

Immunoglobulin Isotypes



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IgM

(IgM) Mountain-goblin

IgM fixes complement. It has a monomer shape on the B cell, but it will be a pentamer shape with a J chain when it's secreted. Pentamer shape allows avid binding to antigen while humoral response develops. It is the first antibody to be produced.

Primary Immune Response

(1) Wand Immune-moon

IgM is produced in the primary immune response against antigens. It can be memorized by the presence of "M" in iMMediate. "iMMediate" responds to antigen.

Cold Agglutinin Autoimmune Hemolytic Anemia (C-AIHA)

Cold-ice with A-gluing Auto-in-moon Anemone

IgM is associated with C-AIHA, which is characterized by the presence of IgM autoantibodies that bind to the surface of RBCs at cold temperatures, leading to extravascular hemolysis.

IgG

(IgG) Gold-goblin

IgG is the main antibody used in the secondary response to antigens. It is the most abundant immunoglobulin subtype found in serum. It fixes complement, neutralizes bacterial toxins and viruses, and opsonizes bacteria.

Crosses Placenta

Cross-sign Placenta-present

IgG is the only immunoglobulin subtype that can cross the placenta, and infants use it as passive immunity.

Warm Agglutinin Autoimmune Hemolytic Anemia (W-AIHA)

Warm-sun with A-gluing Auto-in-moon Anemone

IgG is associated with W-AIHA, characterized by IgG autoantibodies that bind to the surface of RBCs at body temperature, leading to extravascular hemolysis.

IgA

(IgA) Apple-goblin

IgA prevents bacteria and viruses from attaching to mucous membranes in the body, such as the GI tract and airways. It mainly proceeds in the GI tract at the Peyer patches. It has a monomer shape in circulation, but it can be in a dimer shape if it's secreted. This immunoglobulin subtype differs from IgM and IgG because it does not fix complement.

Released in Secretions, Mucosal Fluids, and Breast Milk

Secretions

IgA is released in secretions (e.g., saliva, tears), mucosal fluids, and breast milk. It is the body's most produced antibody but has a lower serum concentration. IgA can protect the body against gut infections such as Giardia.

IgD

(IgD) Detective-goblin

IgD has an unknown function but is expressed on the surface of B cells as a B-cell receptor for antigens. It is found to be low in serum, and IgD co-expressed with IgM as a receptor on B-cells.

IgE

(IgE) Electric-goblin

IgE has a key role in type I hypersensitivity, and it binds to antigens on parasites and allergens. It has the ability to bind mast cells and basophils.

Against Parasitic Worms

Against Worms

IgE activates eosinophils against parasitic worms. This activation releases a major basic protein that is toxic to parasites.

Allergic Reaction

Allergy-alligator Reaction

IgE binds to mast cells and basophils. It cross-links when exposed to an allergen, releasing inflammatory mediators, such as histamine, which mediates allergic reactions (type I hypersensitivity) and anaphylaxis.