

Evidence of Complement Receptor Genes in Invertebrates (Echinodermata)

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ABSTRACT

Recently CR receptor gene was discovered in the Asterid : *Asterias rubens* (Echinodermata). Other Echinodermata show in their genomes the CR2 gene (CR2 Complement C3d receptor 2) i-e Ophiurids (*Ophiocomina nigra*) and Crinoïds (*Antedon bifida*) The sequences of their transcriptomes are presented.

INTRODUCTION

Recently, CR receptor gene was discovered in an Invertebrate : the sea star *Asterias rubens* (Asterids, Echinodermata) (Ref : 1). It seems clear to us, to look for such genes in other Echinodermata : *Ophiocomina nigra* (Ophiurids), *Antedon bifida* (Crinoïds) which possess, in their genomes, the well-known IGHKappa gene (corresponding to the Invertebrate Primitive Antibody (Ref. 2, 3,)

The Complement C3b/C4b receptor 1 like and the CR2 Complement C3d receptor 2 genes were studied in *O.nigra* and *A.bifida* genomes

MATERIALS AND METHODS

a) Animals: *Ophiocomina nigra*, *Antedon bifida* were purchased from the Marine Laboratory of Roscoff (France)

b) Obtention of ophiurid and crinoïd mRNA: Digestive coeca were excised from the animal's bodies. *O.nigra*, *A bifida* mRNA were obtained from Uptizol (Interchim).

Quality control were operated.

c) 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.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+ (Ref;5) with parameter word_size 7.

RESULTS

We just find, in *Ophiocomina nigra* and *Antedon bifida* CR2 complement C3d receptor 2 gene. Complement C3b/C4 b receptor 1 like gene is not present significantly.

First we present the characteristics of CR2 transcriptome in *Antedon bifida*:

QueryID	Query name	Subject ID	Identity (%)	Length	Mismatch	Gapopen	Query cover (%)	E-value	Bitscore
NM_001006658.2	CR2	TRINITY_DN16054_c3_g1_i1	83,33	48	4	3	1,00	2,80E-02	41,70

The sequence one is following :

```
>TRINITY_DN16054_c3_g1_i1 (CR2)
5GTCCACTATTAATTTGTTACAAAACACTA
ATTACGAATGTCAACAAGTCGGATATCAT
TT
ATTTTCTACTAACTGAAATACTTTACTTTC
AGTCTAGATAGCCTAAACCCAACTCGAT
TCAACATTTAATATTTTTAGAGATTAATATA
ATCTCAGATGAAGTAGTAACTAGTAAAC
ATTTAAAAATAAGCGCAAAGTGAACTT
```

```
CTATTATAGGAATATTCAGTAATCATACT
TC
AAAAAATTAATCATGTATCATAAAGTTATT
GGTACTGTAATGCAAGTAGAATAGTAATAG
ATAAGAAGTCTTCCATTGGCAACCACTGCT
TTTAAATAGATTTTATTGTAAATAAAAAAT
ACTAAAGCAAAAAAAAAAAAAAAAAAAAAA
AACAGAA3'
```

We repertoriare the *Ophiocomina nigra* CR2 transcriptome sequence to compare :

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>TRINITY_DN65134_c0_g1_i1 (CR2)

```
5AAAACAGGCAAAAATGCTCTTTAGGAA
AACACAAACGCGTCTCCGGACTCTCCGC
GTGCT
CTGCATGTGCATCTGCATTGTA ACTCTGTAT
TACACACAAAAAAAATATGCGAGTGTATT
TGCGAGTTGATCACGCATATGCCTACATG
AGTTAGGTGGATAATTGAAAGCTCCACAT
GG
AAAAAATTACGATACAGGAAGGTAAAAT
TGTA AAAAAAATAATATCAAAAAA AAAAA
AAAA
AAAAAAGACCACTCAA AACCAAGA
CAGAATGACGAAGACCACA3'
```

CONCLUSION

Blasts against human were performed. They lead us to envisage as highly true the evidence of CR and CR2 genes in Invertebrates (Echinodermata).

CR2 gene, in human, encodes a membrane protein which function as a receptor for Epstein-Barr virus binding on B and T lymphocytes.

Echinodermata lymphocytes exist, do they possess such a receptor? That is the question! Further studies are necessary to clarify this problem.

When we compare the sequences of CR2 *Antedon bifida* and *Ophiocoma nigrum* transcriptomes we observe slight differences in 5'-3', between them. They are due to alignment's differences. Nevertheless, it is obvious, that CR2 gene is present in these two Echinodermata.

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