Gene name: IL1R2 **Previous HGNC Symbols for IL1R2 Gene:** IL1RB
External Ids for IL1R2 Gene: HGNC: 5994 NCBI Gene: 7850 Ensembl: ENSG00000115590
OMIM®: 147811 UniProtKB/Swiss-Prot: P27930
NCBI Gene Summary: The protein encoded by this gene is a cytokine receptor that belongs to the interleukin 1 receptor family. This protein binds interleukin alpha (IL1A), interleukin beta (IL1B), and interleukin 1 receptor, type I(IL1R1/IL1RA), and **acts as a decoy receptor that inhibits the activity of its ligands**. Interleukin 4 (IL4) is reported to antagonize the activity of interleukin 1 by inducing the expression and release of this cytokine. This gene and three other genes form a cytokine receptor gene cluster on chromosome 2q12. Alternative splicing results in multiple transcript variants and protein isoforms. Alternative splicing produces both membrane-bound and soluble proteins. A soluble protein is also produced by proteolytic cleavage.

GeneCards Summary: IL1R2 (Interleukin 1 Receptor Type 2) is a Protein Coding gene. Diseases associated with IL1R2 include Endometriosis and Mastitis. Among its related pathways are Interleukin-1 family signaling and NF-KappaB Family Pathway. Gene Ontology (GO) annotations related to this gene include *interleukin-1 receptor activity* and *interleukin-1, type II, blocking receptor activity*. An important paralog of this gene is IL1RAPL2.

UniProtKB/Swiss-Prot Summary: Non-signaling receptor for IL1A, IL1B and IL1RN. Reduces IL1B activities. Serves as a decoy receptor by competitive binding to IL1B and preventing its binding to IL1R1. Also modulates cellular response through non-signaling association with IL1RAP after binding to IL1B. IL1R2 (membrane and secreted forms) preferentially binds IL1B and poorly IL1A and IL1RN. The secreted IL1R2 recruits secreted IL1RAP with high affinity; this complex formation may be the dominant mechanism for neutralization of IL1B by secreted/soluble receptors. (IL1R2_HUMAN,P27930)
Cellular localization: Cell membrane; Single-pass type I membrane protein

Full Name: Interleukin 1 Receptor Type II (IL1R2), also known as CD121b.
Protein Type: Decoy receptor for interleukin-1 (IL-1) cytokines.
IL1R2 is a member of the interleukin-1 receptor family. Unlike IL1R1, which transduces IL-1 signals leading to inflammatory responses, IL1R2 lacks a cytoplasmic signaling domain and functions primarily as a "decoy" receptor.

🔬 Biological Function of IL1R2

- **Ligand Binding:** Binds IL-1α, IL-1β, and IL-1 receptor antagonist (IL-1Ra), preventing them from interacting with signaling receptors.
- **Signal Inhibition:** By sequestering IL-1 ligands, IL1R2 inhibits the IL-1-mediated inflammatory signaling cascade.

- **Interaction with IL-1RAcP:** Forms non-signaling complexes with IL-1 receptor accessory protein (IL-1RAcP), further dampening IL-1 activity.

- **Soluble Form:** A soluble version of IL1R2 can be shed into the extracellular space, acting as a systemic inhibitor of IL-1.

🦠 Role of IL1R2 in Sepsis

Sepsis is characterized by a dysregulated immune response to infection, leading to systemic inflammation and organ dysfunction. IL1R2 plays a modulatory role in this context:

- **Anti-inflammatory Role:** By acting as a decoy receptor, IL1R2 mitigates the effects of IL-1, a key pro-inflammatory cytokine involved in sepsis pathogenesis.

- **Regulation by Cytokines:** Anti-inflammatory cytokines like IL-4 and IL-13 can upregulate IL1R2 expression, enhancing its inhibitory effects during inflammatory responses.

- **Expression in Immune Cells:** IL1R2 is expressed on various immune cells, including neutrophils and monocytes, which are pivotal in the sepsis-induced inflammatory cascade.

