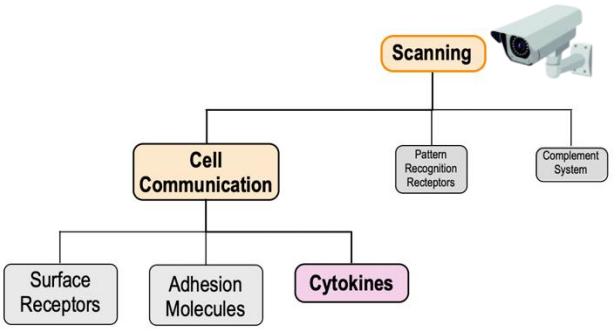
CONCEPT: CELL COMMUNICATION: CYTOKINES

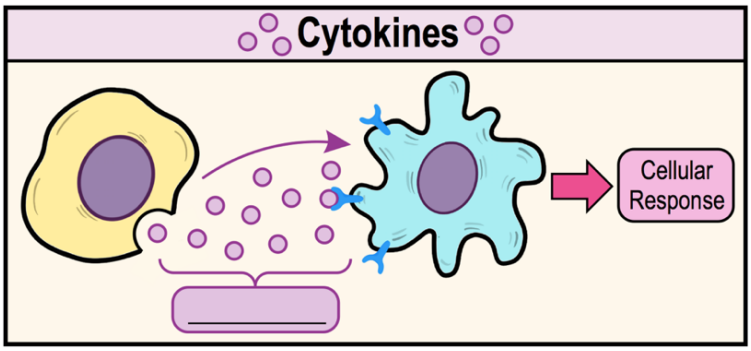
●**Cytokines:** a broad group of soluble _____ that are the *communication* signals between cells.

□ Regulates *intensity* & *duration* of an _____ response by recruitment of cells (Ex. phagocytic cells).

□ Binding to a cell induces cellular changes such as *movement, differentiation, or cell* _____.

□ Different types of cytokines induce different effects on a cell when bound.





Types of Cytokines

●**Chemokines:** cytokines that allow for _____ (movement of a cell towards or away from a signal).

□ _____ immune cells so they can travel to infection sites.

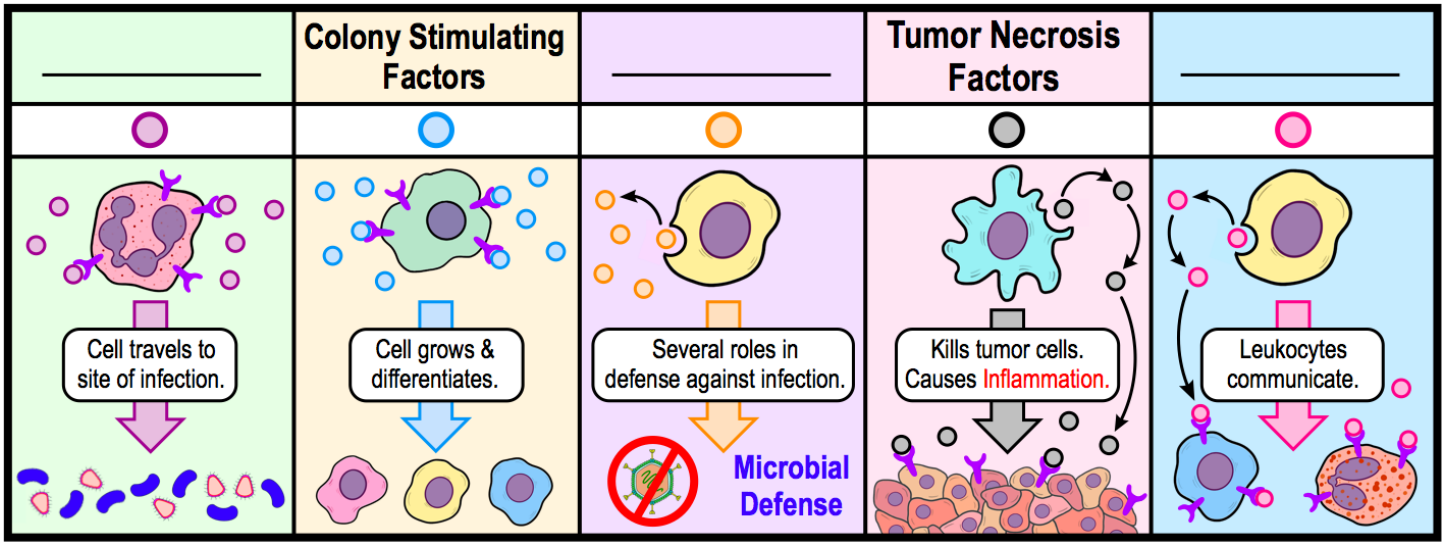
●**Colony-Stimulating Factors:** *stimulate* growth & *differentiation* of immature _____ in bone marrow.

●**Interferons (_____s):** provides antiviral effects (defense against viruses) to neighboring cells.

●_____ **Necrosis Factor (TNF):** primary role is killing tumor cells but also initiates the *inflammatory* response.

□ Can also initiate _____ (programmed cell death) in infected cells.

●**Inter<u>leuk</u>ins:** cytokines that serve as communication molecules between <u>leuk</u>ocytes.



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PRACTICE: How do cytokines function?

a) They bind directly to microbes to enhance their chance of being ingested (phagocytosed).
b) They are secreted in the phagolysosomes of macrophages to kill ingested microbes.
c) They are secreted by one cell and trigger cellular response in another cell.
d) They work as a complex of proteins to produce a hole in microbial cell membranes to lyse them.

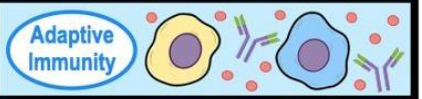
PRACTICE: Which type of cytokine is used to recruit immune cells to the site of infection, inflammation, or tissue damage?

a) Interferons.
b) Chemokines.
c) Interleukins.
d) Tumor necrosis factors.

Types of Interleukins

●*Recall:* **Interleukins** are _____ that serve as communication molecules between leukocytes.

●There are *many* types of interleukins (ILs) including:

Interleukins		
IL-1	Promotes inflammation, fever, & _____ of macrophages & T cells.	
IL-2	Promotes rapid ____ cell proliferation.	
IL-4	Promotes _____ immune system response.	
IL-6	Promotes _____, fever, & proliferation of T cells & B cells.	

PRACTICE: If the body needs to stimulate the production and proliferation of B cells, which type of interleukin signal would it use?

a) IL-2.
b) IL-6.
c) IL-4.
d) IL-1.

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PRACTICE: The "voices" of a cell, which carry messages, are:

a) Surface receptors.
b) Platelets.
c) Cytokines.
d) Antigens.

PRACTICE: In what process is tumor necrosis factor (TNF) not involved?

a) Chemotaxis of phagocytes.
b) Fever.
c) The inflammatory response.
d) The classic complement pathway.

PRACTICE: During presentation of APC-bound antigen, macrophages and dendritic cells secrete the cytokine _____, which activates T helper cells.

a) Interferon.
b) Interleukin-1.
c) Interleukin-2.
d) Histamine.