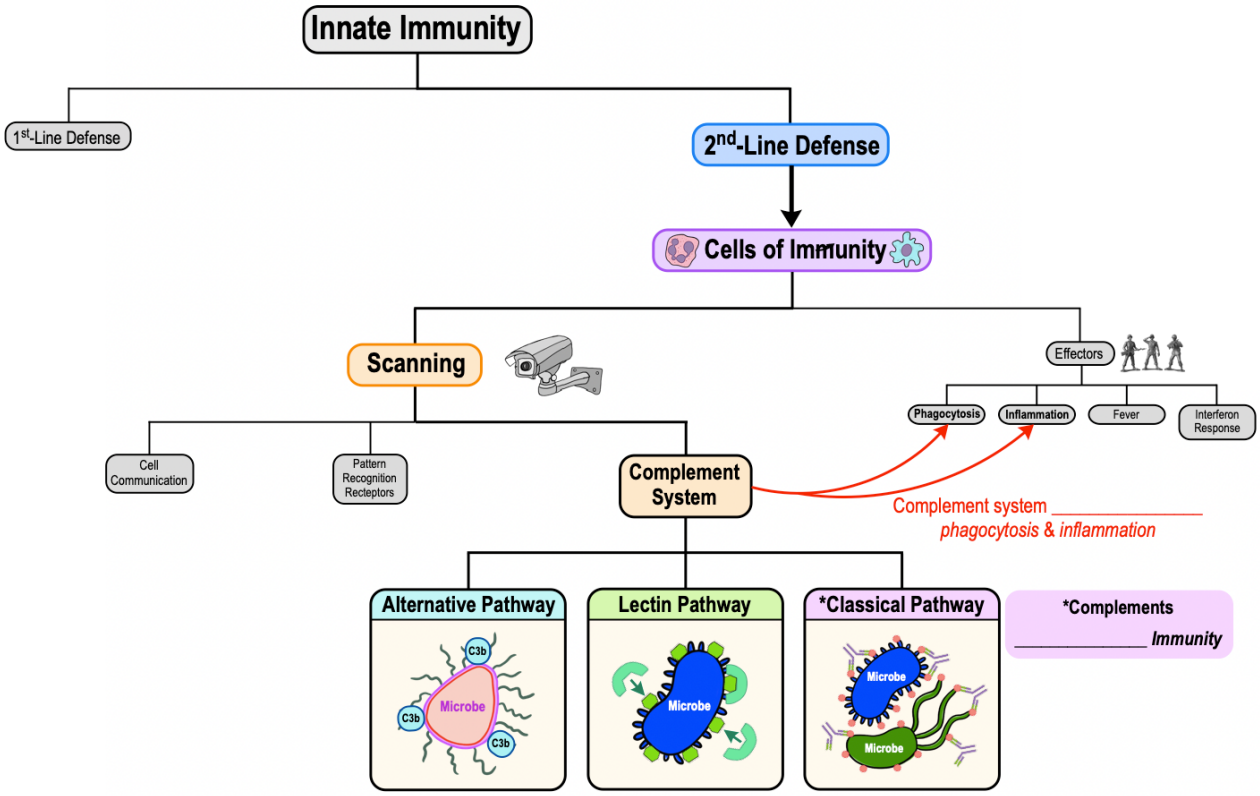
CONCEPT: INTRODUCTION TO THE COMPLEMENT SYSTEM

- _____ **System:** system of *inactive* proteins in blood initiating immune response when *activated* by infection.
  - □ Signals of microbes during infection activate proteins & a *cascade* of reactions generates a _____.
  - □ *Responses* include *removal of invading microbes* & *inflammation*.
  - □ Is not adaptable & it is considered part of _____ *immunity.*
    - □ HOWEVER, it "*complements*" (acts in combination with) _____ response of *adaptive immunity*.
  - □ Activated by one of 3 pathways: *1) Alternative* *2) Lectin* *3) Classical*



PRACTICE: What does the word "complement" mean in the name complement system?

a) This is a system of proteins that complements or enhances the abilities of the immune system to kill microbes.

b) This is a system of proteins that replaces the innate immune system when the infection is too extreme.

c) This is a system of proteins that competes with the adaptive immune system to kill pathogens.

PRACTICE: Which of the following are results of activation of the complement system?

1. Removal or destruction of microbes.
2. Inflammation.
3. Production of antibodies.

a) 2 only.

b) 1 and 2.

c) 3 only.

d) 1, 2, and 3.

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Proteins of the Complement System

●Complement proteins are designated with a letter _____ & numbered C1-C9 (order of *discovery*).