📈 Diagnostic and Prognostic Value

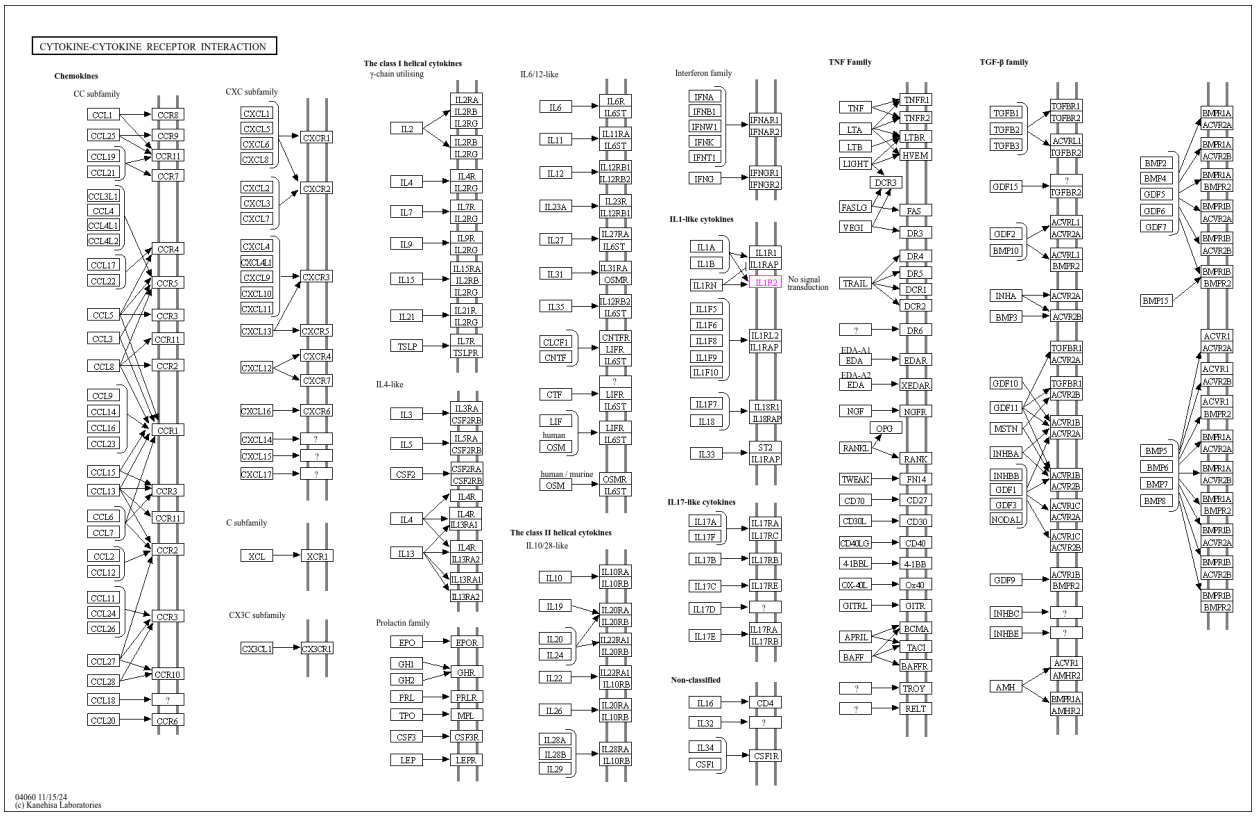
- **Biomarker Potential:** Elevated levels of soluble IL1R2 have been detected in the plasma of sepsis patients, correlating with disease severity and outcomes.

- **Therapeutic Implications:** Modulating IL1R2 levels could offer therapeutic avenues to control excessive inflammation in sepsis.

📚 Supporting Literature

DOI: 10.1097/SHK.0000000000000714
DOI: 10.1016/j.jinf.2024.106300
DOI: 10.1016/j.jinf.2021.05.039

KEGG:



Enrichr-KG: