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Research Article

Other Irf Genes in the Sea Star Asterias Rubens

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Abstract

IRF4, IRF2 and IRF8 genes have been recently discovered in the sea star A Rubens. Emergence of other IRF: IFIH1, IFRD1 and I2BPL genes occur in this invertebrate.

keywords: *Irf Genes; IRF4; IRF2; IRF8; Sea Star Asterias*

Introduction

In mammals, interferon regulatory factors (IRFs) play a fundamental role in both the innate and adaptative immunity [1]. IRF2, IRF4 and IRF8 have been recently shown in the sea star Asterias rubens which is the only invertebrate to possess these factors (in press). Other IRFs found exclusively, in this invertebrate are now described such as: IFIH1, IFRD1 and I2BPL genes.

Materials and Methods

Sea stars were obtained from the Biology Institute (Gothenburgh University). Immunizations, genomic studies were already described [2]. After ligation of adapters for Illumina's GSII sequencing system, the cDNA was sequenced in the Illumina GSII platform sequencing. 1.100 bp from one side of the approximately 200 bp fragments sequences were assembled using Velvet [3].

Results

First result concern IFIH1 gene: One Contig (Contig 11382) could be annotated via BLASTX to *MUS musculus* "Interferon-induced helicase C domain-containing protein 1" (IFIH1-MOUSE), with an e-value of 3.1e-32. On an aligned region of 427 amino acids, 200 positive and 122 identical amino acids were found.

> Contig 11382.

5'CCAGGAGGTACCAGTCACAAATCTGGTTTTAGAACTCATCTTCGTCCTGCAGAAGTACAA
AGCCAGCTTTCTTCCACTGCTTCGGAACCTTTGCAGTTCCTTCGCGAGAGAAGACAATCT
TGAAGCTGTCTGCTTTCAGTGCGTATCCGAGAGGGGGGTCTAGCAACAGGAACTTCTGCA
TTGTTCCAAGATTTTTCTTGCAGGTGTAAGTGGCACATTTGATGAGACCAGTTGTTTCTG
TGTCTCGATATCGCTGTGGTCTGCTATACTGTATCTCTGTAATCTTGCTACCAAAGTCCG
GACTGATGCAAGTCACATGACCAGCAGTTCCTTTCCGTCGCAGCTCTGACGCTTTGCAAA
TGTAGGCGGAGCATTCTTTACAATGAATGTGGATCTTCTCAAGATCGTGCATACTGCCTT
GGAGCTTTTCCTGCTCCTCAGCTTTGATTATTGCTTTTATTCGTGCGTCCTGTTTTTCCT
GGATCTTGACAAGCCGATCCTCTTCCACCATGGCTTCCAGCTCCTCCATTGCTTTCTCCA
TTCTGACCACCTTTGAGCGATTCTCATACTCTCTCTTTTCATTTTGGGAATTTCTTTCCA
CGATGAGGAAGCACTGGCTCCCACTTGCACGTGCTCGTCCCTTCGACTGGACCGTGCCGA
TCTCATTACTGACGAAGTTATACCTGATGACAAAGCTACAGGCTGGCATGTCAAGGCCTT

CCTGAGCGATATCTGTAGCCACTAAGATGTTACAGCCATCATCTTTTCTGAAACTGTTCA
GAACCTCCTTCTGTTGAGCCTCTGTCAGGCAGTCATCTTCTAGGCTGCCCTGCCCAACCA
GCCTGAGTGGTTCGATCCTGCATGGTAAGGACTTCAGGAGATTTGAAGACCTCAGAAACT
CAACCAGAGCGGTGGCAGCTACTTTCATGGTTGCGAGAATAATTCCTTTAGATTCAGGTT
TATCCGAGAAGATCTCATGTAGAACATGAGCAAGTTCCCCAAGCTTGTGGTTGCTATGCT
GCCCTTCGTCCTTCTCCAGTTCCTTCATTCGAGGAAGTTGTGAGTTGAAGAGGCGCCGGC
AGTGTTCCTCAACTGGTACCTGGTCTGGATGATCGTGAACATATCGACTGACATGAAACT
CCTCCAAGTGTCGAACTCCATCCTTGACCCTTAGATCATCGTAGAGAATCATGGCACGAT
TGTACTCGTATAAGTACATGTAGACAATGATATCCGTGCGATTGGCCGATCTCTG 3’

Second result concern IFRD1 gene: One Contig (Contig 4733) could be annotated via BLASTX to *Mus musculus* “Interferon-related developmental regulator 1” (IFRD1-MOUSE), with an e-value of 2.6e-27. On an aligned region of 124 amino acids, 91 positive and 69 identical amino acids were found.

