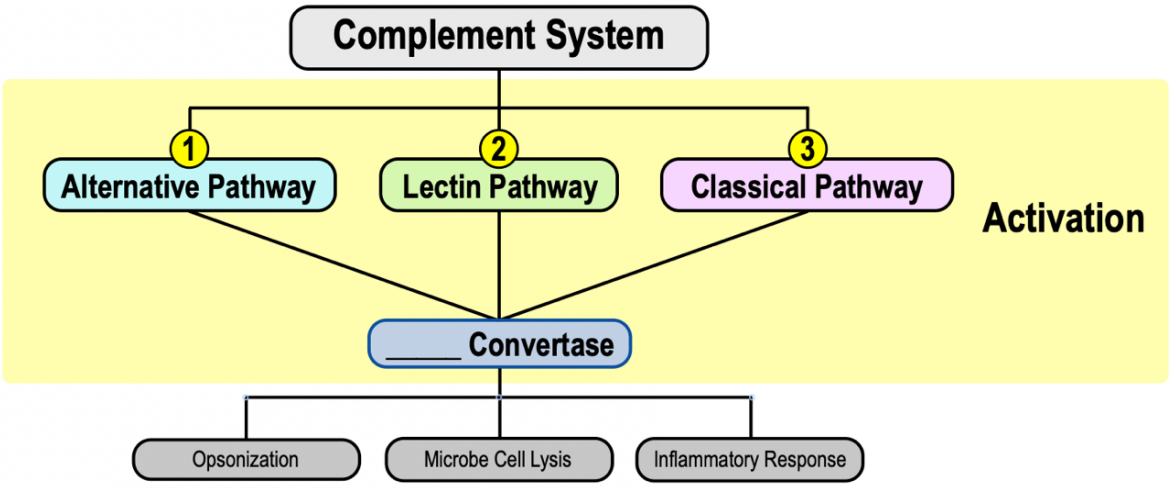
CONCEPT: ACTIVATION PATHWAYS OF THE COMPLEMENT SYSTEM

●*Recall:* activation of the complement system occurs by one of _____ different pathways:

1) _____ Pathway **2) _____ Pathway** **3) _____ Pathway**



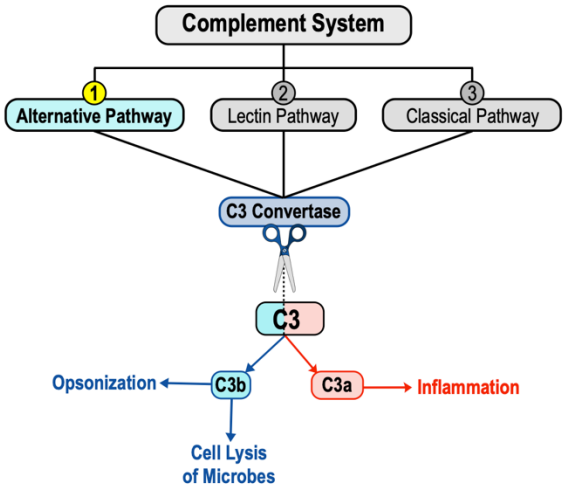
1) Alternative Pathway

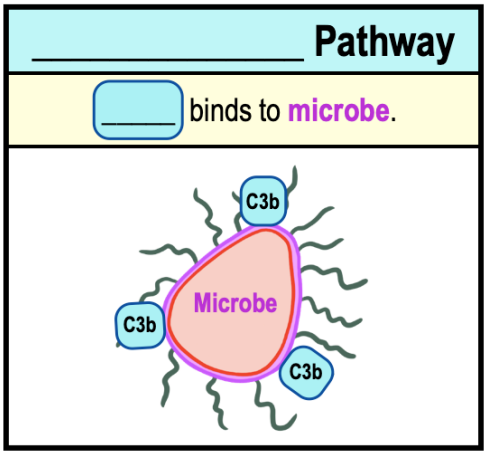
●**Alternative Pathway:** activated when complement protein **C3b** binds to surface molecules of invading microbes.

