

## C1q Tumor Necrosis Factor Gene Family In *Asterias Rubens*

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### Abstract

C1q tumor necrosis factor related protein 4 gene (a new cytokine) was recently discovered in the sea star genome. Its genome and role were presented in a recent report

New C1q tumor necrosis factor genes were also found in the *Asterias rubens* genome. They may be considered as adipokines for the first ones and complement activator for the third one. These genes have been discovered in mammal's genomes and described, for the first time, in an invertebrate: the sea star *Asterias rubens*.

**Keywords:** TNF; cytokines; sea star; Invertebrates.

### Introduction

It is important to speak, first of all, of adipokine biology. Adipokine polypeptides produced by adipocytes, include adiponectin and many cytokines of the immune system, such as TNF. They have potent autocrine, paracrine and endocrine functions (Ref.1). They are characteristics of Vertebrates as complement activators we have, nevertheless, discovered in an invertebrate: the sea star *Asterias rubens* (Ref.2).

Complement activator is an important component of the innate immune response against viral infection and also shapes adaptive immune responses. VACCC complement control protein C3 vaccinia virus: a complement control protein (VCP) plays a role as modulator of the complement activation in mouse (Ref.3): it was found also in *Asterias rubens* genome when compared to mouse one..

### Materials and methods

Sea stars were obtained from the Biology Institute (Gothenburg University)

Immunizations to HRP, genomic studies were already described (Ref.4)

After ligation of adapters for Illumina's GSII sequencing system, the cDNA was sequenced on the Illumina GSII platform sequencing.

1.100 bp from one side of the approximately 200 bp fragments sequences were assembled using Velvet (Ref.5).

### Results

First, results in non-immunized sea stars were given:

Control:Contig13514 sp|Q9ES30|C1QT3\_MOUSE Complement C1q tumor necrosis factor-related protein 3 OS=Mus musculus GN=C1qtnf3 PE=2 SV=1

Control:Contig3127 sp|Q8K479|C1QT5\_MOUSE Complement C1q tumor necrosis factor-related protein 5 OS=Mus musculus GN=C1qtnf5 PE=1 SV=1

Second, results in HRP sea stars which have been immunized to HRP were presented:

HRP:Contig1946|m.5489 sp|Q9ES30|C1QT3\_MOUSE Complement C1q tumor necrosis factor-related protein 3 OS=Mus musculus GN=C1qtnf3 PE=2 SV=1

HRP:c43408\_g1\_i1|m.4242 sp|P68639|VCP\_VACCC Complement control protein C3 OS=Vaccinia virus (strain Copenhagen) GN=C3L PE=1 SV=1

### Discussion . Conclusion

The dispatching of genes is different from a point of view of sea star immunization to HRP (Horse-radish peroxidase). So the VACCC Complement control protein C3 was only found in immunized sea star genome. The question is: Is it the fact of immunization which induces such gene in sea star? In all our experiments which present such phenomenon, we have not given elaborated responses. In the present case we consider that it is a mystery for us. So further studies would be necessary to clarify the question.

We just may say that the found genes are usually described in Vertebrates. Two out of three could be considered as cytokines of The TNF family genes.

The third one plays a role in innate immune response and adaptative one: it's a regulator of Complement. The presence of a complement system is clearly established in Asterias rubens

It is the first time we analyse such sophisticated genes belonging to the Tumor Necrosis Factor (TNF) family, in an Invertebrate.

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