

Gene name: **IFNG**

External Ids for IFNG Gene: HGNC: [5438](#) NCBI Gene: [3458](#) Ensembl: [ENSG00000111537](#) OMIM®: [147570](#) UniProtKB/Swiss-Prot: [P01579](#).

NCBI Gene Summary for IFNG Gene: This gene encodes a soluble cytokine that is a member of the type II interferon class. The encoded protein is secreted by cells of both the innate and adaptive immune systems. The active protein is a homodimer that binds to the interferon gamma receptor which triggers a cellular response to viral and microbial infections. Mutations in this gene are associated with an increased susceptibility to viral, bacterial and parasitic infections and to several autoimmune diseases.

GeneCards Summary for IFNG Gene: IFNG (Interferon Gamma) is a Protein Coding gene. Diseases associated with IFNG include [Immunodeficiency 69](#) and [Hepatitis C Virus](#). Among its related pathways are [Antiviral mechanism by IFN-stimulated genes](#) and [Gene expression \(Transcription\)](#). Gene Ontology (GO) annotations related to this gene include *cytokine activity* and *type II interferon receptor binding*.

UniProtKB/Swiss-Prot Summary for IFNG Gene: Type II interferon produced by immune cells such as T-cells and NK cells that plays crucial roles in antimicrobial, antiviral, and antitumor responses by activating effector immune cells and enhancing antigen presentation (PubMed:[16914093](#), [8666937](#)). Primarily signals through the JAK-STAT pathway after interaction with its receptor IFNGR1 to affect gene regulation (PubMed:[8349687](#)). Upon IFNG binding, IFNGR1 intracellular domain opens out to allow association of downstream signaling components JAK2, JAK1 and STAT1, leading to STAT1 activation, nuclear translocation and transcription of IFNG-regulated genes. Many of the induced genes are transcription factors such as IRF1 that are able to further drive regulation of a next wave of transcription (PubMed:[16914093](#)).

Cellular location: mainly extracellular region.

Interferon-gamma (IFN- γ), encoded by the **IFNG** gene, is a critical cytokine in both innate and adaptive immunity. Produced predominantly by activated T cells and natural killer (NK) cells, IFN- γ plays a pivotal role in modulating immune responses, including the activation of macrophages, enhancement of antigen presentation, and promotion of Th1 cell differentiation.

- **Diagnostic Role:** Elevated levels of IFN- γ have been observed in septic patients, reflecting its involvement in the inflammatory cascade. However, its diagnostic utility is limited due to the intricate balance between pro-inflammatory and anti-inflammatory phases in sepsis, which can influence IFN- γ levels variably.
- **Prognostic Role:** The prognostic significance of IFN- γ in sepsis is nuanced. Some studies suggest that sustained high levels may correlate with adverse outcomes, while others indicate that IFN- γ can help reverse sepsis-induced immunosuppression by promoting metabolic pathways in immune cells. For instance, IFN- γ has been shown to regulate immunosuppression in septic mice by promoting glycolysis through the PI3K/AKT/mTOR pathway.

Additionally, sepsis has been found to impair IFN- γ production in CD8 T cells through changes in local chromatin structure, which may contribute to the immunosuppressive state observed in sepsis survivors.

Cytokine_cytokine receptor pathway:

