AID deficiency

GENERAL INFORMATION

Description:

Hyper-IgM syndrome type 2 (HIGM2) is characterized by normal or elevated serum IgM levels with absence of IgG, IgA, and IgE, resulting in a profound susceptibility to bacterial infections. There is an absence of immunoglobulin class switch recombination (CSR), a lack of immunoglobulin somatic hypermutations, and lymph node hyperplasia caused by the presence of giant germinal centers. This is an autosomal recessive disorder responsible for approximately 30% of Ig deficiencies with increased IgM.

Alternative names:

- HIGM2
- Activation-induced cytidine deaminase deficiency
- Activation-induced cytidine deaminase
- Non-X-linked hyper-IgM syndrome
- Hyper-IgM syndrome 2
- Autosomal recessive hyper-IgM immunodeficiency
- Autosomal recessive hyper-IgM syndrome

Classification:

- Deficiencies predominantly affecting antibody production
  - Defects of class-switch recombination and somatic hypermutation (Hyper-IgM syndromes) affecting B cells

Inheritance:

Autosomal recessive

OMIM:

- #605258 Immunodeficiency with hyper-IgM, type 2
- *605257 Activation-induced cytidine deaminase; AICDA

Cross references:

Incidence:

1: 2,000,000 births/year

CLINICAL INFORMATION

Description:

There is usually an early onset; the diagnosis should always be considered when Pneumocystis pneumonia is causing illness. Symptoms are similar to those in XHIM syndrome, with increased risk of neutropenia, thrombocytopenia, hemolytic anemia, and gastrointestinal and liver involvement.
The clinical features associate a particular susceptibility to bacterial infections affecting essentially the upper respiratory tract and enlargement of secondary lymphoid organs.
The complications include i.e: IgM lymphomas, opportunist pneumonias, autoimmune disease, and aplastic anaemia. There is a particular risk of Cryptosporidial infection of the biliary tree, leading to a severe cholangitis and liver failure.

Diagnosis:

Diagnostic laboratories:

Clinical:

- Molecular diagnosis of autosomal reccessive hyper-IgM syndrome, ORPHANET

Genetic:

- AICDA, GeneTest

Therapeutic options:

- (Intravenous) immunoglobulins started early to achieve residual IgG level>8g/l. This treatment leads to a decreased number of infections and diminishes or normalizes IgM levels. The lymphoid hyperplasia is not influenced by treatment. In case of enlarged lymphadenopathies there is need for surgical resection or biopsy.
- Hypogamaglobulinemia, eMedicine

Research programs, clinical trials:

- European Initiative for Primary Immunodeficiencies

GENE INFORMATION

Names:

HUGO name: AICDA
Alias(es): AID, CDA2, HIGM2, activation-induced cytidine deaminase

Localization:

Reference sequences:

DNA: AB040430 (EMBL) , **cDNA:** AB040431 (EMBL) , **Protein:** Q9GZX7 (TrEMBL) Other Sequences

Chromosomal Location:

12p13

Maps:

AICDA (Map View)

Variations / Mutations:

- AICDAbase; Mutation registry for non-X-linked hyper-IgM syndrome

Other gene-based resources:

Ensembl: ENSG00000111732, GENATLAS: AICDA, GeneCard: AICDA, UniGene: 149342, Entrez Gene: 57379, euGenes: 57379, GDB: 10796899

PROTEIN INFORMATION

Description:

Other features:

Other related resourses:

InterPro: IPR002125; dCMP/cyt_deam, PROSITE: PS00903; CYT_DCMP_DEAMINASES

Expression pattern for human:

Tissue	Exp. (%)	Clones
B-cells	53.22	17:16554
B cells from Burkitt lymphoma	24.18	1:2143
pool, lung+testis+B-cell	5.57	6:55819
germ cell	5.16	2:20100
tonsil, enriched for germinal center B-cells	4.25	3:36605
lymph	3.92	5:66155
unclassified	1.99	2:52050
kidney	0.88	2:117781
pool, liver+spleen	0.84	1:61534

Animal models:

Mouse:

MGD: ; Aicda

Fly:

euGenes: ; CG6107

C.elegans:

euGenes: ; gon-1

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

Other information sources:

- Understanding Hyper-IgM syndrome, PIA
- Hyper IgM Syndrome, Genetic Information and Patient Services, Inc. (GAPS)