

Evidence of Cxcr4 Gene in Invertebrates: The Echinodermata

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ABSTRACT

Many genes which are present in Human are present also in Echinodermata such as CXCR4 gene. Its main characteristics and sequence are described in this paper.

Keywords: Invertebrates; Echinodermata ; CXCR4 gene

INTRODUCTION

CXCR4 gene is a typical one we met usually in Human. The CXCR4 gene provides instructions for making a receptor protein that spans the outer membrane of cells specifically white blood cells, that is to say: « **Cells showing the antigen** ».

Since we discovered Invertebrate Primitive Antibody (Ref.1-2) and invertebrate lymphocytes in Echinodermata, we decide to look for genes and cells which are implicated in « **showing the antigen** ».

It is why we tried to discover in Echinodermata CXCR4 gene.

Ophuirid and Crinoïd genomes were studied.

MATERIALS AND METHODS

Animals: Ophiocomina nigra (Ophuirid) Antedon bifida(Crinoïd) were obtained at the

RESULTS

The following table shows the main characteristics of the Echinodermata CXCR4 transcriptome

QueryID	Query Name	SubjectID	Identity (%)	Length	Mismatch	Gapopen	Query cover (%)	E-value	Bitscore
NM_003467.3	CXCR4	TRINITY_DN12629_c0_g2_i1	92,86	28	0	2	2,00	4,00E-02	39,90

CXCR4 transcriptome in Antedon bifida (Crinoïd , Echinodermata)

The corresponding sequence in 5'-3' shows :

>TRINITY_DN12629_c0_g2_i1 (CXCR4)

5'AAAATGAAAATGATACAACCTTTATTT
 TTTATATGATTCCTTCAGTAATGGTAGGTC
 TA
 TATGAAAGTTGATTAGGTAATACATTCTTA
 TATACTGTTCTTAATTGCAACCAGTAATAT
 TTAAAGTACAGACTACTACTCCACATATTT

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Obtention of ophuirid and crinoïd mRNA:

Digestive coeca were excised from their bodies and mRNA were obtained from Uptizol (Interchim) then quality controls 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.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.

GTATATTGATACAGTATTCCAAAATTGGTG
 TATTGCAGTGTACAGTACTTTGTATTAAGT
 TGTATGGGACTTATTTTTTAGCATTATATT
 ACTGTAATACTTGACATGTTCCACTAGTTT
 GTCCCGGTCTTCTTCTGGGAGAAATGCAC
 A
 TTCAGCAGCACAACTCTTAATCTTATCA
 CATCTTCATCCGATATCCAAAATATTTCA
 G
 AGCAATATCCTTCTTCTGTCATTAATGTGTT
 CATAAAATGCAAACCTGTCGTCAGTATTTA
 A

TGAAAAATTCAAACCTATCTTTTGCAAATC
 TTATAGCTGGATGTTTATTCCAATCTGGAC
 T
 AACACTACCAAGAATCATACTAGAGGTTG
 GGCATACTTCCAAATGTACATTTGTCTTCT
 T
 TACCAACTCATAAACTTTGTCATCATCAA
 GACAATGATAACCGTGACCTATACGTTGA
 GC
 TTAAACACCTCAATTGCTTCCTTTACATT
 GGCTGCTGGTCCGGACTCCCCTGCATGTA
 T
 TGCTCTCTTTATGTTTAGTTTAATGGCTTC
 CTGAAATGCCTGGTGAAATTCATTTTGTA
 G
 AGTTAGTGATTCGTCACCACCTATACCAA
 TGCCTACAACACCATCATTTTCGATACTTG
 TC
 ACATAATTCTACAACCTCCTGGCACCCT
 CTGGCTTTCCTCTCATAAGACATATTATAC
 T
 CCTGGCTTGACACCATACTTGTCTTGTC
 CTTCTTTTAAACCTTCATTCACAAGTTGT
 AC
 AACTTGATCTGCTGTCATATTTTCATTTGA
 TAGAAGATGGGGCAGTATGATGTTTCGA
 A
 ATATGCAACCCCTTCCTTCAACTTATCTTC
 ACACAGATCTCTTGCAATTTCTTTATTGC
 TTCACTATCACCTCTTAGAATAGGCATATA
 GATTTCAAACCTCTTGATGAATTTTGTCAA

TGATCCACCACCCACTACATGTAGCTCTG
 AAGTGAAGTCTTTAAAGTTCTTTCCAGGC
 AG
 TGTATCTAACATGCCTCGTCGTTTTGCAAT
 GTTCCAAAGAGTTTCTGCCCGACAAGAA
 CC
 ATCAAGGTGGCAATGTAATTCAACCTAAA
 ATAAAAACCAATTCAACACATCCATAACA
 TT
 AAAT3'

CONCLUSION

It is obvious that CXCR4 gene is present in Invertebrates. This gene is, in human, in relation with immunodeficiencies and cancer. We suppose it is in correlation with immune defence in Echinodermata, since we discover, the IPA (Invertebrate Primitive Antibody) (Ref 1-2) in these same Echinodermata. Further studies are necessary to determine the exact rôle of IPA, of CXCR4 gene in these last ones.

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