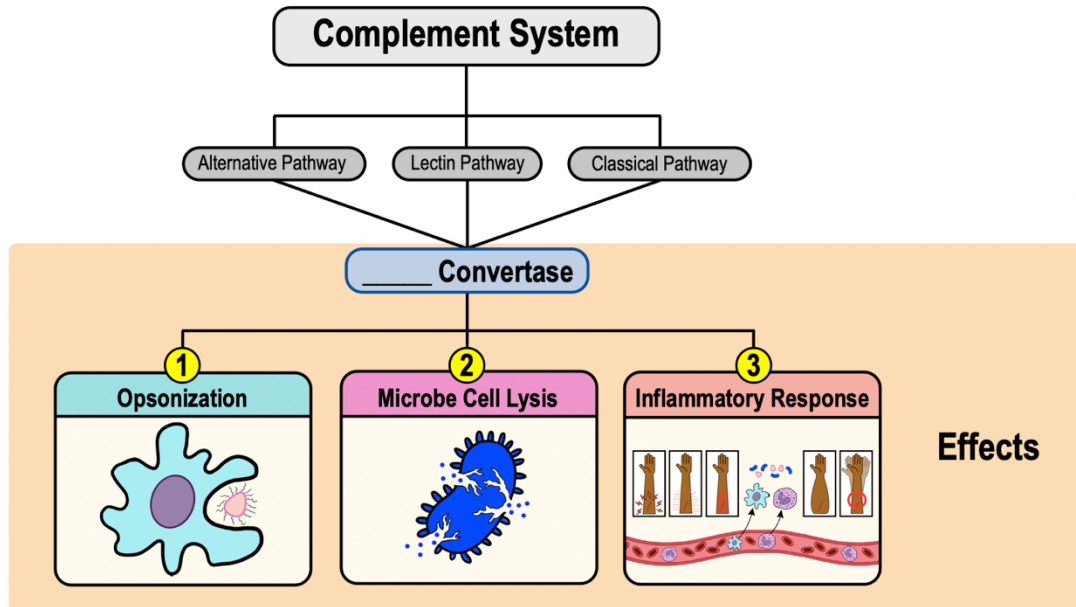


CONCEPT: EFFECTS OF THE COMPLEMENT SYSTEM

● Recall: Activation of the complement system results in ____ possible effects/immune-responses:

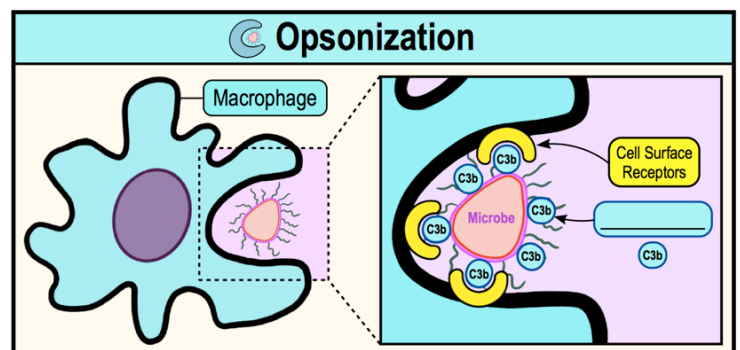
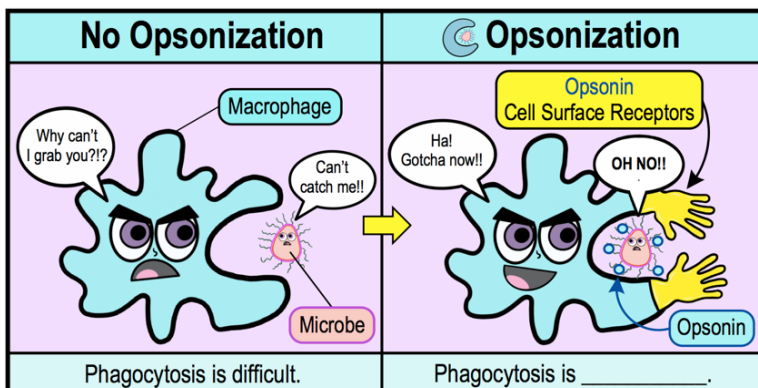
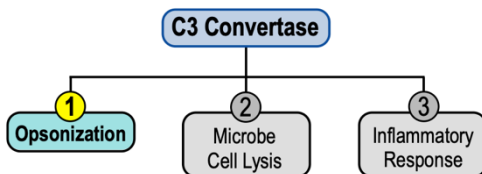
1) _____ 2) Microbe Cell _____ 3) _____ Response



