CONCEPT: 2) AVOIDING PHAGOCYTOSIS

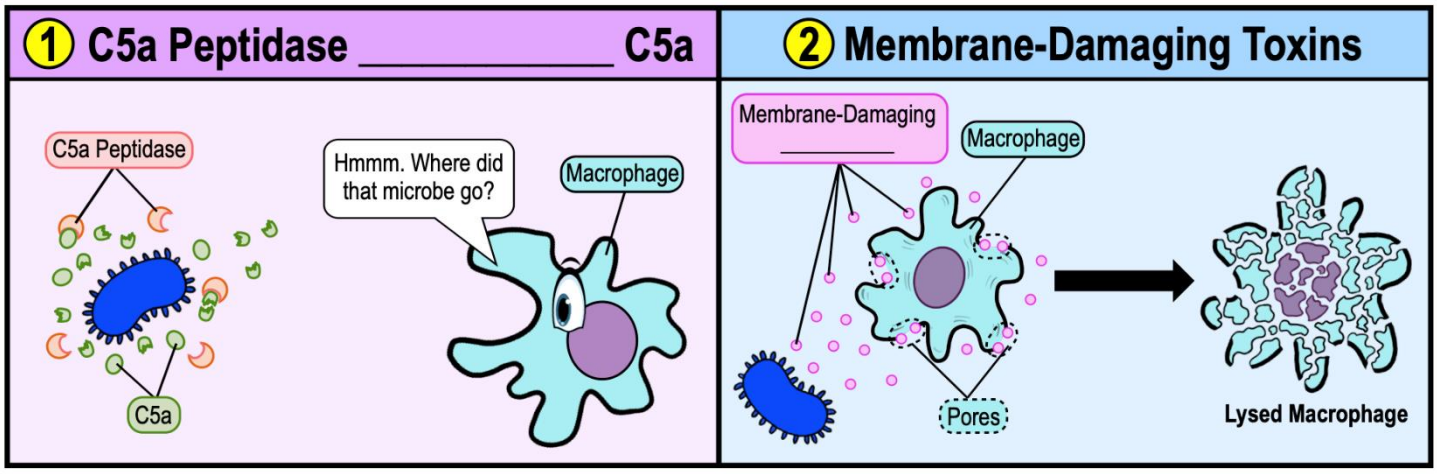
●*Recall:* Phagocytic cells destroy microbes in a series of steps (*chemotaxis*, *recognition*, *attachment*, *engulfment*, *fusion*).

Pathogens Avoid an Encounter with Phagocytes

●Certain pathogens can avoid encountering phagocytic cells using one of ____ mechanisms:

1) Production of the enzyme _____ **Peptidase** which degrades the complement system protein C5a.
   - □ *Recall:* C5a is the chemoattractant that recruits phagocytic cells to sites of infection.

2) Production of _____-Damaging Toxins that kill phagocytes & other cells.
   - □ Form _____ in membranes of phagocytic cells.



●Some pathogens can survive phagocytosis by phagocytic cells & induce apoptosis once inside the cell.

PRACTICE: Why do some pathogens destroy the host organism's C5a proteins?

a) The phagocytic immune cells are not attracted to the pathogen without C5a.
b) The phagocytic immune cells cannot bind to the pathogen without C5a.
c) The membrane of the phagocytic immune cells degrades without C5a.

PRACTICE: What benefit do pathogenic bacteria obtain from secreting membrane-damaging toxins?

a) The toxins will damage any surrounding immune cells.
b) The toxins will stop the immune cells from phagocytosing the pathogen.
c) The toxins will stop the immune cells from sending messages to other immune cells.
d) All of the above.
e) None of the above.

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Pathogens Use Capsules & M Proteins to Avoid Opsonization

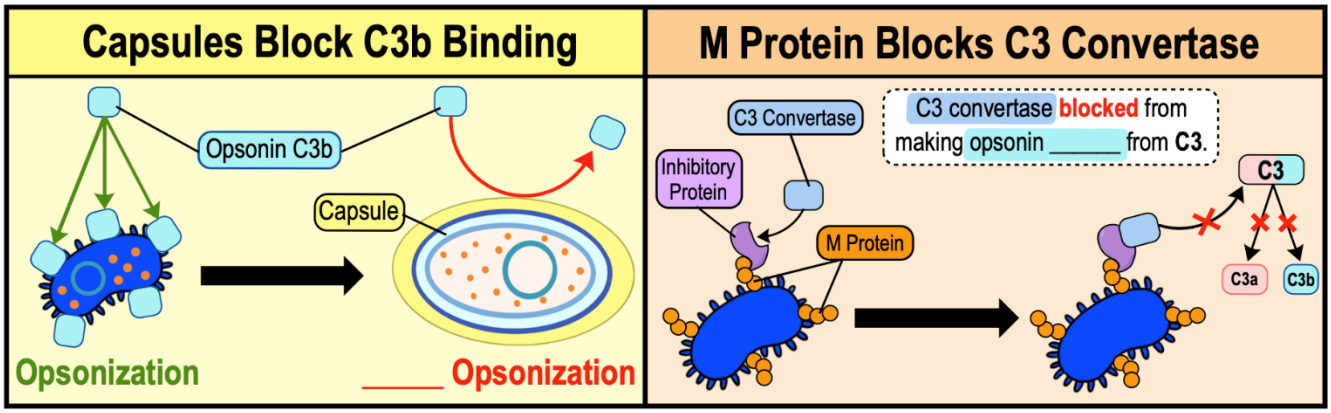
●*Recall:* **Opsonization:** process that makes microbes *easier* to bind/engulf during *phagocytosis.*

●Some pathogens can prevent opsonization by the production of a _____.