5’CTAGAATCTCTGGCCCAAACTTGATAATCTCATGCGGGATGTCGTTTTCCTCAATCGTTC
TGATGATATCTCTGAAGCTAGACCGTTGCTGACGTCTGTCTTTCTTAGCTCTGTATTTAT
TGCTGTCTGTTGCTAAGCCTCGTAGACTAACCAATAACTCCTCAACATTCTCCATGTCAA
AGTCTTCATTCTGCTCCCTGGCTAACTCATAAAGCATAGCAATGGACTCTCCCGCCTCGA
TCCTCAGGCTGACATCATCGCTGTGTAGGAGACTAGGAAGTTTACTTAAATGGCTATCCA
CAAGTTTTGAAACACGGGATGGTGGTGTGATAGATAGTAACAGGGTCCATGCAGACAGTG
CCGCGCAATGCAGCGCCGAGACGGCTGGGTTGTGCGAGGGCGCTGTGCCATCT 3’

Third result concern IFR gene: I2BPL One Contig (Contig 3305) could be annotated via BLASTX to *Mus musculus* “Interferon regulatory factor 2-binding protein-like” (I2BPL-MOUSE), with an e-value of 3.3e-71. On an aligned region of 370 amino acids, 224 positive and 190 identical amino acids were found.

>Contig 3305.

5’AAAGTGTGTGTCCTCTAAACGCTCGTGGCAAATGGTACACTTGAGTGTACTTATGGGTAC
AGAAGAGTCCGGGAGGTGACTTGTGTTTGAACTGATGCTGGTTTCAATGGGGTGTCCCTG
GGACTGGGCAAGCTCTCTGCTTCGGTACAGAGCTCGGCGCTGAGCTTGAGTTGGGGAGTG
GGGACTCCGCTGAGTTTTGTCCGAAGATGTCCCGTTGTTGCTGGGGTTGCTAACCAGATT
GGGCATGGAGTTGTCTGGCTTGTTTGGCGAAGTGGGGGTGCCGAGGTTGTCAGTGACTGA
CATGAGGGCGGCCATGGGTGAGGGGCCTCCCTGTGTGGAGCTACCCGTCTCCGGTGGAGT
GCTCGATGTCGGATTGCTCAGAGGAGAGCCACCCGAGCTGGGAGGCCTGGAGCTAGAATT
AAATCCAGTCGAGGCGATGGTGTGTTTCAATCCCTCACTCTGGTTCTGCAACCACTGTTG
TCTCTGCTGTTGCACCTGTTCGTCCGTCAACTTTCCGGGAACTTCGGGGTCAGGTTCGGG
GGATGCCTTGCGTTTCTTGGACTTGTGCGGCATGCCCGCCATCATCTGATTGGCTATGAT
GGTTGGCAAAACGGGACAGCTCGCGTCAATGTACGGCTGTGGCAACATATCTACGCTGAC
AACTTCTTTGAAGAATCGTACAGCTTCGGGCAAAAGATCACCGAGTGTCCGCCAATCATT
AGAACCGTGTTTCTTTTCATACTCCAGATATTTAAACCCTGACGAAAGTCCCTTCCCCAT
GTCTTTCAAACAATCGGAGTACATCTGTTTGGCTACACCAGAGGCACTGTGATACACTTT
GTTCGATCCGCTCGGATATTCAATGAAAATTTTCAATTCATAATCCATACCTGGTTTGTA
GGTAGCATCAAATGAAAACACACGACCTCTCCGGGTGTGATCTTTCTTGAATCTTACCTC
AAACGGGGTGCAGTTGGAAAGTGTTGCCAGTGTTTGACGAACAAGTCCCGGGCGC3’

Discussion and Conclusion

These 3 interferons are, in a general way, found in vertebrates. In mouse, IFIH1 encodes a cytoplasmic viral RNA receptor that activates type I interferon [4]: it implicates antiviral immunity. We suppose it plays the same role in sea star. IFRD1 gene, in mouse is expressed mostly in neutrophils skeletal and cardiac muscle (inducer of muscle regeneration). In sea star its role remains enigmatic. At last, I2BPL gene, in mouse, encodes a transcription factor that may play a role in regulating female reproductive function. Its function, in sea star holds of the mystery. In conclusion six IFR genes have been described in an Invertebrate: the sea star Asterias rubens, when compared to mouse genome: they concern adaptative and innate immunity.

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