1) Opsonization

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

- Microbes are coated with *opsonins*.
- _____: molecules recognized by cell surface receptors of phagocytic cells.
- **C3** _____ is an opsonin that binds microbes & makes phagocytosis easier for phagocytic cells.



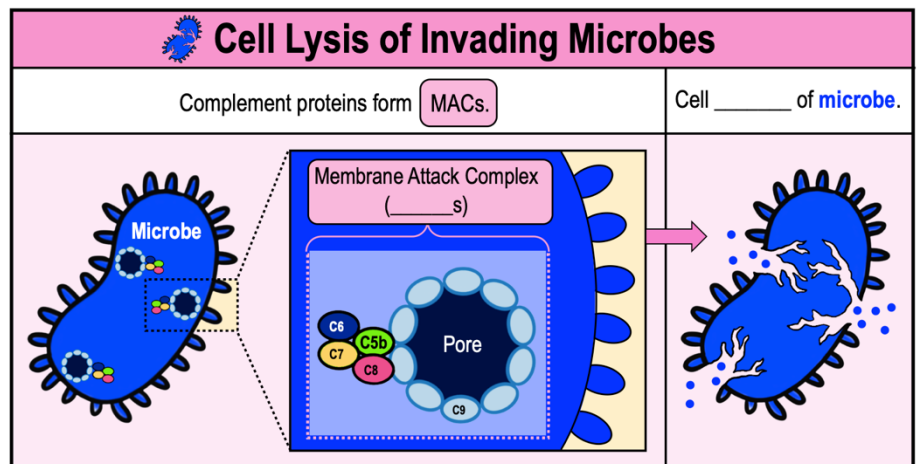
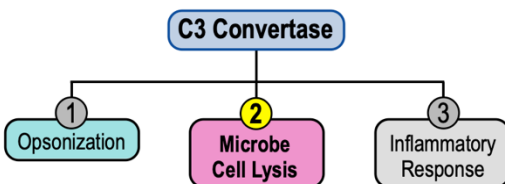
CONCEPT: EFFECTS OF THE COMPLEMENT SYSTEM

PRACTICE: A pathogenic bacterium that is able to avoid binding with the complement protein C3b would most likely protect itself from which of the following immune responses?

- a) Cell lysis of the bacterium.
- b) Opsonization.
- c) Triggering an inflammatory response.
- d) Antibodies binding to the bacterium.

2) Cell Lysis of Invading Microbes

- Multiple complement system proteins form a complex in cell _____ called *membrane attack complexes*.
 - **Membrane Attack Complexes (_____s):** multiple complement system proteins that create pores in the cell.
 - Pores in cell membranes cause microbes to die by cell _____.
 - Effective against gram-_____ bacteria, but NOT gram-*positive* bacteria (thick peptidoglycan cell walls).
 - Components of the complement system involved in MAC formation include C5 - C_____.



PRACTICE: The complement system can lead to the removal or destruction of invading microbes and the inflammatory response. Which immune response of the complement system is not effective against gram-positive (+) pathogenic bacteria?

- a) Opsonization of invading microbe.
- b) Inflammatory response.
- c) Cell lysis of invading microbe.

