

## Sources and Functions of Key Cytokines

**Table 1. Sources and Functions of Key Cytokines.\***

Cytokine	Main Cell Source	Function
Interferon- $\gamma$	Th1 cells, natural killer cells, natural killer T cells	Cell-mediated immunity; control of intracellular pathogens; inhibition of Th17 pathway
Interleukin-1	Monocytes, other cells	Proinflammatory cytokine; induction of Th17 cells
Interleukin-4	Th2 cells, natural killer T cells	Antibody-mediated immunity; control of parasitic infections; antiinflammatory effect by inhibition of interleukin-1, TNF, and interleukin-6 production by monocytes; inhibition of Th17 pathway
Interleukin-6	Monocytes, other cells	Induction of acute-phase proteins; effects on B cells; induction of Th17 cells
Interleukin-8	Monocytes, other cells	Major chemokine for neutrophils
Interleukin-12	Monocytes, dendritic cells	Induction of Th1 pathway; acts in synergy with interleukin-18
Interleukin-17	Th17 cells, natural killer cells, natural killer T cells	Proinflammatory cytokine; control of extracellular pathogens; induction of matrix destruction; synergy with TNF and interleukin-1
Interleukin-18	Monocytes, dendritic cells	Induction of Th1 pathway; acts in synergy with interleukin-12
Interleukin-21	Th17 cells	Amplification of Th17 pathway in autocrine fashion
Interleukin-22	Th17 cells	Induction of epithelial-cell proliferation and of antimicrobial proteins in keratinocytes
Interleukin-23	Monocytes, dendritic cells	Th17 expansion and stabilization
Interleukin-25	Th2 cells	Interleukin-17 family member; induction of Th2-associated cytokines; inhibition of interleukin-1 and interleukin-23
TGF- $\beta$	Many cells	Induction of Foxp3+ regulatory T cells in the absence of interleukin-6; together with interleukin-6, interleukin-21, and interleukin-1 $\beta$ , induction of Th17 cells
TNF	Monocytes, dendritic cells	Proinflammatory cytokine; acts synergistically with interleukin-17

\* TGF- $\beta$  denotes transforming growth factor  $\beta$ , and TNF tumor necrosis factor.

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Add one more: IL-10. Main cell source: Th2, Monocytes & DC. Functions: regulatory/suppressive on Th1 and CD8 reactions, B cell differentiation and proliferation.