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Journal of Applied Biotechnology & Bioengineering

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A true new gene in ophiocomina nigra: an ophuirid Igkappa gene

Abstract

An Igkappa gene was discovered in the transcriptome of the Ophuirid: Ophiocomina nigra. So, with the Asterid: Asterias rubens, 2 classes of Echinodermata, possess each an Igkappa gene. It remains enigmatic, when we have a look on the 3 other classes without this gene: The Echinids, Holothurids, and Crinoids.

Keywords: invertebrate, ophiocomina nigra, ophuirid igkappa gene, HRP

Volume 5 Issue 1 - 2018

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Received: January 09, 2018 | **Published:** January 29, 2018

Introduction

Recently, investigations performed in our laboratory, have provided evidence, that the Ophuirid: Ophiocomina nigra (Echinodermata), presented antibody-like reactions with cellular and humoral reactions to peroxydase antigen. These reactions are similar to those observed in the sea star Asterias rubens, another Echinodermata[1] and we know that the Asterias rubens genome contains the sea star Igkappa gene with Ig sites,[2] a Fab gene, a Fc receptor gene. The aim of this work consists to explore immune genes in the genome of virgin Ophiocomina nigra.

Materials and methods

Ophiocomina nigra was collected to the Biologic station of Roscoff (France). Digestive coeca were excised and treated with Uptizol (Interchim) to obtain m RNA Ophiocomina nigra.

Preparation of library (RNA), by the use of the kappa mRNA hyper prep kit

Sequencing: the sequencing was done with a NextSEq 500 Illumina(2.75 bases). Transcriptome was assembled from RNA-Seq fastq files using Trinity v2.1.1[3] 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+[4]) with parameter word size 7.

Results

An obtained blast against homo sapiens was very highly significant (E-value of 2,00E-12). Undoubtly it brings the evidence of the existence of an Ophuirid-IGKappa gene (Table 1).

The sequence follows

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

5' GAGGAACTGCTCAGTTAGGACCCAGACGGAACC
ATGGAAGCCCCAGCGCAGCTTCTCTTCCTCCTGCTAC
TCTGGCTCCCAGATACCACTGGAGAAATAGTGAT
GACGCAGTCTCCAGCCACCCTGTCTGTGTCTCCAGG
GGAAAGAGCCACCCTCTCCTGCAGGGCCAGTCAG
AGTGTTACCAGCAACTTAGCCTGGTACCAGCAGACA
CCTGGGCAGTCTCCCAGGCTCGTCATCTATGGTG
CATCCAGCAGGGCCAGTGGTGTCCCAGCCAGGTTCA
GTGGCAGTGGGTCTGGGACAGAGTTCACTCTCAC
CATCAGCAGCCTGCAGTCTGAAGATTTTGCAGTTTA
TTACTGTCAGCAGTATAATAAGTGGCCGCACACT
TTTGGCCAGGGGACCAAGCTGGACATCAAACGAACT
GTGGCTGCACCATCTGTCTTCATCTTCCCGCCAT
CTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTG
TGTGCCTGCTGAATAACTTCTATCCCAGGGAGGC
CAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATC
GGGTAACTCCCAGGAGAGTGTCACAGAGCAGGAC
AGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTG
ACGCTGAGCAAAGCAGACTACGAGAAACACAAAG
TCTACGCCTGCGAAGTCACCCATCAGGGCCTGAGCT
CGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTG
TTAGAGGGAGAAGTGCCCCCACCTGCTCCTCAGTTC
CAGCCTGACCCCCTCCCATCCTTTGGCCTCTGAC
CCTTTTTCCACAGGGGACCTACCCCTATTGCGGTCC
TCCAGCTCATCTTTCACCTCACCCCCCTCCTCCT
CCTTGGCTTTAATTATGCTAATGTTGGAGGAGAATG
AATAAATAAAGTGAATCTTTGCAAAAAA A A A A A A A
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA **3'**

Table 1 An obtained blast against homo sapiens was very highly significant (E-value of 2,00E-12)

Query ID	Query name	Subject ID	Identity	Length	Mismatch	Gapopen	E-value
BC030813.1	Igk	TRINITY_DN64572_c0_g1_i1	89.47	57	6	0	2,00E-12

Conclusion and discussion

A gene of about 960 nucleotides appears. It is longer than the one found in Asterias rubens (Asterid) in immunized sea stars to HRP.[2] For the second time, "The classic immunology" is broken with the emergence, in Invertebrates, of a gene which has the property of Invertebrate primitive antibody. But it would be necessary to correlate this gene to the obtained immune reaction in Ophuirids. A bright avenir is opened in the field of comparative immunology.

Highlights

- In 2015 discovery of the sea star Igkappa gene
- Discovery of the sea star Primitive antibody

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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Citation: Leclerc M, Marie Y, Davoult D, et al. A true new gene in ophiocomina nigra: an ophuirid Igkappa gene. *J Appl Biotechnol Bioeng.* 2018;5(1):17–18. DOI: 10.15406/jabb.2018.05.00111