Evidence of \textit{Il2} and \textit{Il6} Genes in the Crinoïd: \textit{Antedon bifida} (Echinodermata)

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For the first time, in 1984, the concept of lymphokine-like substances was evoked in an Echinodermata: the sea star \textit{Asterias rubens} (1). Later, in 1996, it was spoken of interleukin (\textit{Il}2, \textit{Il}4, and \textit{Il}6 in the same animal (2).

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

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

\textit{Antedon bifida} was obtained at the station of Biologie Marine of Roscoff, France. Digestive coeca were excised from the \textit{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-blastdb 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 \textit{Il2} and \textit{Il6} transcriptomes, when compared to Homo sapiens and Mus musculus ones. Figure 1 shows the corresponding sequences in 5\textprime -3\textprime direction.

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

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|}
\hline
Query ID & Symbol & Species & Subject ID & (\%) & Length & Mismatch & Gapopen & Query cover (\%) & E-value & Bitscore \\
\hline
NM_000586.3 & \textit{Il2} & Home sapiens & TRINITY_DN20229_c2_g8_i1 & 97.06 & 34 & 1 & 0 & 4 & 5.00E-08 & 58.4 \\
\hline
NM_001314054.1 & \textit{Il6} & Mus musculus & TRINITY_DN19147_c3_g2_i1* & 96 & 25 & 0 & 1 & 2 & 0.026 & 39.9 \\
\hline
\end{tabular}
\caption{\textit{Il2} and \textit{Il6} transcriptome characteristics}
\end{table}

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Evidence of Il2 and Il6 Genes in Antedon Bifida

TRINITY_DN20229_c2_g8_i1 (IL2)

5’-ACAACCTCCCTACCTTGTGACATA TTACACTACAAGAGTTAAGAAAACT CAGCTGAAGAAT
AATAATCTGAACAAATGTTAGCAACATTAACCTATACAACTCAAACTTAAAGCAATAA
CGGACAAAGTATATTTTTCACTATACAAATATATTTTGGCTGTA AACATGAATTA
TATTATTTTGCGAGAAGTAAAGGTGGCAGTAGAATTAGACAAGGAGGGTATAGA
CACAACAAATCAAAAAA
AAA

TRINITY_DN19147_c3_g2_i1 (IL6)

5’-AGTGAATTACGCCGAATTTCTGATTGTTCCAATCAAATATTTATTACGCTAAATGATCC
AAATCAATTATATTATTATATACATAAACATCAAACTCAAATAATATACACGGTSTAAC
GTATTTAATTTAAGCAAGGAATACACCTCCTTCGGAAACTCAGTCCAGGAAACCAATTTCTG
TTCCGAGGCTACCTGGGCGCATTAACCTGGGGAGCACATGTTTCGAGAAGAACATCCACTA
ACAAATCTTATTTTTTTTATCTGTTTCTGATTTAAATATACACATCAACTTTACTTAC
GCATATTATATGACCCACACTACAAATATACATCTTCCAGACCCAAATGATGCTACACCTT
AATACCCCTCTGATACCCATACACATTTACCCGTTTTCCAAATCTGATTACACT
GGTTAAAACGCGACGTCACTTAACTTTCTGAACTTTTAATCCGACCACAAACTTT
TGGGAAAGTCTTTCCATATCTCCTGAAIAAGAAAACCTTACCTTTATGGTTTATTAATAC
TAAACGAACCTCCTACGCAATGCATTAAGGAAGGTGTAGAATTTTTAAATACAT
TTAATGTTAGGTTAACACATGACGTGGTTAAATTTTGTTG

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


