

# Major Histocompatibility Complex Genes in Echinodermata

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## Abstract

MHC Class II gene was described in Echinodermata, so in Invertebrates. For the present time MHC Class I gene was not found in a significant manner (e-value too weak) but further studies are necessary to conclude about its existence in Echinodermata.

**Key words:** MHC genes; Echinodermata.

## INTRODUCTION

As C.A Janeway wrote in 2001: "The operate of MHC molecules is to bind amide fragments derived from pathogens and show them on the cell surface for recognition by the suitable T cells [1]. the implications area unit nearly always hurtful to the pathogen-virus-infected cells area unit killed, macrophages area unit activated to kill bacterium living in their animate thing vesicles, and B cells area unit activated to supply antibodies that eliminate or neutralize living thing pathogens. Thus, there's sturdy selective pressure in favor of associate microorganism that has mutated in such how that it escapes presentation by an MHC molecule.

Two separate properties of the MHC create it troublesome for pathogens to evade immune responses during this approach. First, the MHC is polygenic: it contains many completely different MHC category I and MHC category II genes, in order that everyone possesses a collection of MHC molecules with completely different ranges of peptide-binding specificities. Second, the MHC is very polymorphic; that's, there are a unit multiple variant of every cistron at intervals the population as a full. The MHC genes area unit, in fact, the foremost polymorphic genes known Because of the polygeny of the MHC, everyone can specific a minimum of 3 completely different antigen-presenting MHC category I molecules and 3 (or generally four) MHC category II molecules on his or her cells. In fact, the amount of various MHC molecules expressed

on the cells of {most people most of the people the cisternal public the majority} is larger attributable to the acute polymorphism of the MHC and the codominant expression of MHC gene product.

The term polymorphism comes from the Greek poly, which means several, and morphed, which means form or structure. As used here, it means that within-species variation at a cistron locus, and so in its macromolecule product; the variant genes which will occupy the locus area unit termed alleles. There are a unit quite two hundred alleles of some human MHC category I and sophistication II genes, every cistron being gift at a comparatively high frequency within the population. therefore, there's solely a little probability that the corresponding MHC locus on each the homologous chromosomes of a personal can have constant allele; most people are heterozygous at MHC loci. the actual combination of MHC alleles found on one body is understood as associate MHC haplotype. Expression of MHC alleles is codominant, with the macromolecule product of each the alleles at a locus being expressed within the cell, and each cistron product having the ability to gift antigens to T cells. The intensive polymorphism at every locus so has the potential to double the amount of various MHC molecules expressed in a personal and thereby will increase the range already offered through polygeny.

In addition to the extremely polymorphic 'classical' MHC category I and sophistication II genes, there are a unit

several genes encryption MHC category I-type molecules that show very little polymorphism; most of those have nonetheless to be appointed a operate. they're connected to the category I region of the MHC and their precise variety varies greatly between species and even between members of constant species. These genes are termed MHC category IB genes; like MHC category I genes, they inscribe inscribe cell-surface molecules. Their expression on cells is variable, each within the quantity expressed at the cell surface and within the tissue distribution".

In human, the most operate of major organic phenomenon complicated (MHC) category II molecules, is to gift processed antigens that area unit derived primarily, from exogenous sources.

Constitutive expression of MHC category II molecules is additionally confined to skilled antigen- presenting cells (APC) of the system [2].

Since we've discovered the IPA (Invertebrate Primitive Antibody), to accumulate an improved understanding of the invertebrate system, it appeared helpful to appear for MHC genes (HLA-DRB1 gene)(HLA-C gene) in invertebrates with Ophiocominanigra (Ophuirids), Antedon bifida (Crinoïds) as model of studies[3-6]. On the opposite hand we'll have a glance on an MHC category I cistron (HLA-C gene) like a molecule that may be a heterodimer consisted of an important chain and a lightweight one (beta-2 macroglobulin).

## MATERIALS AND METHODS

### Animals

Ophiocominanigra (Ophuirid) Antedon bifida (Crinoid) were obtained at the station of Biologie Marine of Roscoff, France.