CONCEPT: EFFECTS OF THE COMPLEMENT SYSTEM

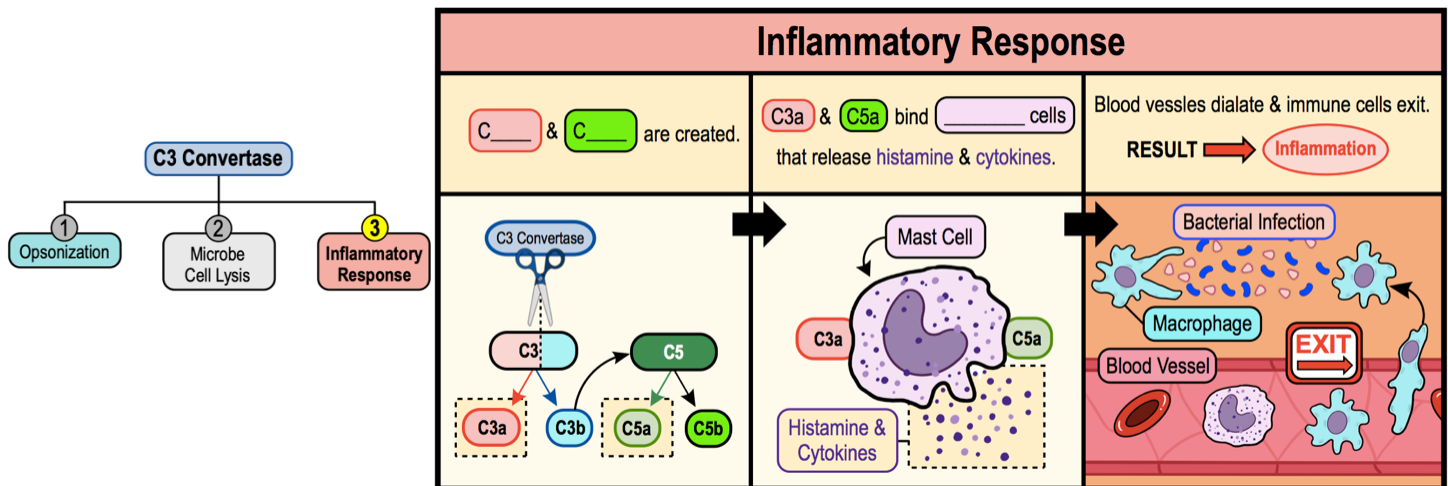
PRACTICE: How do membrane attack complexes cause cell lysis of invading microbes?

- a) The complexes attack the cell walls of the microbe causing it to be vulnerable to attack by immune cells.
- b) The complexes form pores in the cell membrane of the microbe causing the cytoplasmic contents to leak out.
- c) The complexes attack the cell surface receptors of the microbe triggering the cell membrane to degrade.

3) Inflammatory Response

● In order to contain site of damage, eliminate microbes, & restore tissue damage, the *inflammatory response* may occur.

- **Recall: Inflammation:** an _____ immune response characterized by swelling, redness, heat, & pain.
- C3a & C5a induce changes in epithelial cells lining blood vessels causing them to _____ (enlarge).
 - Dilation allows additional complement proteins & immune cells to leave the blood & enter infected site.
- C3a & C5a also cause mast cells to *degranulate*, releasing _____-inflammatory cytokines.



PRACTICE: Which of the following cellular responses does not occur due to the inflammatory response?

- a) Mast cells degranulate releasing histamines.
- b) Epithelial cells change shape allow blood vessels to dilate.
- c) Macrophages pass through the epithelial cells of blood vessels to the site of injury.
- d) Neutrophils form membrane attack complexes to attack invading microbes.

PRACTICE: The main complement proteins involved in the inflammatory response of the immune system are?

- a) C3a and C3b.
- b) C3a and C5a.
- c) C5a and C5b.
- d) C5a and C3b.