

The problem of il2 in echinodermata

Abstract

The IL2 gene was at last discovered in an Invertebrate: the ophiurid *Ophiocoma nigrum* (*Echinodermata*). Many genomic researches in sea star *Asterias rubens* (another *Echinodermata*) were unsuccessful even if Flow cytometry indicated positive results. It's the first time that such an interleukin gene appears in invertebrates.

Keywords: *echinodermata*, ophiurids, asteroids, genome, il2

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Michel Leclerc

Immunology of Invertebrates University of Orleans, France

Correspondence: Michel Leclerc, Immunology of Invertebrates University of Orleans, 556 rue Isabelle Romée, 45640 Sandillon, France, Tel 02 38 41 02 09, Email mleclerc45@gmail.com

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Introduction

In a general way, IL2 interleukin is linked to T vertebrate lymphocytes. On the other hand an IL2 activity was demonstrated in sea star (*Echinodermata*)^{1,2} but was not found in sea star genome in a significant manner (because of the weakness of the e-value). Recently after hard research it was discovered in the first sister of the sea star *Asterias rubens*: the ophiurid: *Ophiocoma nigrum*. The aim of this paper consists in presenting the IL2 sequence in the ophiurid genome we just studied.

Materials and methods

Animals were obtained from the Biologic Station Marine of Roscoff (France). Digestive coeca were excised from their body and *Ophiocoma nigrum* mRNA was realized by the mean of Uptizol kit (Interchim) after purification.

Sequencing was operated on Illumina Next 500 with paired-end: 2.75 bp. Quality controls were operated.

Transcriptome was assembled from RNA-Seq fastq files using Trinity v2.1.1³ with default parameters. A BLAST database was created with the assembled transcripts using makeblastdb application from ncbi-blast+ (v2.2.31+). The sequences of transcripts of interest were then blasted against this database using blastn application from ncbi-blast+

⁴ with parameter word_size 7.

Results

The sequence of Ophiurid IL2 comes now:

>NM_000586.3 Homo sapiens interleukin 2 (IL2), mRNA

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5'AGTTCCTCATCTCTCTTTAATCACTACTCACAGTAACCTCACTC
CTGCCACAATGTACAGGATGCAACTCCTGCTTGCATTGCACTAAGT
CTTGCACTTGTACAAACAGTGCACCTACTTCAAGTTCTACAAAGAA
AACACAGCTACAACCTGGAGCATTACTGCTGGATTACAGATGATTT
TGAATGGAATTAATAATTACAAGAATCCCAAACTCACCAGGATGCTC
ACATTTAAGTTTTCATGCCCCAAGAAGGCCACAGAAGTAAACATCT
TCAGTGTCTAGAAGAAGAAGTCAAACCTCTGGAGGAAGTGTAAAT
AGCTCAAAGCAAACTTTCACTTAAGACCCAGGGACTTAATCATA
TCAACGTAATAGTTCTGGAAGTAAAGGATCTGAAACACATTTCATG
TGTGAATATGCTGATGAGACAGCAACATTGTAGAATTTCTGAACAG
ATGGATTACCTTTTGTCAAAGCATCATCTCAACACTGAAAGTGTCTC
CACTTAAACATATCAGGCCTTCTATTTATTAAATATTTAAATTT
TATATTTATTGTTGAATGTATGTTTGTACCTATTTCTTAAACTAT
AAATATGGATCTTTTATGATTTCTTTTGTAAAGCCCTAGGGGCTCTAA
AATGTTTCACTTATTTATCCCAAAATATTTATTATATGTTGAATG
TTAAATATAGTATCTATGTAGATTGGTTAGTAAACTATTTAATAAA
TTTGATAAATATAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3'
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Table 1

Table 1 The sequence of Ophiurid IL2

Query ID	Query Gene Name	Subject ID	Identity (%)	Length Alignment	Mismatch	Gapopen	E-Value	Bitscore
NM_000586.3	IL2	TRINITY_DN228128_c0_g1_i1	94.74	38	2	0	1,00E-08	60,2

Discussion & Conclusion

The main acquisition of *Echinodermata*, especially asterids and perhaps ophiurids, seems to be cellular differentiation into two subpopulations, ancestral to B and T vertebrate lymphocytes. These cells interplay with macrophage-like cells, resulting in the synthesis of primitive antibody complement-dependent.⁵

As for IL2, genomic studies in ophiurids show clearly its existence with an excellent e-value. Thus, another acquisition in *Echinodermata* consists in the appearance of a panel of interleukins in ophiurids and certainly in asterids: IL1, IL2, IL4, IL6 which play a role in the regulation of the immune system of these invertebrates. We

hope that the present paper will help in suggesting provocative ideas on adaptative and innate immunity in invertebrates.

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Conflicts of interest

Author declares there are no conflicts of interest.

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