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Echinodermata IGKAPPA Genes

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Abstract

We recall in this review, the sequences in 5'-3' of IGKAPPA Genes belonging to Asterids (Asterias rubens), Ophuirids (Ophiocomina nigra) and Crinoïds (Antedon bifida). Main characteristics are also given about these 3 classes of Echinodermata which include also Echinids and Holoturids.

1. Introduction

The sea star Igkappa gene was firstly found in 2014 [1]. Secondly, Ophiocomina nigra Igkappa gene and Antedon bifida Igkappa gene were discovered in 2018 [2,3]. In the present paper, their sequence transcriptomes are evoked.

2. Materials and Methods

2.1 Animals

Ophiocomina nigra (Ophuirid) Antedon bifida (Crinoïd) Asterias rubens (Asterids) were obtained at the station « Of Biologie Marine of Roscoff » France.

2.2 Obtention of mRNA

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

2.3 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 with default parameters [4]. 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+ with parameter word size 7 [5].

3. Results

The different sequences of Igkappa transcriptomes in 5'-3'are shown :

A. Firstly with Igkappa Asterias rubens :

5'TGATGAATCTCTTAAAATTATATTTAAAAATTACAAATTAAAAATTATTTGATAT
TTTGTTCTGGCTCAAACCTTATTGTATTTTGTGTTGTATCAAGACTATGTGCCTGGACTTGGTTT
GGGATCTTGCACCCCTAGGGTGGTTCTGTGGGGAACCGTGACAAGTGTTTCTGGAGGAAC
TTTTGTGAGAATTGTAGAAGAACACAAGTGAACCTCATGAACAAAGCAAACACCCACTTT
GTCAGAGATAGATTATCCTGTTCACAAATATCACAGTTATGCAGGTGTTTTTTGTTTTTT
TTCAATCTTTGTCTTTTTCAGACATTTATGGCAATGCAGTCCAAGTATGCACAACCAATG
TTTGTTTGTGGTAAATCTTTGTATGAAAACTATGTGTTTATTCACACTGTGATATCTACT
TAGTAAATTCATTCAATTTTCAGGGTTGATGCTTTGTAAACTTTGCTTTTTGTATAAAAT
AAGGAAACATAAATGGAATGTGAGGTAAAACAAAGTCAACAATGTACATAAATGTGGCCA
AGTCACACTAATGGGTTAAAAGATAACTTTGTAAATGAGGCGTGAGACAAATGTAACTTT
TTTGTCGCAGTCTTTTCCTGTACATTCAAAAGCTGTTCATGATTTTTCATTGCAAAAATA
AATAAATTGACCTTAAGAAGTTACAAGGTCATATATTACTACAAAACCACGTTCCCCTCA
TATGTTACTCTTTTGTGCACATCAGTGTAGAACCACCCACATATGTATATTGCGCCACTG
ACCTATGACATTTTGATGAATGCAATCGATGTGTAACACTTGTGGAATATTGAAGTGTGT
GTAGTACAATGGCACATTGTCCGTGTTTTGTATAAAAATAGGAAATAAAATGGTACACCA
CT 3'