Obtention of ophuirid and crinoid template RNA

Digestive coeca were excised from their bodies and template RNA were obtained from Uptizol (Interchim) then qc was operated [7].

## Sequencing

Sequencing was created on Illumina Next Seq five hundred with paired end: a pair of. 75 bp. Transcriptome was assembled from RNA-Seq fastq files victimisation Trinity v2.1.1 with default parameters [8]. A BLAST info was created with the assembled transcripts victimisation makeblastdb application from ncbi-blast+ (v2.2.31+). The sequences of transcripts of interest were then blasted against this info victimisation blastn application from ncbi-blast+ with parameter word size 7[9].

## RESULTS AND DISSCUSSION

MHC cistron category II seems within the ordination of Ophiocominanigra and Antedon bifida one, in a very vital manner. The transcriptomes square measure given within the following tables, with the sequences simply when. First Ophiocominanigra results show the "HLA-DRB1" transcriptome that possesses a brief sequence however a particular one (Table 1).

We find the transcriptome known as HLA-DRB1 Antedon bifida with the subsequent e-value, identity, bit score. The sequence in 5'-3' shows additionally a brief one as for the ophuirid: Ophiocominanigra however remains extremely specific (Table 2).

MHC ClassI cistron wasn't found, a minimum of in a very vital manner (the e-value wasn't significative).

## CONCLUSION

It is obvious that MHC classII gene (HLA-DRB1 gene) exist in Echinodermata, a minimum of in Echinodermata that possess a classy system as Asterids, Ophuirids, and Crinoïds. it might be fascinating additionally to review MHC system in Echinodermata that gift solely innate immunologic response as Echinids, Holothurids [10]. The HLA-DRB1 cistron may be a a part of a family of genes known as the human leucocyte substance (HLA) complicated.

**Table 1:** First Ophiocominanigra results.

QueryID	Quer Name	SubjectID	Identity (%)	Length	Mismatch	Gapopen	Query cover (%)	E-value	Bitscore
NM_002124.3	HLA-DRB1	TRINITY_DN4807_c1_g1_i1	90,77	65,00	3	2	5,00	1,00E-15	84,20
>TRINITY_DN4807_c1_g1_i1									

**Table 2:** Second Ophiocominanigra results.

QueryID	Quer Name	SubjectID	Identity (%)	Length	Mismatch	Gapopen	Query cover (%)	E-value	Bitscore
NM_002124.3	HLA-DRB1	TRINITY_DN20232_c5_g3_i1	83,05	59	9	1	5,00	4,00E-06	52,80
>TRINITY_DN20232_c5_g3_i1									

The macromolecule encoded by this cistron belongs to the HLA category II beta chain paralogues. the category II molecule may be a heterodimer consisting of associate alpha (DRA) and a beta chain (DRB), each anchored within the membrane. It plays a central role within the system by presenting peptides derived from living thing proteins to T helper cells. category II molecules square measure constitutively expressed in skilled substance presenting cells (APC: B lymphocytes, nerve fiber cells, macrophages) and will be induced in non-professional APCs. DRB1 is expressed at tier 5 times beyond its paralogues DRB3, DRB4 and DRB5. DRB1 is gift all told people. gene variants of DRB1 square measure connected with either none or one in all the genes DRB3, DRB4 and DRB5. There square measure four connected pseudogenes: DRB2, DRB6, DRB7, DRB8 and DRB9.

We attempt currently to seem for MHC category I genes in Ophurids and Crinoïds. The HLA-C cistron (we looked for) belongs additionally to the HLA complex: it helps the system to tell apart the body own proteins from proteins created by foreign invaders like viruses and microorganism.

Although all efforts to seek out in Invertebrates a serious organic phenomenon complicated System are unsuccessful, we discover nowadays, for the primary time, an MHC category II cistron (HLA-DRB1 gene) in

Echinodermata: It's of nice novelty. It's an elementary discovery within the domain of Comparative medicine.

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