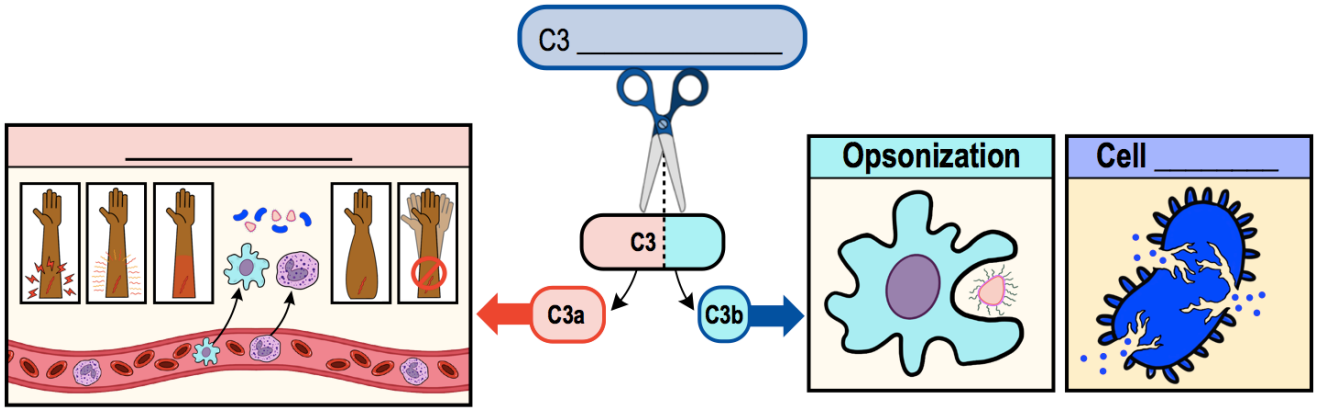
□ Proteins remain _____ until fragmented (activated fragments indicated by lowercase a & b).

●_____ is a *critical,* inactive complement protein that is activated by *C3 convertase*.

□ **C3 convertase:** enzyme that activates C3 by hydrolyzing (or fragmenting) it into C3___ & C3___.

□ C3a & C3b interact with other complement system components causing an _____ response.

□ *Recall:* Immune responses to complement activation include *opsonization*, *cell lysis*, & *inflammation*.



PRACTICE: If the complement proteins are always present in the body, then why are the results of the complement system not always occurring?

a) The complement system proteins need to be activated by the invasion of a microbe.
b) The complement system proteins are held in the lymph nodes until an infection occurs.
c) The complement system proteins are inactive until cleaved by another complement protein.
d) The complement system proteins are not always present and only translated when an infection occurs.
e) A and B.
f) A and C.
g) D only.

PRACTICE: Place the steps of the complement system in the correct order (Order steps 1-3).

_____ Opsonization, cell lysis of microbes, or inflammation occurs.

_____ C3 convertase splits C3 into C3a and C3b.

_____ C3a and C3b recruit other complement proteins to create an immune response.

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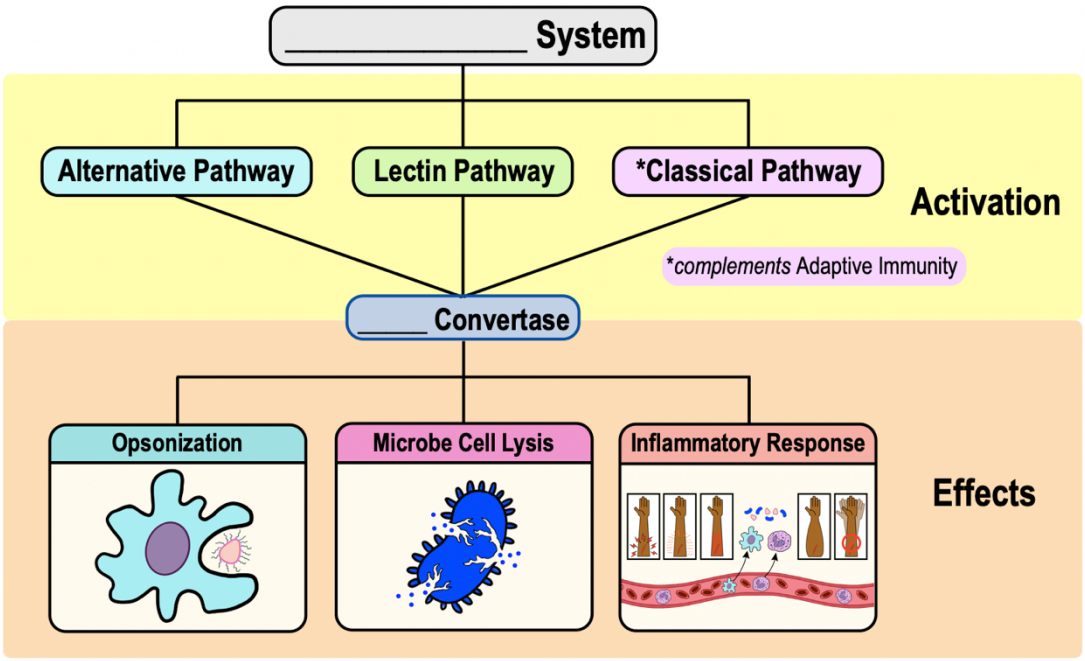
Map of the Lesson on the Complement System

●Activation of the complement system can be *initiated* by one of _____ different pathways:

1) **Alternative Pathway** 2) **Lectin Pathway** 3) **Classical Pathway**

●Each pathway *differs* in initiation; however, all 3 pathways result in formation of the enzyme _____ **convertase**.

□ Results in 3 possible effects: 1) *opsonization* 2) *cell lysis of invading microbe* 3) *inflammatory response.*



PRACTICE: How do the three pathways of the complement system differ?

a) The pathways differ in the resulting immune response they trigger.
b) The pathways differ in the complement proteins that they activate.
c) The pathways differ in what triggers the initiation of the pathway.

PRACTICE: The possible effects of the lectin pathway of the complement system are?

a) C3 convertase formation.
b) Opsonization of infecting microbes.
c) Cell lysis of infecting microbes.
d) Triggering the inflammatory response.
e) All of the above.