B. Second, the Antedon bifida IgK transcriptome sequence is the one:

>TRINITY_DN9178_c0_g1_i2(Igk):
5'AGCGAATGAAAAAGAAGAACCGGCCAAAAAAAGTACTTCTACCAAAGAAGCGAATGAAAA
AGAAGAACCGGCCAAAAAAAGTACTTCTACCAAAGAAGAAACTGAAATAGAAGAACTAAC
CGAAACAAGTATTTCTACAAAATCAGTTTCTGCCAGTGATATATTCCTTGGTACAACTTT
CACACTGGAGATGGGATTCTGCGTAGGACCTGAACACAAACCGTTTACAGGAGATTTCGA
CGGTGACGGTAATGAAGATCTTCTGTTTCACAATTCAAAGACAGGCTCGAAAAAGATATA
CTATGCAAGTTGTGACGGCTCTTTTAATGGTGATAGGTCGTGGAGAAGAGAGATGAATTT
TTGCTACGTAAGTGGATATGATCTATACATTGGTGATTTCAACGGCGATGGTCGATCCGA
TATGCTGTGTCATCGTCCTCAGTATGGTCAGATTTGGGTTGTGTTGGCGCAACCTGGGGG
TGTATTCACTGCTAACCCGTGGTCGTATAGTCCCAATTGGTGCAAGGCCACCACTGATAA
AGTATATATTGGAGACTTCAACGCAGACGGTCGGGATGATATTCTTTGCCACACACAAAG
TTCGGGTTACATTGCAATATATTATGCATTATACACTGGTTATTTTTCTACCTCTACAAC
ATATCGCTTTACACGAAGTATGAGTTGGTGCAGAGGTACATATCAAAGAGTGTATACTGG
AGATTTCAACGGAGACCGAAGGGTTGATATGCTCTGCCACGACTACTCATCTGGCTACAT
ATATGTAGCAGTAGCCACAGCGACTGGTGGATTCACCTCTGCCACATGGAGCAGAAGTAT
GGGCTGGTGCAAGCATTCGAACTCTAAGCTCAGCATTGGAGATTTCAATAAAGATAACCG
CGACGACATCATGTGCAGCGACACAAATGGTCCTTACTGGATAGCATTCTCTCTGTACAA
CGGTTCGTTTTCATCTAAAAGCTGGACCCGTAAACAAAACTGGTGTACATCTGGCAATGA
TGTGTTAGTTTCGGATGTGAATGGAGATGGTGGGGATGATTTGATGTGCCATAATGAAGC
CGACGGCATCAAGTACATATCGATCAACCATAAGGCCTAAAGCAAGTTCCTCTCAATATT
ACAGAAAACTATTCACCACAAATGATTCATTTTGTACTGAACCTCAATTCAAATTCAATT
AAAATTTACATAAACGTTAACGGAAGGATACAATCAACTAAAATAATGTTCATTCATTAT
TTTTCGTCGATAACCTAAACAAAAATCAGATAAGAAATTATACAATAATATACTGTAAAC
GTATTATACAAAATAATTAAATGTATATTAAGCTACTGTACTTAGAAATGTACTTGTACG
CTTATTAATATTAATAAGCCTAATGCCCGGGTTGATAATAATAAAATACATTTTTGCAAG
TTCAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAACTCAAAA
GTCCCAGGCCCCACCCCGACCTACTGAACCAGAAAG3'

C. Third, the sequence of Ophiocomina nigra Igk transcriptome appears as following :

>BC030813.1 Homo sapiens immunoglobulin kappa locus, mRNA (cDNA clone MGC:22645 IMAGE:4700961), complete cds

5'GAGGAACTGCTCAGTTAGGACCCAGACGGAACCATGGAAGCCCCAGCGCAGCTTCTCTTCCTCCTGCTAC
TCTGGCTCCCAGATACCACTGGAGAAATAGTGATGACGCAGTCTCCAGCCACCCTGTCTGTGTCTCCAGG
GGAAAGAGCCACCCTCTCCTGCAGGGCCAGTCAGAGTGTTACCAGCAACTTAGCCTGGTACCAGCAGACA
CCTGGGCAGTCTCCCAGGCTCGTCATCTATGGTGCATCCAGCAGGGCCAGTGGTGTCCCAGCCAGGTTCA
GTGGCAGTGGGTCTGGGACAGAGTTCACTCTCACCATCAGCAGCCTGCAGTCTGAAGATTTTGCAGTTTA
TTACTGTCAGCAGTATAATAAGTGGCCGCACACTTTTGGCCAGGGGACCAAGCTGGACATCAAACGAACT
GTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTG
TGTGCCTGCTGAATAACTTCTATCCCAGGGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATC
GGGTAACTCCCAGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTG
ACGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTACGCCTGCGAAGTCACCCATCAGGGCCTGAGCT
CGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAGAGGGAGAAGTGCCCCCACCTGCTCCTCAGTTC
CAGCCTGACCCCCTCCCATCCTTTGGCCTCTGACCCTTTTTCCACAGGGGACCTACCCCTATTGCGGTCC
TCCAGCTCATCTTTCACCTCACCCCCCTCCTCCTCCTTGGCTTTAATTATGCTAATGTTGGAGGAGAATG
AATAAATAAAGTGAATCTTTGCAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3'

4. Conclusion

Three sequence IGKAPPA transcriptomes are described in 3 classes of Echinodermata (Asterids, Crinoïds, Ophuirids) out of 5. They show 2 IG sites or more. We have decided to interpret them as IPA (Invertebrate Primitive Antibody). Complement genes have also been described in these 3 classes. They make the immune humoral response possible in these 3 invertebrates.

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