Gene name: **FCGR1A**

External Ids for FCGR1A Gene: HGNC: 3613 NCBI Gene: 2209 Ensembl: ENSG00000150337 OMIM®: 146760 UniProtKB/Swiss-Prot: P12314

NCBI Gene Summary: This gene encodes a protein that plays an important role in the immune response. This protein is a high-affinity Fc-gamma receptor. The gene is one of three related gene family members located on chromosome 1.

GeneCards Summary: FCGR1A (Fc Gamma Receptor Ia) is a Protein Coding gene. Diseases associated with FCGR1A include Peritonitis and Pharyngitis. Among its related pathways are ADORA2B mediated anti-inflammatory cytokines production and Regulation of actin dynamics for phagocytic cup formation. Gene Ontology (GO) annotations related to this gene include *obsolete signal transducer activity, downstream of receptor* and *IgG binding*. An important paralog of this gene is FCRLB.

UniProtKB/Swiss-Prot Summary: High affinity receptor for the Fc region of immunoglobulins gamma. Functions in **both innate and adaptive immune responses**. Mediates IgG effector functions on monocytes triggering antibody-dependent cellular cytotoxicity (ADCC) of virus-infected cells. (FCGR1_HUMAN,P12314)

Cellular localization: mostly Cell membrane; Single-pass type I membrane protein.

Full Name: *Fc Fragment of IgG Receptor Ia*
Aliases: CD64, IGFR1, FCG1
Protein Type: High-affinity **Fc gamma receptor** (FcγRI), member of the immunoglobulin superfamily.

🔬 Biological Function of FCGR1A (CD64)

FCGR1A encodes CD64, a high-affinity receptor for the Fc region of IgG. It plays a crucial role in antibody-mediated immune responses, including:

- Phagocytosis
- Cytokine release
- Antigen presentation

⚙️ Key Functions:

1. Opsonization: Binds IgG-coated pathogens → promotes phagocytosis
2. Cytokine modulation: Induces TNF-α, IL-6, IL-1β upon activation
3. Antigen presentation: Facilitates cross-presentation by macrophages and dendritic cells
4. Host defense: Important in clearing bacteria, viruses, and immune complexes

🧫 Expressed In:

- Monocytes

- Macrophages
- Dendritic cells
- Neutrophils (upon activation by IFN-γ)

🦠 FCGR1A in Sepsis

CD64/FCGR1A is one of the most upregulated surface receptors in early sepsis, making it an excellent biomarker and immune effector.

🔥 Early Sepsis:

- Rapidly upregulated (within hours) on neutrophils and monocytes
- Triggered by LPS, IFN-γ, and TNF-α
- Enhances:
    - Pathogen recognition and clearance
      Pro-inflammatory cytokine production
    - Immune cell recruitment

📈 Clinical Relevance in Sepsis

● Diagnostic Marker: Elevated nCD64 expression has been extensively studied as a biomarker for the early detection of sepsis. Meta-analyses have demonstrated that nCD64 exhibits high sensitivity and specificity for diagnosing sepsis in critically ill patients, making it a valuable tool for distinguishing sepsis from non-infectious inflammatory conditions.

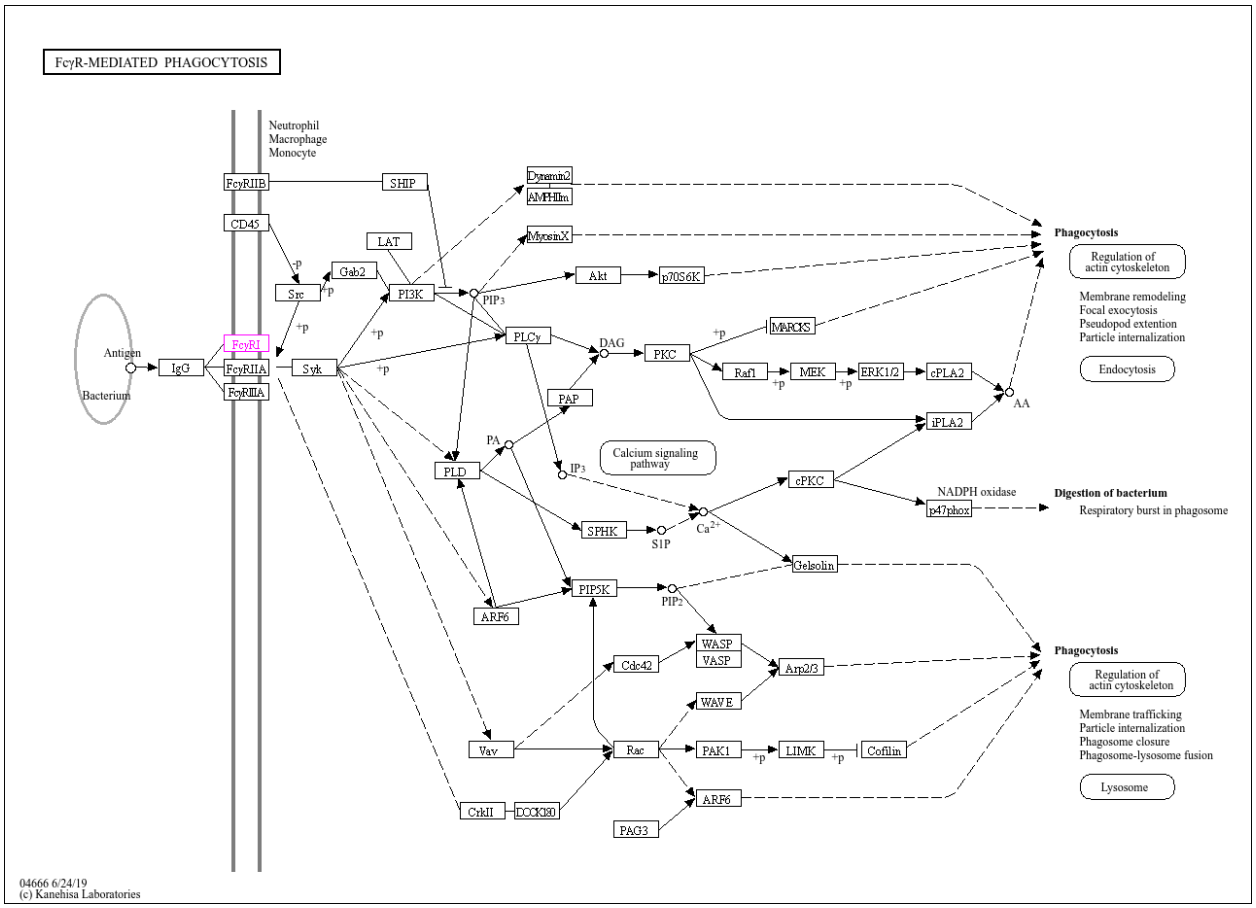
● Prognostic Indicator: Beyond diagnosis, nCD64 levels have been investigated for their prognostic value. Studies suggest that higher nCD64 expression correlates with increased severity of sepsis and may be associated with higher mortality rates, indicating its potential utility in assessing patient prognosis.

🔬 Many hospitals use CD64 index (neutrophil surface expression) as a rapid diagnostic test for early sepsis detection.

🧪 Supporting Literature

Doi: 10.1016/j.cyto.2007.02.007
Doi: 10.1093/cid/cit936

KEGG:



Enrichr-KG: