

## A Galectin from Rock Bream *Oplegnathus fasciatus*: Molecular Characterization and Immunological Properties

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**Abstract :** In fish, innate immune defense is the first immune response against microbial pathogens which consists of several antimicrobial components. Galectins are one of the carbohydrate binding lectins that have the ability to identify pathogen by recognition of pathogen associated molecular patterns. Galectins play a vital role in the regulation of innate and adaptive immune responses. Rock bream *Oplegnathus fasciatus* is one of the most important cultured species in Korea and Japan. Considering the losses due to microbial pathogens, present study was carried out to understand the molecular and functional characteristics of a galectin in normal and pathogenic conditions, which could help to establish an understanding about immunological components of rock bream. Complete cDNA of rock bream galectin like protein B (rbGal like B) was identified from the cDNA library, and the in silico analysis was carried out using bioinformatic tools. Genomic structure was derived from the BAC library by sequencing a specific clone and using Spidey. Full length of rbGal like B (contig14775) cDNA containing 517 nucleotides was identified from the cDNA library which comprised of 435 bp in the open reading frame encoding a deduced protein composed of 145 amino acids. The molecular mass of putative protein was predicted as 16.14 kDa with an isoelectric point of 8.55. A characteristic conserved galactose binding domain was located from 12 to 145 amino acids. Genomic structure of rbGal like B consisted of 4 exons and 3 introns. Moreover, pairwise alignment showed that rock bream rbGal like B shares highest similarity (95.9 %) and identity (91 %) with *Takifugu rubripes* galectin related protein B like and lowest similarity (55.5 %) and identity (32.4 %) with *Homo sapiens*. Multiple sequence alignment demonstrated that the galectin related protein B was conserved among vertebrates. A phylogenetic analysis revealed that rbGal like B protein clustered together with other fish homologs in fish clade. It showed closer evolutionary link with *Takifugu rubripes*. Tissue distribution and expression patterns of rbGal like B upon immune challenges were performed using qRT-PCR assays. Among all tested tissues, level of rbGal like B expression was significantly high in gill tissue followed by kidney, intestine, heart and spleen. Upon immune challenges, it showed an up-regulated pattern of expression with *Edwardsiella tarda*, rock bream irido virus and poly I:C up to 6 h post injection and up to 24 h with LPS. However, In the presence of *Streptococcus iniae* rbGal like B showed an up and down pattern of expression with the peak at 6 - 12 h. Results from the present study revealed the phylogenetic position and role of rbGal like B in response to microbial infection in rock bream.

**Keywords :** galectin like protein B, immune response, *Oplegnathus fasciatus*, molecular characterization

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