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Short Communication

The Asterias Rubens Toll-Like Receptors (Tlr): Genomic Studies

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Abstract

Sea star TLR receptors were described in the present paper. Most of them correspond to mouse TLR in their genome. Two other ones were found in Drosophila melanogaster and its genome.

Keywords: *Asterias Rubens; Toll-Like Receptors; DROME; TLR network*

Introduction

At the end of the 20 th century, Toll also named Drome was shown to be an essential receptor for host defense against fungal infection in Drosophila melanogaster which only has innate immunity.

Later a mammalian homolog of the Toll receptor (now named TLR4) was discovered to induce expression of genes involved in inflammatory response.

Further more, activation of innate immunity is a critical step to the development of adaptative immunity which has been described in mammals and also in sea star immune system [1].

The aim of the present work, is to report genomic studies concerning TLR in immunized and non-immunized sea stars to HRP.

Materials and Methods

Sea stars were obtained from the Biology Institute (Gothenbugh University). Immunizations, genomic studies were already described [2]. After ligation of adapters for Illumina's GSII sequencing system, the cDNA was sequenced on 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 results concern significative TLR genes found in control sea stars (a) and immunized sea stars (HRP) (b and c) as compared to Drosophila melanogaster genome :

Control

Contig13262 582 tr|Q2XXW0|Q2XXW0_DROME CG6890 (Fragment) OS=Drosophila melanogaster GN=Tollo PE=4 SV=1

immunized sea stars to HRP

Contig3456|m.6143 1127 tr|Q2XXW0|Q2XXW0_DROME CG6890 (Fragment) OS=Drosophila melanogaster GN=Tollo PE=4 SV=1
Contig17904|m.13098 711 tr|M9NDW9|M9NDW9_DROME Toll-9, isoform B OS=Drosophila melanogaster GN=Toll-9 PE=4 SV=1

DROME Toll-9 isoform B in immunized sea star (sequence)

One contig (Contig17904|m.13098) could be annotvated via BLASTX to Drosophila melanogaster "Toll-9, isoform B" from the Trembl database (M9NDW9_DROME), with an (e-value of 3.98e-25. On an aligned region of 204 aminoacids, 109 positive and 68 identical amino acids were found.

5'GGATTTCAACCCCGAAGTTTTGAACTGTGATGGAAAGATTCCGCTGCAGTATTGGATCAT
AATTGGTGTTGGAAACTTTGTGATCCTCGTTTTAATCATTGCTTTGATATATAATCGCTG
GAAGATTTACTATGTCTACTTGTTGGTGAAGGCGCGCCATCATCGGGCAAGAAAAGACGA
GTATGACAGATTGAATGATTACAGGTTCGATGCCTTCATATCTCACAGCAGCGCTGACGA
GGATTGGGTCAAAGATAAACTGTTACCTGAGCTAGAGAATGGAGAGAATCCATTCAAAGT
CTGCCATCACGAGCGTGATTTTGAACCTGGGCAAGAGATCATTGACAACATCATTGATTC
CGTCGACCACAGCAGACGCACCATCTGTGTCATATCGAAGAGCTACCTGGAGAGCAACTG
GTGCACCTACGAGAGACGGGTCACCATGAGTAAATTATTCATCAACTACAAAGATGTCCT
GGTTCTGATCATCTTGGAAGATATTCCAGATAAGAAGATGTCCAAGTATGATCTCATCCA
CCGGGCAGTCAAGAAGAACACGTACCTGAAGTGGCCGGGAGAGGATGGAAGAGCTGATGA
GAAGGCTGTTTTCTGGCAACGCCTGAAGACAGTCTTGGGTGAAGATCGTACACCGGAAAA
TAATGAGGAGCTTGCTTAAAGGCACTTGCTTAAAGGCACTGGACACTGTTG3'

Sea star TLR receptor genes when compared to mouse TLR ones :

Immunized and non-immunized sea stars and Mouse share in common :

TLR1 toll-like receptor 1, TLR4 toll-like receptor4, TLR3 toll-like receptor 3,TLR5 toll-like receptor5, TLR7 toll-like receptor 7, TLR9 toll-like receptor 9, TLR12 toll-like receptor 12, TLR13 toll-like receptor 13.

Discussion

It seems now obvious that the recognition of microbial components by TLRs initiates signal transduction pathways which triggers expression of genes. These gene products , in Asterias rubens, control innate immune responses and further instuct development of antigen-specific adaptative immunity which induces the production of the « invertebrate primitive antibody »[1].

On the other hand, the presence of TLR9 (Toll-9 isoform B in Drosophila) , indicates that it mediates induction of NF Kappa-B in human [4] and may be in sea star. We recall the discovery of NF Kappa-B genes in sea star [5].

Conclusion

The TLR network in Asterias rubens sea star seems complete when compared to mouse one.

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