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Phylogeny and Mucosal System of Gnathostomes and Agnathans

Karashi Shama Shama*

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

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All animals, vertebrate or invertebrates, faces the challenges of combating pathogens while maintaining a tolerant relationship with symbiotic microorganisms. Tolerance to symbiotic is not a static or inert interaction but rather, required continuous active regulation of the front lines for these interactions with the mucosal surfaces. A fundamental question is whether or not specialized immune cells or organs have evolved in all animals to cope with the unique problems of mucosal defence, or whether specialized mucosal immunity is unique to vertebrates such as mammals [1]. is question can be answered by investigating the phylogeny of the mucosal and systemic immune system, from invertebrates to sh, amphibians, reptiles and birds to prototherians, the metatherians and eutherians. ere is also, an extremely practical reason for studying phylogeny of many species and su er from diseases of mucosal surfaces so that producing mucosal vaccines against sh pathogens is arguably as important to humankind as producing vaccines against the mucosal pathogens of mammals. Most of the paradigms for immune defences and symbiosis were established from studies of humans and a few other mammalian species such as rodents. Although these studies have provided more than a century of discovery and progress, much has also been learned from non-mammalian vertebrates as well as invertebrates, particularly over the past two decades [2-4].

e unique aspect of adaptive immune system is the generation of diverse receptors from germ line DNA. Among the animal phyla, the chordates arguably exhibit the greatest diversity in immune systems. Vertebrates are divided into Gnathostomes and Agnathans. ese two lineages have adaptive immune systems that followed very di erent evolutionary paths while maintaining some common features. Both lineages use lymphocytes as the major cell type mediating adaptive immunity [5].

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ese lymphocytes express cell surface, antigen speci c and clonally unique receptors. In all gnathostomes, the T-cell antigen receptors are composed of a heterodimers. e genes encoding these four chains are highly conserved both in sequence and organization from sharks to mammals, leading to the conclusion that the TCR performs common functions across all the gnathostomes lineages, principally as recognition, Unlike antibodies that serve both as signalling receptors and are also secreted, the TCR serves solely to recognize antigenic epitopes when they meet a threshold of binding a nity. e requirement of recognizing antigenic peptides and glycolipids presented on molecules encoded by the major histocompatibity complex has further contained the evolution of T cell receptors. e relationship between Tcell receptor and major histone compatibility complex is also ancient in the gnathostomes and conserved in all living species [6].

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In agnathans there are discrete lymphocyte subsets. One subset does not secrete its antigen receptor but is capable of producing cytokines that regulate other cell types. In gnathostomes these are the T cells whereas in agnathans they are lymphocytes. Also present is subset that is capable of producing its antigen receptor both as cell surface receptor and as a secreted molecule, o en in a polymeric form. ese are the B cells in gnathostomes and lymphocytes in agnathans. erefore, the paradigm of the dichotomy between B and t cells in mice and humansproably arose in a common vertebrate ancestor more than 500 million years ago, before the evolution of the thymus, spleen, TCR, Immunoglobulin's, and other structures with which most immunologists are familiar [7].

Agnathans and Gnathosmata are two groups of organisms that live in aquatic environments. e primitive forms of both groups are extinct, they are vertebrates, both have a cartilaginous skull, and they show great importance in determining the evolutionary relationships of higher organisms.

Agnathans and Gnathostomata are two varied groups of sh that show very early evolutionary patterns. e key di erence between agnathans and Gnathostomata is the possession of a jaw. Agnathans do not possess a jaw while Gnathostomata possesses true jaws. Besides, a further di erence between agnathans and Gnathostomata is that the Gnathostomes possess paired appendages and ns, while the Agnathans do not possess paired appendages and ns [8].

Agnathans and Gnathostomata are two groups of sh. Both are vertebrates, and they live in aquatic environments. Importantly, they show great signi cance in evolutiodehce i98(n)19(n)(3)6(9(n)19(917wp(-b513)9(n)4(di erence between Agnathans and Gnathostomata is the presence or absence of the jaw. at is; the Agnathans do not possess jaws, while the Gnathostomata possess jaws. ey also di er in the fact that only Gnathostomata possess appendages as ns. So, this is the summary of the di erence between Agnathans and Gnathostomata [9, 10].

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None

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None

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***Corresponding author:** Karashi Shama Shama, Department of Immunology, Iran University of Science, Tehran, Iran, E-mail: karashishama@gmail.com

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