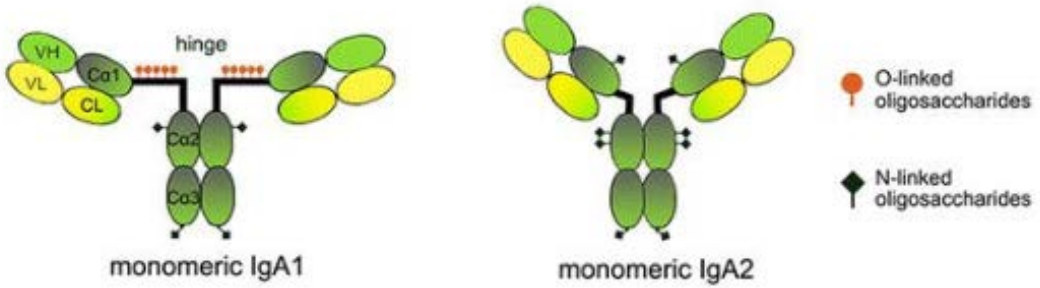
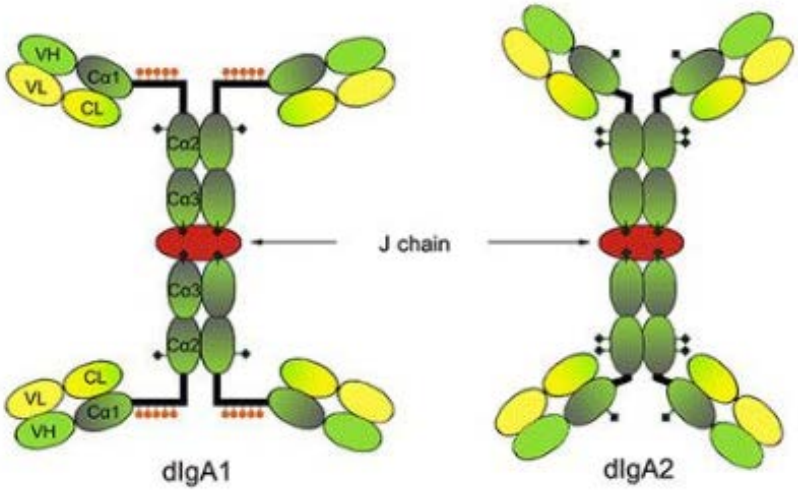


IgAの単量体



IgAの二量体
これにはJ鎖がついて
二量体を形成して
います。

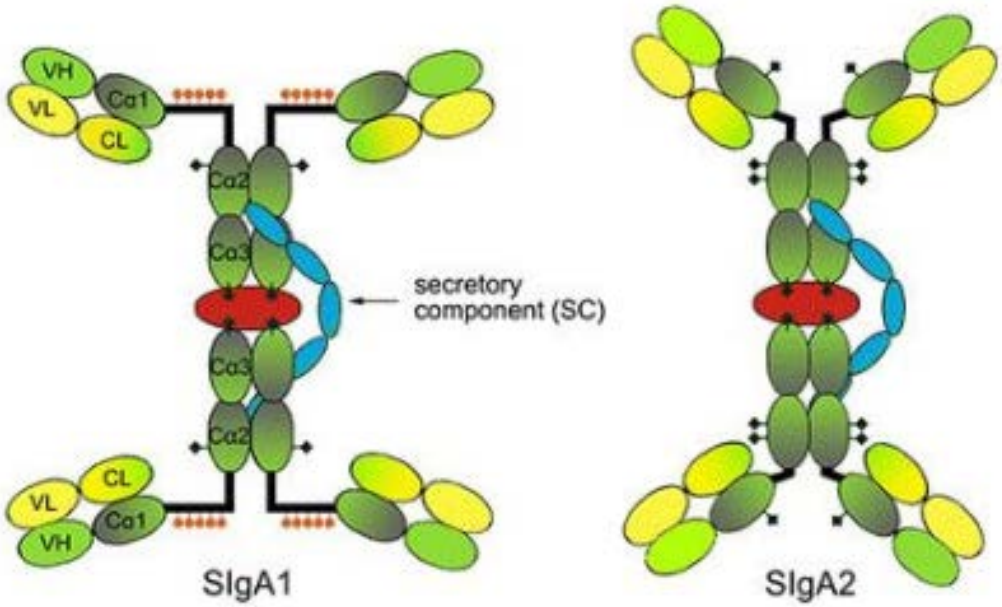


Figure 1

Human IgA1 and IgA2 molecules as monomers, dimers (dIgA1 and dIgA2, respectively) and as secretory forms (SIgA1 and SIgA2, respectively). Green, heavy chain; yellow, light chain; red, J chain; blue, secretory component (SC); orange, O-linked oligosaccharides in the IgA1 hinge region. N-linked oligosaccharides are shown at the approximate locations in both IgA1 and IgA2 molecules.

