

Adaptative Immunity, A True New Gene in Ophiocomina Nigra: An Ophuirid Igkappa Gene

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Abstract

It was shown 32 years ago that the sea star axial organ cells (AO cells) produced a spontaneous cytotoxicity against mouse cancerous cells. Recently, we discovered a sea star Ig kappa gene with immune properties. This gene was inserted in a CMV (cytomegalovirus) and finally in a plasmid called « young » plasmid. The induced « young » protein exerted a spontaneous cytotoxicity against Hela cells (cervix carcinoma cells) and at a weaker degree against dendritic cells, MSC cells.

Keywords: Ophiocomina nigra; Ophuirid Igkappa Gene

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 peroxidase antigen. These reactions are similar to those observed in the sea star *Asterias rubens*, another Echinodermata and we know that the *Asterias rubens* genome contains the sea star Igkappa gene with Ig sites, a Fab gene, a Fc receptor gene [1-4]. 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 with default parameters. A BLAST database was created with the assembled transcripts using make blast db application from ncbi-blast+ (v2.2.31+) [5]. The sequences of transcripts of interest were then blasted against this database using blastn application from ncbi-blast+ with parameter word size 7 [6].

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.

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

The Sequence Follows

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

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5'GAGGAACTGCTCAGTTAGGACCCAGACGGAACCATGGAAG
CCCCAGCGCAGCTTCTCTTCTCCTGCTAC
TCTGGCTCCCAGATACCACTGGAGAAATAGTGATGACGCAGT
CTCCAGCCACCCTGTCTGTGTCTCCAGG
GGAAAGAGCCACCCTCTCTGCAGGGCCAGTCAGAGTGTTAC
CAGCAACTTAGCTGGTACCAGCAGACA
CCTGGGCAGTCTCCAGGCTCGTCATCTATGGTGCATCCAGC
AGGGCCAGTGGTGTCCAGCCAGGTTCA
GTGGCAGTGGGTCTGGGACAGAGTTCACCTCACCATCAGCA
GCCTGCAGTCTGAAGATTTTGCAGTTTA
TTACTGTCAGCAGTATAATAAGTGGCCGCACACTTTTGGCCA
GGGGACCAAGCTGGACATCAAACGAACT
GTGGCTGCACCATCTGTCTTCATCTTCCC GCCATCTGATGAG
CAGTTGAAATCTGGAACGCCTCTGTTG
TGTGCCTGCTGAATAACTTCTATCCCAGGGAGGCCAAAGTAC
AGTGAAGGTGGATAACGCCCTCCAATC
GGGTAACCTCCAGGAGAGTGTACAGAGCAGGACAGCAAGG
ACAGCACCTACAGCCTCAGCAGCACCCTG
ACGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTACGCC
TGCGAAGTCACCCATCAGGGCCTGAGCT
CGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAGAGG
GAGAAGTGCCCCACCTGCTCCTCAGTTC
CAGCCTGACCCCTCCCATCCTTTGGCCTCTGACCCTTTTTC
ACAGGGGACCTACCCCTATTGCGGTCC
TCCAGCTCATCTTTCACCTCACCCCTCCTCCTCTTGCTT
TAATTATGCTAATGTTGGAGGAGAATG
AATAAATAAAGTGAATCTTTGCAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3'

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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 [3]. 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 Ophurids. We suggest that the Echinodermata primitive antibody is composed of 4 sub-units Kappa light Chains of 30.000 daltons each, as it was said for the Asterid: *Asterias rubens* A bright avenir is opened in the field of comparative immunology [1].

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