

## Primitive Immunoglobulins from ophiocomina Nigra (Ophuirids) Igkappa Gene When Compared to Human Immunoglobulin Kappa Locus. Bioinformatic Data. The Ophuirid Anti-Hrp Protein

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### Abstract

Entiere identities between Invertebrate *Ophiocomina nigra* IGKappa gene and Human IGK gene are confirmed, in the present work, at the level of immunoglobulin domains (constant and variable) and by informatic technology. Have to speak from now of Echinoderm primitive Immunoglobulins. A such supposed anti-HRP « Immunoglobulin » Protein was shown in microscopy.

**Introduction:** The transcriptome of the Ophuirid : *Ophiocomina nigra* IGKappa gene which has been discovered recently(1). Since it was synthesized de novo and cloned in a pUC-GW-Kan plasmid (2) which was a gift of Bo Huang laboratories+.

**Materials:** The original sequence of the Ophuirid IGKappa gene, after cloning, was the following in 5'-3'

**Keywords:** *Homo sapiens*, *Ophiocomina nigra* IGKappa gene etc.

### Original sequence

GAGGAACTGCTCAGTTAGGACCCAGACGGAACCATGGAAGC  
CCCAGCGCAGCTTCTCTTCTCTGCTACTCTGGCTCCCAGA  
TACCACTGGAGAAATAGTGATGACGCAGTCTCCAGCCACCCT  
GTCTGTGTCTCCAGGGGAAAGAGCCACCCTCTCTGTCAGGG  
CCAGTCAGAGTGTTACCAGCAACTTAGCCTGGTACCAGCAGA  
CACCTGGGCAGTCTCCCAGGCTCGTCATCTATGGTGCATCCA  
GCAGGGCCAGTGGTGTCCCAGCCAGGTTCACTGGCAGTGGG  
TCTGGGACAGAGTTCACTCTCACCATCAGCAGCCTGCAGTCT  
GAAGATTTTGCAGTTTATTACTGTCAGCAGTATAATAAGTGG  
CCGCACACTTTTGGCCAGGGGACCAAGCTGGACATCAAACG  
AACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGA  
TGAGCAGTTGAAATCTGGAAGTGCCTCTGTTGTGTGCCTGC  
TGAATAACTTCTATCCCAGGGAGGCCAAAGTACAGTGGAAAG  
GTGGATAACGCCCTCCAATCGGGTAACTCCAGGAGAGTGT  
CACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCA  
GCACCCTGACGCTGAGCAAAGCAGACTACGAGAAACACAAA  
GTCTACGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCC  
CGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAGAGGGAGA  
AGTGCCCCCACCTGCTCCTCAGTTCAGCCTGACCCCTCCC  
ATCCTTTGGCCTCTGACCCTTTTTCACAGGGGACCTACCCC  
TATTGCGGTCTCCAGCTCATCTTTCACCTACCCCCCTCCTC  
CTCCTTGGCTTTAATTATGCTAATGTTGGAGGAGAATGAATA  
AATAAAGTGAATCTTTGCAAAAAAAAAAAAAAAAAAAAAA  
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  
AAAAAAAAAAAAAAAAAAAAAAAAAAAA

On the other hand we present, an anti-HRP (Horse-Radish peroxydase) protein in the Ophuirid : *Ophiocomina nigra*, (Fig.1) (3)

It results from immunization of *O. nigra* to HRP. We notice some plasmolymphocytic cells, in photon microscopy, which have reacted positively (brown coloration) to HRP : HRP which is revealed by diaminobenzidin. These « precipitates » may correspond to « Primitive Immunoglobulins » from Invertebrates.

