γ1 isotype deficiency

GENERAL INFORMATION

Description:

Immunoglobulin G sublass deficiency is defined as a decrease of an IgG sublass greater than 2 standard deviations below the normal mean for age. One or more IgG subclasses and other Ig isotypes may be involved. This deficiency may be isolated or associated with other immunodeficiencies (IgA deficiency, ataxia-telangiectasia).

Classification:

- Deficiencies predominantly affecting antibody production
  - Selective deficiency of IgG subclass, IgE and/or IgA class or subclass

Inheritance:

Autosomal recessive

OMIM:

- *147100 IgG heavy chain locus; IGHG1

Cross references:

Phenotype related immunodeficiencies:

- IDR factfile for γ2 isotype deficiency
- IDR factfile for partial γ3 isotype deficiency
- IDR factfile for γ4 isotype deficiency

Incidence:

Incidence is not known.

CLINICAL INFORMATION

Description:

IgG sublass deficiency is clinically significant only if an impaired response to bacteria such as tetanus, diphteria, and pneumococcus occurs. Antitetanus and antidiphteria antibodies (IgG1) should be checked if the titers for total Igs are normal. Presentation, CVID like, is possible at any age. Patients can have recurrent infections, bronchiectasis, asthma, sinusitis, autoimmune disease.

Diagnosis:

Diagnostic laboratories:

Clinical:

- IgA and IgG subclass deficiencies, eMedicine

Genetic:

- Molecular Haematology Department - Royal Hallamshire Hospital (Sheffield), EDDNAL

Therapeutic options:

- Only symptomatic patients should be treated. Antibiotic therapy in case there are recurrent infections followed by (intravenous) Ig if infections are not controlled.
- Immunoglobulin G deficiency, eMedicine
- Hypogammaglobulinemia, eMedicine
- IgA and IgG subclass deficiencies, eMedicine

Research programs, clinical trials:

- Improved Healthcare for Patients with Primary Antibody Deficiencies through new Strategies Elucidating their Pathophysiology (IMPAD)
- European Initiative for Primary Immunodeficiencies
- Immune Regulation in Patients with Common Variable Immunodeficiency and Related Syndromes, ClinicalTrials.gov

GENE INFORMATION

Names:

HUGO name: IGHG1
Alias(es): Immunoglobin heavy constant gamma 1 (G1m marker), immunoglobulin gamma 1 (Gm marker), Ig gamma-1 chain C region

Localization:

Reference sequences:

DNA: J00228 (GenBank) , **cDNA:** AB066922 (GenBank) , **Protein:** P01857 (SWISSPROT)

Chromosomal Location:

14q32.33

Maps:

IGHG1 (Map View)

Other gene-based resources:

Ensembl: ENSG00000177145, GENATLAS: IGHG1, GeneCard: IGHG1, UniGene: 525648, Entrez Gene: 3500, euGenes: 3500, GDB: 120085, IMGT: IGHG1

PROTEIN INFORMATION

Description:

Miscellaneous:

Nie has the g1m(17) allotypic marker, 97-k, & the g1m(1) markers, 239-d & 241-l. Kol & eu sequences have the g1m(3) marker & the g1m (non-1) markers.

Structures (PDB):

1FC1 Crystallographic refinement and atomic models of a human Fc fragment and its complex with fragment B of protein A from Staphylococcus aureus at 2.9- and 2.8-A resolution.

1FC2 Crystallographic refinement and atomic models of a human Fc fragment and its complex with fragment B of protein A from Staphylococcus aureus at 2.9- and 2.8-A resolution.

Domains:

Ch1 domain: 1-98

Hinge domain: 99-110

Ch2 domain: 111-223

Ch3 domain: 224-330

Other features:

Disulfide bond interchain (with light chain):
103

Disulfide bond interchain (with heavy chain):
109

Disulfide bond interchain (with heavy chain):
112

Disulfide bonds: 27-83, 144-204, 250-308

Other related resourses:

PIR: GHHU, InterPro: IPR003006; Ig_MHC, InterPro: IPR003597; Ig_c1, Pfam: PF00047; ig, SMART: SM00410; IG_like, SMART: SM00407; IGc1, PROSITE: PS00290; IG_MHC

Expression pattern for human:

Animal models:

Mouse:

MGD: ; Igh-1

Fly:

euGenes: ; Toll-7

OTHER RESOURCES

Societies:

General:

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