



Cloning, partial sequence, and single-nucleotide polymorphism of the ryanodine receptor gene of the Pacific white shrimp *Litopenaeus vannamei* (Penaeidae)

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ABSTRACT. Ryanodine receptor/calcium release channel is a large protein that plays an essential role in muscle contraction; mutations in the ryanodine receptor gene affect sensitivity to stress. As a first step towards investigating the relationship between the ryanodine receptor and shrimp cramped muscle syndrome, we cloned, partially sequenced, and examined single-nucleotide polymorphisms (SNPs) of the ryanodine receptor gene of the Pacific white shrimp (*Litopenaeus vannamei*). The nucleotide sequence of a 15.06-kb *L. vannamei* genomic DNA segment containing a partial ryanodine receptor gene sequence was determined (deposited in GenBank nucleotide database: HM367069). Direct sequencing of PCR-amplified ryanodine receptor exons with their intron-flanking regions in 10 cramped muscle syndrome shrimp and 10 healthy shrimp, revealed seven SNPs. Five of them (1713A/G, 1749T/C, 1755T/C, 3965G/A, and 8737C/T) are located in exons; however, they appear to be neutral (synonymous), since they do not alter the encoded amino acid. The other SNPs (1553C/T and 13337A/G) are in introns. The SNPs identified in the ryanodine receptor gene could be useful for association studies aimed

at determining the physiological role of the ryanodine receptor in cramped muscle syndrome of shrimp.

Key words: *Litopenaeus vannamei*; Ryanodine receptor; Cloning; Single-nucleotide polymorphism