Interleukin 7 receptor deficiency

GENERAL INFORMATION

Description:

Defective IL7R expression causes T-B+NK+ SCID. Loss of IL-7R function leads to the loss of an antiapoptotic signal, resulting in a loss of T-cell selection in thymus.

Alternative names:

- IL7R
- IL7R deficiency
- IL-7 receptor alpha chain (CD127)

Classification:

- Combined B and T cell immunodeficiencies
  - T⁻B⁺ SCID

Inheritance:

Autosomal recessive

OMIM:

- #600802 Severe combined immunodeficiency, autosomal recessive, T-negative/B-positive type
- *146661 Interleukin 7 receptor; IL7R

Cross references:

Phenotype related immunodeficiencies:

- IDR factfile for X-linked SCID(gamma-chain deficiency)
- IDR factfile for JAK3 deficiency

Incidence:

Incidence it is not known yet.

CLINICAL INFORMATION

Description:

Phenotypically, patients have markedly reduced circulating T cells, an absence of serum Ig in spite of normal B-cell numbers, preserved NK cell numbers and function. Ig levels and NK phenotype are distinct from gamma common chain deficiency, clinically the patients are indistinguishable, with severe and persistent viral and protozoal infections. The recurrent bacterial infections like pneumonia, otitis media, sepsis, persistant viral infections (RSV, enterovirus, parainfluenza, CMV), opportunist infections (Pneumocystis carinii pneumonia) have the onset soon after birth. Other features include failure to thrive and diarrhoea.

Diagnosis:

Diagnostic laboratories:

Clinical:

- Severe combined immunodeficiency, eMedicine
- Severe combined immunodeficiency, eMedicine

Genetic:

- IDdiagnostics

Therapeutic options:

- Treatment of infections with antibacterials, antifungals, and antivirals. Bone marrow transplantation is the only treatment of SCID. Other recommendations include: intravenous gamma-globulin infusion, irradiation of all blood products.
- Gene therapy of human severe combined immunodeficiency (SCID)-X1 disease
- Severe combined immunodeficiency, eMedicine

Research programs, clinical trials:

- Pilot Study of Allogeneic Bone Marrow Transplantation Plus Cyclosporine and Mycophenolate Mofetil to Induce Mixed Hematopoietic Chimerism in Patients With Primary T-Cell Immunodeficiency Disorders, ClinicalTrial.gov
- European Initiative for Primary Immunodeficiencies

GENE INFORMATION

Names:

HUGO name: IL7R
Alias(es): CD127, CDW127, IL-7R-alpha, CD127 antigen, Interleukin 7 receptor, Interleukin 7 receptor alpha chain, Interleukin-7 receptor alpha chain precursor, CDw127

Localization:

Reference sequences:

DNA: M29696 (EMBL) AF043129 (EMBL) , **cDNA:** X58957 (EMBL) , **Protein:** P16871 (SWISSPROT) Other Sequences

Chromosomal Location:

5p13

Maps:

IL7R (Map View)

Markers:

DXS9737, PMC311006P5

Variations / Mutations:

- IL7Rbase; Mutation registry for Interleukin 7 receptor deficiency

Other gene-based resources:

Ensembl: ENSG00000168685, GENATLAS: IL7R, GeneCard: IL7R, UniGene: 362807, LocusLink: 3575, euGenes: 3575, GDB: 127886, HomoloGene: 1646

PROTEIN INFORMATION

Description:

Protein function:

Receptor for interleukin-7

Subunit:

Heterodimer of an alpha chain and a common gamma chain

Subcellular location:

Type I membrane protein (isoforms h20 and h1); secreted (isoform h6)

Protein function:

Event=alternative splicing; named isoforms=3; name=h20; isoid=p16871-1; sequence=displayed; name=h1; isoid=p16871-2; sequence=vsp_001714; name=h6; synonyms=secreted; isoid=p16871-3; sequence=vsp_001713;

Similarity:

Belongs to the type I cytokine family of receptors. Subfamily 4

Database:

Name=prow; note=cd guide cd127 entry;

Domains:

Extracellular domain: 21-239

Cytoplasmic domain: 265-459

Fibronectin type-III domain: 128-224

Ser/Thr-rich domain: 184-189

Other features:

Signal peptide: 1-20

Interleukin-7 receptor alpha chain: 21-459

N-linked (glcnac...) glycosylation sites: 49,65,151,182,232,233

Other related resourses:

PIR: A34791, PIR: B34791, PIR: C34791, InterPro: IPR008957; FN_III-like, InterPro: IPR003961; FN_III, InterPro: IPR003531; Hemtopoptn_S_F1, Pfam: PF00041; fn3, PROSITE: PS01355; HEMATOPO_REC_S_F1

Expression pattern for human:

Tissue	Exp. (%)	Clones
pooled	16.47	8:5702
alveolar macrophage	13.11	1:895
leukopheresis	9.06	6:7769
large cell carcinoma, undifferentiated	6.70	3:5253
lymphocyte	6.35	1:1849
prostate	5.25	1:2237
senescent fibroblast	3.70	3:9520
fibrosarcoma	3.16	1:3710
lung focal fibrosis	3.00	1:3912
lung	2.76	3:12769
pooled	16.47	8:5702
alveolar macrophage	13.11	1:895
leukopheresis	9.06	6:7769
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lung	2.76	3:12769

Animal models:

Mouse:

MGD: ; Il7r, NCBI Gene: ; 16197 (64.25 % aminoacid similarity to human)

Rat:

NCBI Gene: ; 294797 (66.23 % aminoacid similarity to human)

OTHER RESOURCES

Societies:

General:

- International Patient Organization for Primary Immunodeficiencies
- Immune Deficiency Foundation
- NIH/National Institute of Allergy and Infectious Diseases
- European Society for Immunodeficiencies