□ Binding attracts additional complement proteins to bind, eventually forming **C3** _____.

□ Hydrolyzes C3 into _____ & _____ leading to additional steps of the activation cascade.

□ Amplifies the pathway cleaving more _____ to create more C3b that binds the microbe.





PRACTICE: The initiation pathways of the complement system result in the formation of C3 convertase and the cleaving of C3 into C3a & C3b. Where does C3b in the alternative pathway come from if C3 convertase has not yet been created?

a) C3 can spontaneously cleave into C3a and C3b.

b) C3 convertase can spontaneously form and in turn cleave C3 into C3a and C3b.

c) Many microbes already have C3b embedded in their plasma membranes.

CONCEPT: ACTIVATION PATHWAYS OF THE COMPLEMENT SYSTEM

PRACTICE: The alternative pathway resulting in the formation of C3 convertase and the splitting of C3 into C3a and C3b. C3a triggers the inflammatory response. What is the function of C3b created by the alternative pathway?

a) Opsonization of invading microbes.
b) Cell lysis of invading microbes.
c) Binding to invading microbes further stimulating the alternative pathway.
d) Combing with other complement proteins to form the inflammasome.
e) A and B.
f) C and D.
g) A, B, and C.

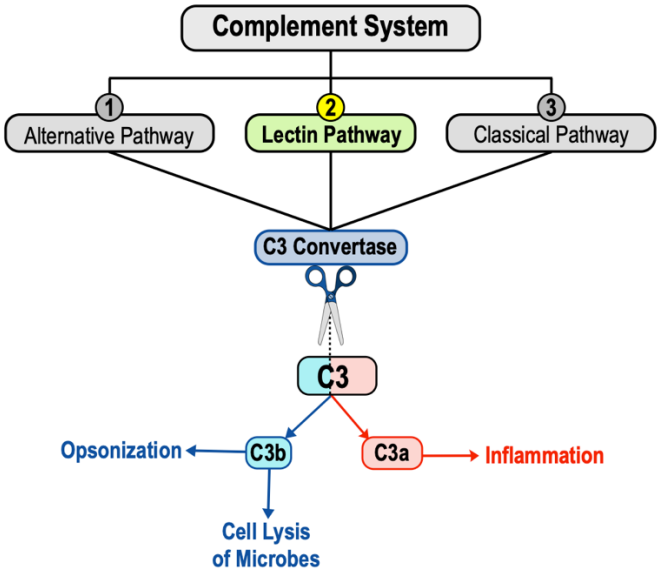
2) Lectin Pathway

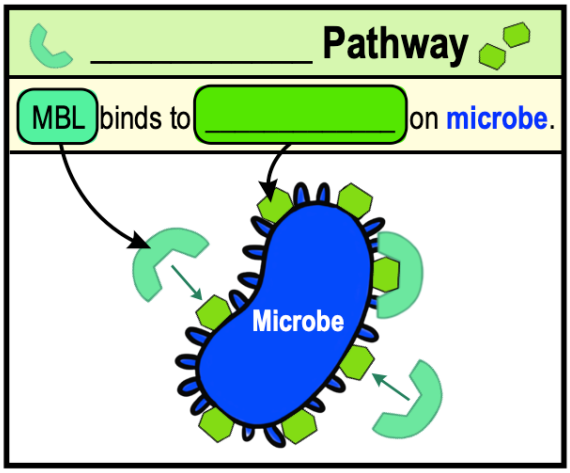
●**Lectin Pathway:** activates complement system with pattern recognition molecules called _____-*binding lectins*.

□ **Mannose-Binding Lectins (_____s):** lectins that bind to specific arrangements of mannose.

□ Mannose is commonly found on bacterial & fungal cell surfaces.

