

Immunology

Dr. Ekhlas M. Idan & Dr. Zahra'a A. Ahmed

**University of Baghdad / College of Science for Women/
Department of Biology**

Cytokines production:-

Small proteins that bind to specific receptor on target cell. Cytokine change cell behavior by altering the function of protein in the cell and by change the expression of specific genes by the cell.

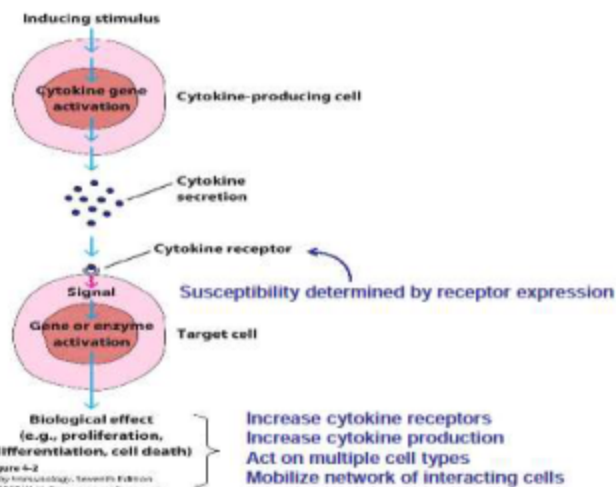


Figure 4-2
Kuby Immunology, Seventh Edition
© 2013 W. H. Freeman and Company

NOMENCLATURE

Cytokines are released by cells of the immune system, especially by monocytes and T lymphocytes, but they are also secreted by many cells in addition to those of the immune system, such as endothelial cells and fibroblasts. They used to have different names depending either on their origin.

Cytokine is a general name; other names include lymphokine (cytokines made by lymphocytes), monokine (cytokines made by monocytes), chemokine (cytokines with chemotactic activities), and interleukin (cytokines made by one leukocyte and acting on other leukocytes).

1. Lymphokines, produced by lymphocytes
2. Monokines, produced exclusively by monocytes
3. Interferons, involved in antiviral responses
4. Colony stimulating factors, support the growth of cells in semisolid media
5. Chemokines mediate chemo-attraction (chemotaxis) between cells .

CYTOKINES BIOLOGICAL EFFECT:-

The cytokines can act as:

- Mediators of the innate immunity (inflammation, chemotaxis, macrophage activation, NK cells) and adaptive immunity (humoral and cellular)
- Regulators of lymphocyte activation, proliferation and differentiation .
- Stimulators of the growth of hematopoietic stem cells .

Cytokines production and release from innate immune cells are critical responses to inflammation and infection. Populations of white blood cells as circulating dendritic cells, monocytes, natural killer (NK) cells, neutrophils, eosinophils, basophils, tissue-resident mast cells and macrophages comprise innate immune cells. These cells control opportunistic invasion with a range of pathogens as viruses, bacteria, fungi and parasites . Cytokine release can be directly evoked by immunoglobulin- or complement receptor-mediated signaling or by pathogens through a diverse array of cellular receptors, including pattern recognition receptors such as TLRs

3. **Immuno regulatory cytokines** regulate the proliferation and differentiation of T and B lymphocytes and NK cells in peripheral lymphoid organs and tissues. First of all, they are produced by activated professional APCs (macrophages and DCs) and the lymphocytes themselves. This group includes IL-2, IL-4, IL-12, IL-15, IFN- γ .
4. **Anti-inflammatory (immunosuppressive) cytokines**. These include IL-10 and TGF- β . In addition, IL-4 and IL-13 are cytokines that inhibit macrophages, and also act as anti-inflammatory in some processes.

Interferons:

IFNs belong to the large class of proteins known as cytokines, molecules used for communication between cells to trigger the protective defenses of the immune system that help eradicate pathogens. Interferons are named for their ability to "interfere" with viral replication by protecting cells from virus infections.