

# THE EXPRESSION ANALYSIS OF *PER1* GENE IN *FUGU*, *TAKIFUGU RUBRIPES* ADMINISTERED WITH IMMUNOSTIMULANTS

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## ABSTRACT

Circadian rhythms are physical, mental and behavioral changes that follow a roughly 24-hour cycle, responding primarily to light and darkness in an organism's environment. These changes occur in most living organisms, including animals, plants and many microbes. Circadian rhythm oscillations are the daily changes in physiology and are due to involvement of numerous genes whose expression peaks and declines approximately 12 hrs apart to undergo a full cycle within 24 hrs. These circadian rhythm controlling genes are called as clock genes that include *Bmal*, *Clock*, *Period (per)* and *Cry* genes in mammals. In recent years, it has been known that clock genes regulate various physiological activities including immune response. But there is little or no information on these genes and their functions in fish. Therefore, cloning of the Japanese pufferfish, *Takifugu rubripes per1* gene was conducted, and expression pattern of the gene in light and dark periods with/without immune stimulation by LPS or polyI:C was analyzed in this study. Results revealed that the *per1* gene was composed of 4215 bp nucleotides that encode a 1404-amino acid residue. A rhythmic change of *per1* gene expression was observed during light and dark periods. A phase change (gap) of *per1* gene expression was confirmed in the pufferfish stimulated with LPS. But a gap of *per1* gene expression was not confirmed in polyI:C stimulated fish. It is suggested that *per1* gene participates in immune regulation at the time of the bacterial infection but not during viral infection because a phase change was seen only in LPS stimulated fish. In conclusion, fish *per1* gene may have regulatory function in immune response similar to that of mammalian species.

## KEYWORDS

*Period1 (per1)* gene, circadian rhythm, LPS stimulation, rhythmic change, phase change (gap)

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