

Antibody Isotypes

Antibodies can come in different varieties known as isotypes or classes. In placental mammals there are five antibody isotypes known as IgA, IgD, IgE, IgG and IgM. They are each named with an “Ig” prefix that stands for immunoglobulin, another name for antibody, and differ in their biological properties, functional locations and ability to deal with different antigens, as depicted in the table.

The antibody isotype of a B cell changes during cell development and activation. Immature B cells, which have never been exposed to an antigen, are known as naïve B cells and express only the IgM isotype in a cell surface bound form. B cells begin to express both IgM and IgD when they reach maturity—the co-expression of both these immunoglobulin isotypes renders the B cell ‘mature’ and ready to respond to antigen. B cell activation follows engagement of the cell bound antibody molecule with an antigen, causing the cell to divide and differentiate into an antibody producing cell called a plasma cell. In this activated form, the B cell starts to produce antibody in a secreted form rather than a membrane-bound form. Some daughter cells of the activated B cells undergo isotype switching, a mechanism that causes the production of antibodies to change from IgM or IgD to the other antibody isotypes, IgE, IgA or IgG, that have defined roles in the immune system.

Antibody isotypes of mammals

Name	Types	Description
IgA	2	Found in mucosal areas, such as the gut, respiratory tract and urogenital tract, and prevents colonization by pathogens. Also found in saliva, tears, and breast milk.
IgD	1	Functions mainly as an antigen receptor on B cells that have not been exposed to antigens. It has been shown to activate basophils and mast cells to produce antimicrobial factors.
IgE	1	Binds to allergens and triggers histamine release from mast cells and basophils, and is involved in allergy. Also protects against parasitic worms.
IgG	4	In its four forms, provides the majority of antibody-based immunity against invading pathogens. The only antibody capable of crossing the placenta to give passive immunity to fetus.
IgM	1	Expressed on the surface of B cells and in a secreted form with very high avidity. Eliminates pathogens in the early stages of B cell mediated (humoral) immunity before there is sufficient IgG.

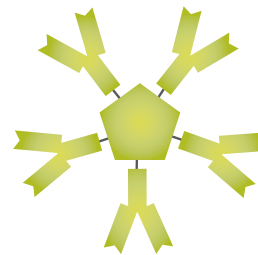
Antibody Complexes



Monomer
IgD, IgE, IgG

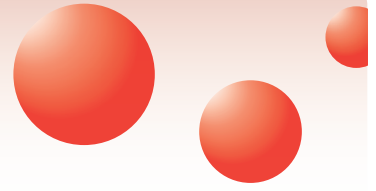


Dimer
IgA



Pentamer
IgM

Antibody Isotypes



REFERENCES

^ Woof J, Burton D (2004). "Human antibody-Fc receptor interactions illuminated by crystal structures". *Nat Rev Immunol* 4 (2): 89–99. doi :10.1038/nri1266. PMID 15040582.

^ Goding J (1978). "Allotypes of IgM and IgD receptors in the mouse: a probe for lymphocyte differentiation". *Contemp Top Immunobiol* 8: 203–43. PMID 357078.

Adapted from Wikipedia, the free encyclopedia.