S. pyogenes*
 - 3. Disrupt signaling: RhoGAP proteins

- C. Survive intracellular killing
 - 1. Inhibit phagosome-lysosome fusion: *M. tb.*
 - 2. Escape from phagosome: *Rickettsia*
 - 3. Survive lysosomal enzymes: *Salmonella*

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8. Defects in phagocyte function

Defects in phagocyte function result in genetic diseases of varying severity

- A. **Leukocyte Adhesion Deficiency:** missing leukocyte integrins. Usually lethal.

- B. **Chronic Granulomatous Disease:** missing NADPH oxidase components. Capsulated bacteria cause serious disease

- C. **Chediak-Higashi Syndrome:** delayed phagosome-lysosome fusion and low chemotaxis. Recurrent infections.

- D. **Myeloperoxidase Deficiency:** no peroxide dependent halogenation of microbes. Patients healthy.

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