□ Capsules can prevent immune cells & opsonins (like C3b) from adhering to pathogen.

●Similar to capsules, production of the cell wall protein (_____ **Protein**) allows a pathogen to avoid opsonization.

□ M protein binds a regulatory protein that degrades C3 Convertase, thereby _____ C3b production.



PRACTICE: The C3b complement protein is incredibly important for opsonization of pathogenic material. How do some pathogens avoid opsonization by interfering with C3b?

a) Pathogen has outer layer that C3b cannot bind to.
b) Pathogen inhibits the functions of C3 convertase.
c) Pathogen stops the formation of C3b.
d) All of the above.

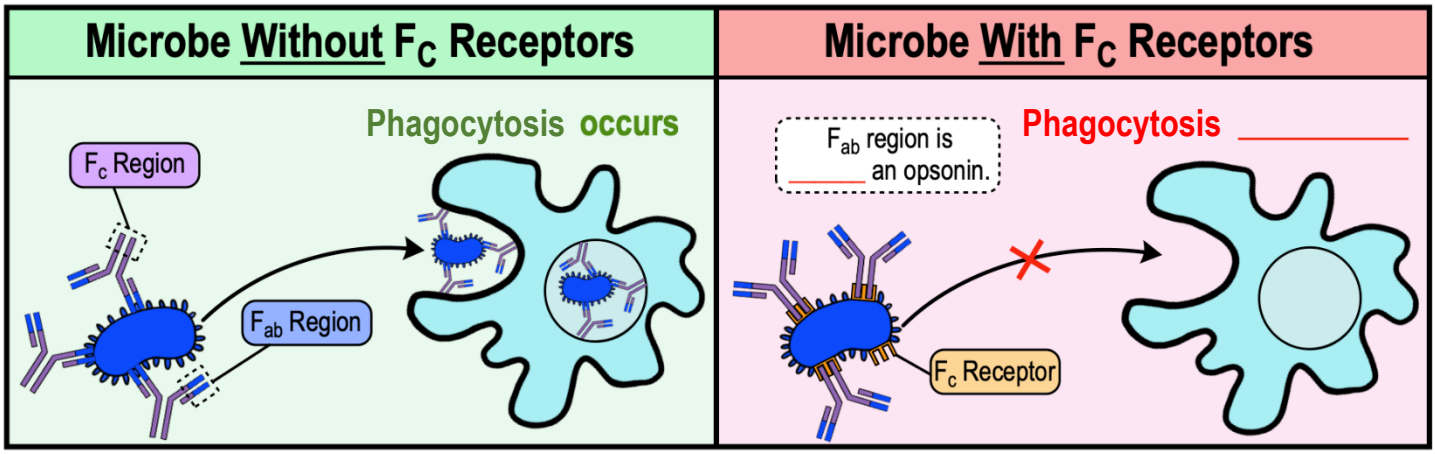
Pathogens use F_c Receptors to Prevent Opsonization

●*Recall:* When antibodies bind a pathogen, the F___ region points *outward* & can serve as an *opsonin* for phagocytes.

●**Fc Receptors:** surface proteins that bind the Fc region of antibodies & *interfere* with their function as _____.

□ Pathogens with F_c receptors bind antibodies & orient them so the F____ region is points *outward* (instead of F_c).

□ Since the F_{ab} region is NOT an opsonin, pathogens with F_c receptors _____ opsonization & phagocytosis.



CONCEPT: 2) AVOIDING PHAGOCYTOSIS

PRACTICE: Certain pathogens have Fc receptors on their surface to avoid which immune responses to infection?

a) Opsonin proteins binding to the pathogen and triggering opsonization.
b) C5a attracting phagocytic immune cells to the pathogen's location.
c) Triggering the classical pathway of the compliment system.
d) Release of histamines trigger an inflammatory response.

PRACTICE: Why would some pathogens inhibit the functions of C3 convertase as a defense mechanism against the host's immune cells?

a) To inhibit the formation of opsonin proteins that bind the pathogen.
b) To inhibit the production of antibodies that recognize the pathogen.
c) To inhibit the activation of T cells that trigger a larger immune response.
d) To inhibit the differentiation of naive B cells into plasma cells.

PRACTICE: *Streptococcus pyogenes* creates a C5a peptidase enzyme which breaks down the host's C5a proteins. Breaking down the C5a proteins has what result?

a) Stopping the opsonization of *Streptococcus pyogenes.*
b) Killing the phagocytic cells.
c) Cell lysis of *Streptococcus pyogenes.*
d) Inhibition of host's membrane attack complexes.
e) Decreased accumulation of phagocytic immune cells.