International Journal of Research Studies in Medical and Health Sciences
Volume 3, Issue 5, 2018, PP 9-10
ISSN : 2456-6373

Evidence of Ifng Gene in a Crinoïd: Antedon Bifida

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ABSTRACT

2 years after the discovery of IRF genes in an Invertebrate: the sea star Asterias rubens (Echinodermata, Asterid), IFNG (Interferon Class II) was found in an ancestral Echinodermata: The Crinoïd Antedon bifida.

Keywords: *Invertebrates; Echinodermata; Crinoïds; Antedon bifida; IFNG gene, Interferons.*

INTRODUCTION

Interferons (IFNs) are a group of signaling proteins, divided, in mammals, among three classes:

Class I, class II, class III.

IFR regulatory factors have been studied in the sea star which is the only Invertebrate to possess these factors playing a role in the adaptative immunity of Asterias rubens (Ref .1). These IFR belong to Class II.

IFNG gene , in homo sapiens, encodes a soluble cytokine that is a member, also, of the IFN type II:

The aim of the present study is a genomic one and particularly the research of IFNG in the Crinoïd: Antedon bifida.

MATERIALS AND METHODS

Animals

Antedon bifida was obtained at the station « Of Biologie Marine of Roscoff » France.

Obtention of Crinoïd mRNA

Digestive coeca were excised from the A. bifida body.

A. bifida mRNA was obtained from Uptizol (Interchim). Quality control were operated.

Sequencing

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 (Ref.2) 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+ (Ref.3) with parameter word_size 7.

RESULTS

IFNG gene was found in a significant manner in Antedon bifida.

First the genomic parameters were given in the following table

QueryID	Query Symbol	Species	SubjectID	Identity (%)	Length	Mismatch	Gapopen	Query cover (%)	E-value	ore
NM_000619.2	IFNG	Homo sapiens	TRINITY_DN9178_c0_g1_i2	95,12	41	2	0	3	5,00E-10	65,

Second,

The transcriptome of the Antedon bifida/ homo sapiens IFNG gene was clarified:

>TRINITY_DN9178_c0_g1_i2 (IFNG)

5'AGCGAATGAAAAAGAAGAACCGGCCA
AAAAAAGTACTTCTACCAAAGAAGCGAA
TGAAAA
AGAAGAACCGGCCAAAAAAAGTACTTCTA
CCAAAGAAGAAACTGAAATAGAAGAACT
AAC
CGAAACAAGTATTTCTACAAAATCAGTTT
CTGCCAGTGATATATTCCTTGGTACAACTT
T
CACACTGGAGATGGGATTCTGCGTAGGA

CCTGAACACAAACCGTTTACAGGAGATT
TCGA
CGGTGACGGTAATGAAGATCTTCTGTTTC
ACAATTCAAAGACAGGCTCGAAAAAGAT
ATA
CTATGCAAGTTGTGACGGCTCTTTTAATG
GTGATAGGTCGTGGAGAAGAGAGATGAA
TTT
TTGCTACGTAAGTGGATATGATCTATACAT
TGGTGATTTCAACGGCGATGGTCGATCCG
A
TATGCTGTGTCATCGTCCTCAGTATGGTC
AGATTTGGGTTGTGTTGGCGCAACCTGG
GGG
TGTATTCACTGCTAACCCGTGGTCGTATA
GTCCCAATTGGTGCAAGGCCACCACTGAT
AA
AGTATATATTGGAGACTTCAACGCAGACG
GTCGGGATGATATTCTTTGCCACACACAA
AG
TTCGGGTTACATTGCAATATATTATGCATT
ATACACTGGTTATTTTTCTACCTCTACAAC
ATATCGCTTTACACGAAGTATGAGTTGGT
GCAGAGGTACATATCAAAGAGTGTATACT
GG
AGATTTCAACGGAGACCGAAGGGTTGAT
ATGCTCTGCCACGACTACTCATCTGGCTA
CAT
ATATGTAGCAGTAGCCACAGCGACTGGTG
GATTCACCTCTGCCACATGGAGCAGAAGT
AT
GGGCTGGTGCAAGCATTCGAACTCTAAG
CTCAGCATTGGAGATTTCAATAAAGATAA
CCG
CGACGACATCATGTGCAGCGACACAAAT
GGTCCTTACTGGATAGCATTCTCTCTGTA
CAA
CGGTTCGTTTTCATCTAAAAGCTGGACCC
GTAAACAAAACTGGTGTACATCTGGCAAT
GA
TGTGTTAGTTTCGGATGTGAATGGAGATG
GTGGGGATGATTTGATGTGCCATAATGAA
GC
CGACGGCATCAAGTACATATCGATCAACC
ATAAGGCCTAAAGCAAGTTCCTCTCAATA
TT
ACAGAAAACTATTCACCACAAATGATTCA
TTTTGTACTGAACCTCAATTCAAATTCAA
TT
AAAATTTACATAAACGTTAACGGAAGGAT
ACAATCAACTAAAATAATGTTCATTCATTA
T
TTTTCGTCGATAACCTAAACAAAAATCAG
ATAAGAAATTATACAATAATATACTGTAAA
C
GTATTATACAAAATAATTAAATGTATATTA
AGCTACTGTACTTAGAAATGTACTTGTAC
G
CTTATTAATATTAATAAGCCTAATGCCCGG
GTTGATAATAATAAAATACATTTTTGCAAG
TTCAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAC
TCAAAA
GTCCCAGGCCCCACCCCGACCTACTGAA
CCAGAAAG**3'**

Discussion and Conclusion

IFNG gene exists in Echinodermata and in Invertebrates!

After the discovery of the IGKappa Gene in Echinodermata, in 3 classes out of 5, it is highly

surprising to find such genes in Invertebrates: IRF2, IRF4, IRF8 genes in Asterias rubens, IFNG gene in Antedon bifida when we have a look to "The Evolution" in a general Way.

Why that in Echinodermata ?. Obviously, we have discovered lymphocytes in sea star, and, invertebrate primitive antibody in sea star, in ophuirid and now in crinoïd. But why this high degree of sophistication in Invertebrates? All that remains enigmatic.

We wait for time to assimilate these data news...

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Citation: *Michel Leclerc, Evidence of Ifng Gene in a Crinoïd: Antedon Bifida. International Journal of Research Studies in Medical and Health Sciences. 2018; 3(5):9-10.*