

Antibody Isotypes

General Info:	<p>IgM, IgG, and IgA are the isotypes found mainly in blood, lymph, and extracellular spaces</p> <p>hinge regions are present in G, A, and D (not M or E)</p> <p>light chain isotypes: kappa and lambda</p>
IgG	<p>150 kD</p> <p>monomers</p> <p>four different subclasses: (IgG1, IgG2, IgG3, IgG4)</p> <p>found in vascular/extravascular spaces as well as secretions</p> <p>most abundant immunoglobulin in blood</p> <p>bulk of immunity to most blood-borne infectious agents</p> <p>with IgM, functions to prevent blood-borne infection (septicemia)</p> <p>only antibody to cross placenta and provide passive immunity to developing and newborn baby</p> <p style="padding-left: 20px;">babies have level of IgG protection in plasma equal to mother</p> <p style="padding-left: 20px;">transport across placenta is also mediated by FcRB</p> <p style="padding-left: 20px;">decreases gradually; IgG levels are lowest in infants aged 3-12 months</p> <p>actively transported from blood into extracellular spaces by FcRn (Brambell receptor) receptor present on endothelial cells</p> <p style="padding-left: 20px;">2 molecules of FcRB bind to Fc region of one IgG</p> <p style="padding-left: 20px;">IgG delivery to extracellular spaces in connective tissues --> protects IgG from degradation of serum proteins</p> <p>used to neutralize microbial toxins and animal venoms</p>
IgA	<p>monomers and dimers</p> <p style="padding-left: 20px;">monomeric IgA enters extracellular spaces; helps IgG protect against bacteria and virus particles</p> <p style="padding-left: 20px;">with IgM and IgG, provide Ag-binding within fluids and tissues of the body</p> <p>dimeric IgA made in secondary LT underlying mucosal surfaces</p> <p style="padding-left: 20px;">GI tract, eyes, nose, throat, mammary glands, respiratory, urinary, and genital tracts</p> <p style="padding-left: 20px;">made in lamina propria (connective tissue underlying basement membrane of mucosal epithelium)</p> <p style="padding-left: 20px;">transported to other side of epithelium by receptors on basolateral surface of epithelial cells</p> <p style="padding-left: 40px;">When transported across epithelial barriers, bound by J chain, bound by poly-Ig receptor on basolateral surface of epithelial</p> <p style="padding-left: 40px;">After transcytosis, released into apical surface</p> <p style="padding-left: 40px;">poly-ig receptor cleaves and releases IgA; IgA still bound to secretory component (fragment of poly-ig receptor)</p> <p>present in external secretions (colostrum, milk, saliva)</p> <p style="padding-left: 20px;">baby receives IgA from mother in milk --> transferred to baby's gut --> bind to microorganisms in gut preventing attachment to gut epithelium --> passes in feces</p> <p>also contains secretory chain and J chain</p> <p>first line of defense against microbes at mucosal surfaces (respiratory, gastrointestinal, and genitourinary tracts)</p>

	<p>more IgA is made than any other isotype (highest concentrations throughout the body) used to neutralize microbial toxins and animal venoms</p>
IgM	<p>900 kD pentamers first antibody produced by B cells during immune response composed of 5 four-chain units with 10 combining sites high avidity very efficient early on, before IgG has been produced pentameric nature --> strong binding but large size (reduced ability to leave blood and also no IgM Fc receptors on phagocytic cells or leukocytes --> IgM can't directly recruit these cells) with IgM, functions to prevent blood-borne infection (septicemia) 10 binding sites --> low affinity, high avidity</p>
IgD	<p>monomers present in low quantities in circulation functions primarily as antigen receptor on B cells B cells express both IgM and IgD that are specific for same antigen relatively unknown</p>
IgE	<p>monomers very low levels enhances acute inflammation and provides protections from worms binds to high-affinity Fc receptors on mast cells, basophils, and activated eosinophils cross-linking of receptors by antigen causes release of histamine from mast cells--> inflammation --> recruits cells FcεRI has high affinity for IgE allergic reactions IgE binds to receptors on mast cells that are specific for Fc regions (constant regions) triggers release of histamine</p>