□ Bound MBLs interact with fragments of activated complement proteins forming a _____ convertase.





PRACTICE: Which of the following choices would *not* be able to stimulate the lectin pathway of the complement system?

a) Flu virus with lectins found in the viral membrane.
b) *E. coli* with mannose found in the bacterium's cell walls.
c) Yeast with mannose found in the fungi's cell walls.

CONCEPT: ACTIVATION PATHWAYS OF THE COMPLEMENT SYSTEM

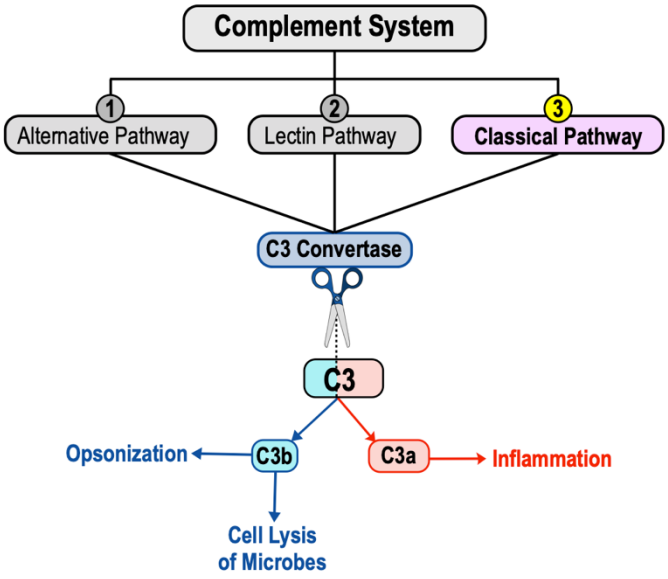
3) Classical Pathway

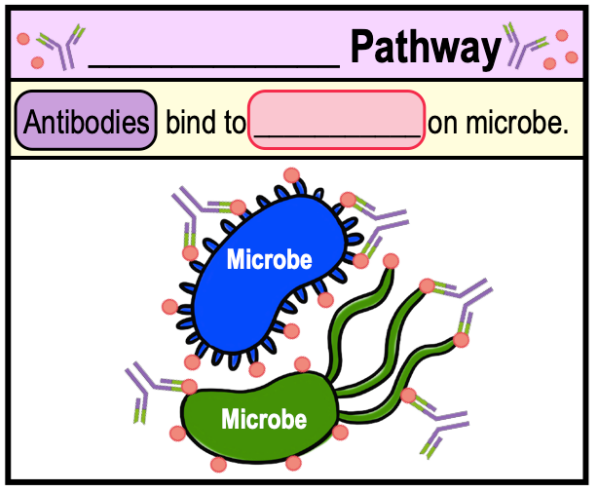
●**Classical Pathway:** activates complement system using _____ created in *adaptive immunity*.

□ *Recall:* **Antigens:** any toxin or foreign substance that induces an *antibody* immune response.

□ **Antibody:** Y-shaped protein that recognizes & binds to an *antigen*.

●During classical pathway, *antibodies* interact with activated complement proteins to form _____ convertase.





PRACTICE: Which of the following is not a mechanism that triggers the complement system?

a) C3b binding to the surface of invading microbes.
b) Antibodies binding to antigens found in the surface of invading microbes.
c) Mannose-binding lectins binding to mannose on the surface of invading microbes.
d) C3 convertase binding to the surface of invading microbes.

PRACTICE: Which of the following initiation pathways of the complement system specially complements and enhances the adaptive immune system?

a) Lectin pathway.
b) Classical pathway.
c) Alternative pathway.
d) Adaptive pathway.

PRACTICE: Which of the following initiation pathways of the complement system specially binds to carbohydrate molecules that are uniquely found on bacterial and fungal cell surfaces?

a) Lectin pathway. b) Classical pathway. c) Alternative pathway. d) Adaptive pathway.