

TABLE E-1 Cytokines and Chemokines, Analyzed with Use of the Protein Chip, and Their Functions*

Cytokine	Function
Interleukin-1 α (IL-1 α)	IL-1 α and IL-1 β have similar biological activities; Derived primarily from activated monocytes and macrophages; Stimulates T and B cells
Interleukin-1 β (IL-1 β)	Induces acute inflammation and associated cytokines such as PGE ₂ , IL-6, IFN β -1, GM-CSF; Increases osteoclastic bone resorption; Induces fever
Interleukin-2 (IL-2)	Derived from T helper lymphocytes; Growth factor for T-cells, B-cells, NK cells, monocytes, macrophages
Interleukin-3 (IL-3)	Derived from activated T-cells and endothelial cells; hematopoietic growth factor; Stimulate of erythroid cells, eosinophils, basophils, mast cell
Interleukin-4 (IL-4)	Secreted by activated T-cells; Pleiotropic effects on B cells, T-cells, monocytes and endothelial cells
Interleukin-5 (IL-5)	Released by T-cells; Involved in eosinophils differentiation
Interleukin-6 (IL-6)	Released by activated monocytes/macrophages; Induced by TNF α and IL-1; Regulates T-cell and B-cell function; Stimulates recruitment of osteoclast precursor; maintains chronic inflammation and bone resorption
Interleukin-7 (IL-7)	Derived from bone marrow cells; Growth factor for progenitor T-cells, B-cells
Interleukin-8 (IL-8)	Derived primarily from monocytes and macrophages; Chemoattractant for neutrophil; Important mediator of osteoclastogenesis, osteoclast migration and angiogenesis; aka monocyte-derived neutrophil chemotactic factor (MDNCF)
Interleukin-10	Derived from helper T-cell lymphocytes (Th2); Stimulates proliferation of mast cells and B-cells; Blocks cytokine synthesis by Th1 cells, monocytes, NK cells
Interleukin-12p40; Interleukin-12p40/p70; Interleukin-12p70	Derived from B-cells and macrophages; Activates cytotoxic T-cells and NK cells Induces IFN- γ and IL-2; Suppresses Th2 cytokines
Interleukin-13 (IL-13)	Derived from helper T-cells; Stimulates IgG secretion by B-cells; Suppresses macrophage inflammation
Interleukin-15 (IL-15)	Derived from T-cells; strong autocrine effects; Activator of NK cells
Interferon- γ inducible protein of 10 kDa (IP-10)	Produced by IFN- γ stimulated monocytes, macrophages and antigen experienced T-cells; Chemoattractant for activated Th1 cells, NK cells; Shares receptor with MIG
Monokine induced by Interferon- γ (MIG)	Produced by IFN- γ stimulated monocytes, macrophages and antigen experienced T-cells; Chemoattractant for activated Th1 cells, NK cells; Shares receptor with IP-10
Interferon- γ (IFN- γ)	Elaborated by T lymphocytes in response to antigen or mitogens; Activation, growth and differentiation of T-cells, B-cells, macrophages and natural killer (NK) cells
Soluble intercellular adhesion molecule (sICAM-1)	Regulates T-cells adhesion to endothelial lining and thus cellular extravasation; Can be considered anti-inflammatory
Macrophage Chemoattractant Protein-1 (MCP-1)	Produced by activated monocytes and endothelial cells; Primary chemoattractant for macrophages, and lymphocytes
Macrophage chemoattractant protein-3 (MCP-3)	Produced by activated monocytes and endothelial cells; Primary chemoattractant for macrophages, eosinophils and basophils
sCD23	Expressed on mature B-cells; Stimulates TNF- α , IL-1 β and IL-6 secretion; Activation and growth of T-cells, B-cells
sCD95	Typically expressed on activated T-and B-cells; Induces apoptosis
Transforming growth factor- β ₁ (TGF- β ₁)	Secreted by macrophages, fibroblasts and bone cells; Increases chondrocyte, osteoblast growth and extracellular matrix deposition; Anti-inflammatory effects include inhibiting T-cell activation, IL-1, TNF- α , IFN- γ , IL-2 receptor and IL-6 secretion
Tumor necrosis factor- α (TNF- α)	Produced primarily by monocytes and macrophages; Primary activator of acute inflammation and related proteins; Stimulates release of IFN- γ , IL-6, IL-1, GM-CSF
Tumor necrosis factor- β (TNF- β)	Acute phase protein involved in muscle and fat catabolism; Induces fever; potent autocrine effects and increased anti-viral/parasite activity
TNF-related apoptosis inducing ligand (TRAIL)	Involved in apoptosis of tumor cells
Eotaxin	Released by activated T-cells and macrophages; Chemoattractant for eosinophils, basophils and Th2 cells
Granulocyte-colony-stimulating factor (G-CSF)	hematopoietic growth factor; Differentiation and development of monocytes and granulocytes
Granulocyte/Monocyte-Colony-stimulating factor (GM-CSF)	Growth factor for hematopoietic progenitors; Promotes differentiation and activation of monocytes and granulocytes
*Adapted from several sources, including Fitzgerald KA, O'Neill LAJ, Gearing AJH, Callard RE. The Cytokine FactsBook. 2nd ed. London: Academic Press; 2001.	