Release of Immunoglobulins in Different Mucosal Linings

Macanes Tae*

Department of Immunology, Iran University of Science, Tehran, Iran

***Corresponding author:** Macanes Tae, Department of Immunology, Iraq University College, Basra, Iran, E-mail: macanestae@gmail.com

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Description

The mucosal immune system is presently in automatically and physiologically diverse tissues, including the gastrointestinal tract, nasopharynx, oral cavity, lung, eye and urogenital tract. Although these compartments share many features the mucosal immune systems of the tissues also directly distinct characteristics, probably reflecting the anatomical and functional requirements at diverse mucosal sites.

Ocular mucosal system and its immunoglobulins

Tears contain relatively high levels of secretory Immunoglobulin A, the dominant immune globulin in ocular fluid with small amounts of monomeric immunoglobulins A and immunoglobulins G antibodies. Reflecting the dominance of immunoglobulin and antibodies in, lacrimal glands contain large numbers of Immunoglobulin A producing cells. The proportion of IgA1-producing cells relative to IgA2-producing cells corresponds to the proportion of IgA1 to IgA2 in tears. Approximately 10% of the Ig-secreting cells produce IgD of unknown functional importance. Importantly lacrimal gland acini and ducts express the polymeric Ig receptor, a key element in the formation of SIgA and its transportation. Induction of antigens in ocular mucosa induces antigenspecific SIgA responses in the ocular and nasal cavities, as well as systemic Immunoglobulin G antibody responses. The tear duct associated lymphoid tissues in the conjunctival sac are connected via the tear duct to nasal cavity.

Oral cavity association with mucosal systems and its immunoglobulins

Saliva consists of fluids derived from large salivary glands, small salivary glands and crevicular fluid. The variable contribution of these tissues and crevicular fluid to the immunoglobulin pool in saliva depends on the periodontal health of the oral cavity. SIgA is dominant in secretions of all salivary glands, with a composition of about 60% IgA1 and 40% IgA2. IgG and IgM are present in small quantities. In contrast, the crevicular fluid contains mainly plasma derived proteins and IgG isotype. In the oral cavity the mucosal and systemic Ig contributions depend on the stage of oral health. In advanced periodontal disease, the proportion of plasma derived IgC antibodies in the Ig pool in whole saliva increases substantially. The local application of antigen to the buccal mucosa, labial mucosa or gingiva stimulates very low antigen specific immune responses.

Mucosal layer of upper respiratory tract and its immunoglobulins

In nasal secretions, which are a major component of the surface barrier in the upper respiratory tract, IgA constitutes about 70% of the Ig pool. Reflecting the dominance of IgA, nasal mucosa contains large numbers of IgA producing cells, particularly of the IgA1 isotype. Approximately, 20% of Ig in nasal secretions is represented by IgG, derived mostly from the circulation with limted local production. Thus, antigen specific IgG antibodies appear in nasal secretions after systemic immunization. In sharp contrast to the predominance of IgA seems to be derived predominantly from the circulation.

Mammary glands mucosa system and related immunoglobulins

Early milk, called colostrum and milk collected at later stages of lactation contain high levels of SIgA and small amounts of monomeric IgA, SIgM and IgG. The subclass distribution varies between donors and on average the proportion of IgA1 slightly exceeds that of IgA2, resembling the distribution of IgA subclasses in the adult small intestine. Humoral immune responses can be induced by the oral administration of antigens; the effectiveness of intranasal, rectal or sublingual immunization routes in the induction of SIgA antibodies in milk has not yet been evaluated in humans. Interestingly, the injection of antigen into lactating mammary glands in experimental animals induces weak local IgA and usually strong IgG responses. Antibodies in human milk refelects the maternal exposure to orally and intestinally encountered antigens and thus provide an appropriate