

## Evolution of the Sea Star Igkappa Gene

Michel Leclerc

556 rue Isabelle Romée, 45640 Sandillon (France)

\*Corresponding Author: Michel Leclerc, 556 rue Isabelle Romée, 45640 Sandillon (France)

### ABSTRACT

Next to the sea star T and B lymphocytes, the preservation of the IgKappa gene for so extended a period of evolution in organisms as distinctively different as sea star, fish, mammal, indicates that it plays an essential rôle in the survival of organisms : rôle in the regulation of immune response, in Asterids. The presence of Fc receptor gene, Fab gene in *Asterias rubens* complete these data.

### INTRODUCTION

The purpose of this work is to draw attention to the mass of Igkappa genes that has accumulated on the sea star Immune system since 2011. From this year, genomes of immunized and non-immunized sea stars to HRP (horse-radish peroxydase) have been studied (1). Although IgKappa gene has been isolated (2) and found in mouse, this gene has also been detected in fish (Zebra fish and *Larimithys crocea*) and mammals. In this paper we will mainly review information on a fish : *Larimithys crocea* and a mammal : *Tupaia chinensis*, to attempt to evoke Igkappa gene evolutionary considerations.

### RESULTS

The sea star Igkappa gene is clearly the oldest IgKappa gene of the immune system of animals.

It shows already two Ig sites (Ref.2). The forms of Igkappa genes are all found in vertebrates, they share many details with the sea star, including the presence of Ig sites.

The preservation of the Igkappa gene in immunized and non-immunized sea stars is an excellent opportunity for further experiments. It is important to notice that the Igkappa chain V-III region HAH of *Tupaia chinensis* is situated (in the assumptions behind the theory of evolution) between the Igkappa chain precursor V-II region (RPMI/133) and Igkappa chain precursor V-IV region/121 The sequence of the anti-HRP IGKappa transcriptome is following (in 5'-3') :

5'TGATGAATCTCTTAAAATTATATTTAA  
AAATTACAAATTAATAATTATTTGATAT  
TTTGTTCTGGCTCAAACCTTATTGTATTT  
TGTGTTGTATCAAGACTATGTGCCTGGA

CTTGGTTT  
GGGATCTTGCACCCCTAGGGTGGTTCTG  
TGGGAACCGTGACAAGTGTTCCTGGAG  
GAAC  
TTTTGTGAGAATTGTAGAAGAACAACAG  
TGAACCTCATGAACAAAGCAAACACCCA  
CTTT  
GTCAGAGATAGATTATCCTGTTCAAAA  
TATCACAGTTATGCAGGTGTTTTTGT  
TTT  
TTCAATCTTTGTCTTTTTTTCAGACATTTAT  
GGCAATGCAGTCCAAGTATGCACAACCA  
ATG  
TTTGTGTTGTGGTAAATCTTTGTATGAAAA  
CTATGTGTTTATTCACACTGTGATATCTA  
CT  
TAGTAAATTCATTCAATTTTCAGGGTTGA  
TGCTTTGTAAACTTTGCTTTTTGTATAAA  
AT  
AAGGAAACATAAATGGAATGTGAGGTA  
AAACAAAGTCAACAATGTACATAAATGT  
GGCCA  
AGTCACACTAATGGGTTAAAAGATAACT  
TTGTAATGAGGCGTGAGACAAATGTAA  
CTTT  
TTTGTGCGAGTCTTTTCTGTACATTCAA  
AAGCTGTTTCATGATTTTTTCATTGCAAAAA  
TA  
AATAAATTGACCTTAAGAAGTTACAAGG  
TCATATATTACTACAAAACACGTTCCCC  
TCA  
TATGTTACTCTTTTGTGCACATCAGTGTA  
GAACCACCCACATATGTATATTGCGCCA  
CTG  
ACCTATGACATTTTTGATGAATGCAATCG  
ATGTGTAACACTTGTGGAATATTGAAGT  
GTGT  
GTAGTACAATGGCACATTGTCCGTGTTTT

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GTATAAAAATAGGAAATAAAAATGGTACA  
CCA CT 3'

### CONCLUSION

The preservation of the IgKappa gene for so extended a period of evolution in organisms as distinctively different as sea star, fish, rodent, mammal, indicates that it plays an essential rôle in the survival of the organisms, rôle in the regulation of the immune response.

Additionally, the existence of members of the IgKappa gene family with conserved functional characters, indicate that the sea star IgKappa gene has evolved prior to the evolutionary

divergence between Invertebrate and Vertebrates: It must be claimed .

On the other hand, the discovery of a Fc receptor gene, of a Fab gene, in *Asterias rubens* genome corroborate the presence of the primitive Invertebrate antibody in asterids (**IPA**).

### REFERENCES

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