IBBJ

Summer 2018, Vol 4, No 3

Letter to the editor

Evidence of *Il2* and *Il6* Genes in the Crinoïd: *Antedon bifida* (Echinodermata)

Michel Leclerc[1*], Ariane Jolly[2], Pierre de la Grange[2]

1. Immunology of Invertebrates, University of Orleans, Sandillon, France.

2. GenoSplice Technology, iPEPS-ICM, Hôpital de la Pitié Salpêtrière, Paris, France.

Submitted 10 Jun 2018; Accepted 142 Jul 2018; Published 17 Aug 2018

For the first time, in 1984, the concept of lymphokine-like substances was evoked in an Echinodermata: the sea star *Asterias rubens* (1). Later, in 1996, it was spoken of inteleukin (*Il*)2, *Il4*, and *Il6* in the same animal (2).

Immunogenomics contributed to determine evidence of the presence of *Il2* (3) and *Il4* genes in Echinodermata but not of *Il6* gene.

The aim of this work, was the research of this last one, in an ancestral Echinodermata: the *Antedon bifida* which belongs to the class of Crinoïds.

Antedon bifida was obtained at the station of Biologie Marine of Roscoff, France. Digestive coeca were excised from the A. bifida body. mRNA was obtained from Uptizol (Interchim, France), and quality control was operated. Sequencing was made on Illumina Next Seq 500 with paired-end : 2. 75 bp. Transcriptome was assembled from RNA-Seq fastq files using Trinity v2.1.1 (4) 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+ (5) with parameter word_size 7.

Table 1 summarizes the obtained results with sea star *Il2* and *Il6* transcriptomes, when compared to Homo sapiens and Mus musculus ones. Figure 1 shows the corresponding sequences in 5'-3'direction.

Although *Il2* gene appears like something well-known in Echinodermata, *Il6* gene evidence was not yet related in invertebrates. Beck and Habicht spoke of Il6 -like protein in 1996 in invertebrates (6). So it is the first time that *Il6* gene is found in invertebrates. Our work in *Antedon bifida*, a Crinoïd, an ancestral Echinodermata shows that in

Table 1. *Il2* and *Il6* transcriptome characteristics

Query ID	Query Symbol	Species	Subject ID	Identity (%)	Length	Mismatch	Gapopen	Query cover (%)	E-value	Bitscore
NM_000586.3	IL2	Home sapiens	TRINITY_DN20229_c2_g8_i1	97,06	34	1	0	4	5,00E-08	58,4
NM_001314054.1	IL6	Mus musculus	TRINITY_DN19147_c3_g2_i1	96	25	0	1	2	0,026	39,9

*Correspondence: Immunology of Invertebrates, University of Orleans, Sandillon, France. E-mail: mleclerc45@gmail.com

[Downloaded from ibbj.org on 2026-11-22]

TRINITY_DN20229_c2_g8_i1 (IL2)
5'ACACCCTCCATCTTGTAGCATAATTACTACAAAGATTAAGAAAAATCAAGCTGCTTAAG
A
AATAATACTGAACAATGGTGTTAAGCACCATTACACCTATACAATCATTAAAGCAATAAA
CGCAACAAGTATATTCAACTATTACAATAATATATTGCCCTGTCGTAATAGTATTTAACA
TAATTATATTGCGAAGAATTAAGCTGCGATAGAATTAGACAAAGAGAAGGTAATGAACAA
TATAAAAATAAATAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAA
AAAAAAAAAAAAAAAAATAAAAAAATTAAATAATAAAAAATAAAAAAAA**3'**

>TRINITY_DN19147_c3_g2_i1 (IL6)
5'AGTGAATTACGCAAAGTTTCTGATTGGTTCCAAATCAATAAATTATCGCTAAATGAATCC
AAATCAAATTATATTATATTTAAACATAAAAACAAAAAATCCATCTCTCAAAACTTAAAA
GTTTTAATTAATGACAAGGTAATCACACGTGTTGAGGAAACCAAATTTCTTGGCGTCTCC
ATTGACTCAAAATTATCTTGGAAACATCATATCAATACAATCTGCAACACAATTGCGAGA
AACACTGGTATGATGAACAAATTAAAGTACACACTTCCATCAAACATTTTATTTAATTTA
TATAATACTTTAATTCTTCCGTACATATCATACTGCAACATTGCCTGGGCCGTTACACCT
GGCAAGTTCAGCACTTTATGCCCCTGGACTAGTTTCGAAACTACCAATATTGACCGAATT
TTTAAATTGCAAAAACGAGCAATCCGAATCTGTTCAGGGGCATCATTCAGATCTCATTCA
AAACACTTATTTTTTAACTTTAAATCTCTCAACGTCTTTGATGTTAATAAACTTCAAACT
GCATTATTCATGTACCGACTTACAAATAATCTACTTCCGACCCACATATGTTCACTCTTT
ACTAAACCTTCTGATACCCATACACATTTTACCCGTTTTTCCAATACTAATGTATACACT
GTTAAAAACTGCGACTCGCACATTAGACGTCATTCAATACTTTATACCGGACCTAAACTT
TGGGAAAGTCTTTCACATTCACTGATAAAGAAACCTTCACTTTTTAGTTTTAAAATTACA
TATAAGCAATCTCTAATCCAAGCATATGATGAATAAGGTGTTATGATTATTTTTAATAAT
GTTAATTTATTGTTATTCTATTTTTTATATATTATAATTTAGTCACAACTATTACTGATA
TTTGTTATTCTCTAATTTTTACTAGGCATTTTGTACAGCAAATATCAAT**3'**

Figure 1. *Il2* and *Il6* sequences.

an original way.

In summary cytokine genes such as *Il1*, *Il2*, *Il4*, *Il6* exist in invertebrates. The present finding highlights the novelty of our work.

Conflict of interest

The authors declared no conflict of interest.

References

1. Leclerc M, Brillouet C, Luquet G, et al. Properties of cell subpopulations of starfish axial organ: in vitro effect of pokeweed mitogen and evidence of lymphokine-like substances. Scand J Immunol. 1981;14:281-4.

2. Legac E, Vaugier G L, Bousquet F, et al. Primitive cytokines and cytokine receptors in invertebrates: the sea star Asterias rubens as a model of study. Scand J Immunol. 1996;44:375-80.

3. Leclerc M. The Problem of Il2 in Echinodermata. Int J Vaccines Vaccin. 2018;5:17-8.

4. Grabherr M G, Haas B J, Yassour M, et al. Full-length transcriptome assembly from RNA-Seq data without a reference genome. Nat Biotechnol. 2011;29:644-52.

5. Altschul S F, Gish W, Miller W, et al. Basic local alignment search tool. J Mol Biol. 1990;215:403-10.

6. Beck G and Habicht G S. Characterization of an IL-6-like molecule from an echinoderm (Asterias forbesi). Cytokine. 1996;8:507-12.

[Downloaded from ibbj.org on 2026-11-22]