二量体に分泌成分のScが付いたが分泌型IgAです。

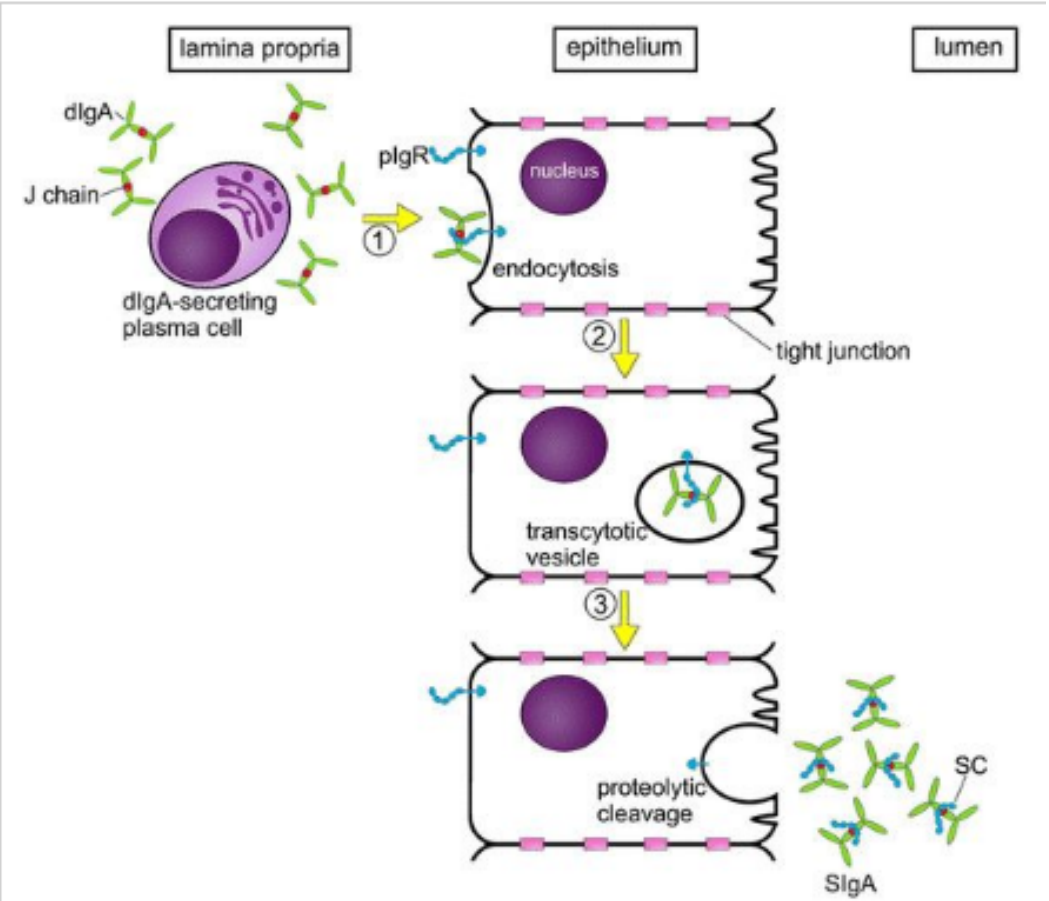


Figure 2

Formation of SIgA. Dimeric IgA (dIgA) is produced by mature plasma cells in the lamina propria; these cells also produce J chains. Step 1, dIgA interacts with the polymeric immunoglobulin receptor (pIgR; shown in blue) on the basolateral surface of epithelial cells. Step 2: export of dIgA across the epithelial cells is mediated by pIgR. Step 3: pIgR undergoes proteolytic cleavage at the luminal side, which results in the generation of secretory component (SC) that is retained by dIgA molecules, giving rise to secretory IgA (SIgA).

J鎖のあるIgAが
上皮に取り込まれて
更に分泌成分のSCと結合し
分泌型のIgAとして
外に分泌されます。

In human serum, approximately 90% of IgA consists of IgA1 and 10% of IgA2 [8]. In contrast, the ratio of IgA1 and IgA2 varies in different mucosal fluids, with IgA1 percentages in male genital secretions and nasal fluids reaching 80-90% and 60% in saliva [18]. Female genital secretions and rectal fluids contain approximately 60% IgA2. Human colostrum was reported to have even higher ratios of IgA2 compared to IgA1; the concentrations of both components decreased during the time of lactation to significantly lower levels in mature milk [19].

IgA in serum is mainly monomeric with dimeric or polymeric forms ranging from <1% to 20% [2]. Polymeric forms of serum IgA include trimers and tetramers.

In mucosal fluids, the major IgA form is secretory IgA (SIgA). It is generated from dimeric (dIgA) secreted locally from mature mucosal plasma cells; dIgA consists of two IgA monomers linked covalently via their Fc portions to the joining (J) chain. The secretory component (SC) is added during the passage of dIgA across the epithelial layer (see below). The open hinge region in SIgA1 makes this molecule more susceptible than SIgA2 to proteolytic cleavage by proteases derived from bacterial pathogens, such as *Haemophilus influenzae* and *Neisseria meningitidis* [20]-[22]. It is currently not known whether SIgA1 and SIgA2 exhibit differential susceptibility to proteolytic cleavage by normal microbial flora in the various mucosal fluids.

The generation of SIgA

In contrast to serum IgA, which is derived from plasma cells in the bone marrow, SIgA is generated locally by plasma cells located in the lamina propria below the epithelium; these cells secrete dIgA, including J chains. After release, the dIgA molecules bind to the polymeric immunoglobulin receptor (pIgR) [23],[24], a transmembrane glycoprotein of the Ig superfamily with five extracellular domains expressed on the basolateral surfaces of mucosal epithelial cells (step 1, Figure 2). Following binding to pIgR, the dIgA-pIgR complex is endocytosed and transported across the epithelial cell in a vesicle (step 2, Figure 2). The J chain is crucial for the formation of the pIgR-dIgA complex and offers a binding site for the pIgR [25]. On the apical side, the complex is released into the lumen, a process during which proteases cleave off SC from the pIgR (step 3, Figure 2). The final product, SIgA, is released into the lumen either as dimer or higher-order multimers and likely interacts with mucus. Such interactions differ from those of IgG, which is also present in mucosal secretions [26]. It is also possible that SIgA1 and SIgA2 bind differentially to mucus, given their differences in structure and glycosylation patterns. Interestingly, free pIgR can also transcytose to the apical surface and undergo proteolytic cleavage, which results in the release of free SC into mucosal secretions [27]-[29].