### Results and Conclusion

The original gene, the original protein issued from this last one share total identity with *Homo sapiens* immunoglobulin kappa locus, mRNA (cDNA clone MGC:22645 IMAGE:4700961) : they have a complete identity (Fig 2) and share nearly 100 AA common, in constant and variable domains respectively

The Sequence of the concerned gene is ID: BC030813.1 At last the Protein GenBank (4) has the following number: AAH30813.1 with 234 amino acids as shown below:

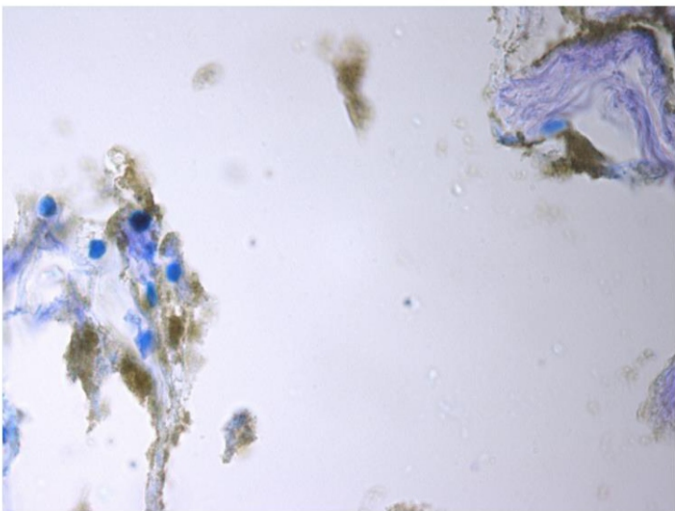
MEAPAQLLFLLLWLPDPTGEIVMTQSPATLSVSPGERATLSC  
RASQSVTSNLAWYQQTGQSPRLVIYGASSRASGVPARFSGS  
GSGTEFTLTISLQSEDFAVYYCQYQNKWPHTFGQGTKLDIKR  
TVAAPSVFIFPPSDEQLKSGTASVCLLNNFYFPREAKVQW  
KVDNALQSGNSQESVTEQDSKSTYSLSSTLTLSKADYEKHK  
VYACEVTHQGLSPVTKSFNRGEC

It is shown inconclusion, that an invertebrate Echinoderm (Ophurid Class) IGKappa gene shares entire identity with a human immunoglobulin IGK (Fig.2). From now on we have to thinkof: Invertebrate Primitive Immunoglobulins about Echinoderms as it is said about IPA(Invertebrate Primitive Antibody) (5) also in Echinoderms.

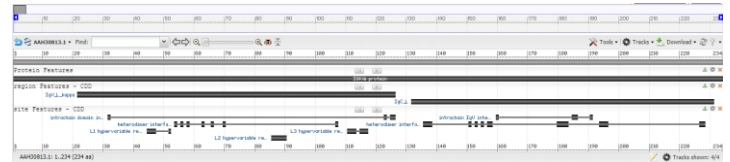
We have not yet the three-dimensional structure of this protein. On the other hand we have the sea star one which is, in a certain way its “sister” in the phylogenetic tree. In fact, compared sequencing of Human IGK and Ophiocoma nigr IGKappa gene present more 90% in similarities as shown in Fig.2. We have illustrated this work with a supposed anti-HRP “Immunoglobulin” from Ophiocoma nigr (Fig.1), in photon microscopy.

In the present time, we don't know the evolutionary process which leads from Echinoderms to Man, in matter of Immunoglobulin “Immunology”. If there is an evolution in this process, many steps are requested to explain such a phenomenon, which suddenly appears, so: MHC genes, CDR1, CDR2, CDR3 regions in the Invertebrate Primitive Antibody (5)

+ We thank greatly Bo Huang Laboratories



**Fig. 1: HRP (Magnification 1000)**



**Figure 2:**

IGK@ protein [Homo sapiens] graphic (in dark) by NCBI (<https://www.ncbi.nlm.nih.gov/protein/AAH30813.1?report=graph>) shares IG domains with Ophiocoma nigr IGKappa protein (in grey) issued from ophurid IGKappa gene

GenBank: AAH30813.1 protein issued from IGK gene has two immunoglobulin domains:

#### 1. Region 1

Region : IgV\_L\_kappa

Comment : Immunoglobulin (Ig) light chain, kappa type, Variable (V) domain

Location : 22...126

Common Length 105 aa

#### 1. Region 2

Region : IgC\_L

Comment : Immunoglobulin constant domain

Location : 132...231

Common Length 100 aa

#### References

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