Human Oncologic Markers Genes In The Crinoïd:Antedon Bifida (Echinodermata)

Michel Leclerc

Immunology of Invertebrates University of Orleans, France

Received: September 29,2018; Accepted: October 1, 2018; Published: January 03, 2019

***Corresponding authors:** Michel Leclerc, Immunology of Invertebrates University of Orleans, 556 rue Isabelle Romée, 45640 Sandillon, France, Email: mleclerc45@gmail.com

Abstract

Evidence of breast cancer 1 and 2 genes and Estrogen receptor 1 one were found in the genome of the crinoïd : Antedon bifida(an ancestral Echinodermata) in a significant manner.

Key words : Invertebrate, Echinodermata, Antedon bifida, human oncologic marker genes.

Thank you and best regards. Michel Leclerc

Results

Evidence of BRCA1, BRCA2, ESR1 genes occur in Antedon bifida

we complete this table by giving the sequences of BRCA1, BRCA2 transcriptomes :

>TRINITY_DN19334_c8_g2_i1 (BRCA1)

```
5'TGTAATCCCAGCACTTTGGGAGGCCGAGGCGGGCGGATCACGAGGTCAGGAGATCGAGAC
CATCTGGCTAACACAGTGAACCCCGTCTCTACTAAAAATACAAAAATTAGCCGGGCG
TGGTGGCGGGCGCTGTAGTCCCAGCTACTCGGAGGCTGAGGCAGGAGAATGGCGTGAA
CCCGGAGGCGGAGCTTGCAGTGAGCCGAGATCGCGCACTGCACTCCAGCCTGGGCGAC
AGAGCGAGACTCTGTCTCAAAAAAAAAAAAAAAAAAAAAA 3'
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>TRINITY_DN19334_c8_g1_i1 (BRCA2)

```
5'GTGCTTTAGAAATGTCGATTATCCGGTGATCACCTGAGGTCAGGAGTTCGAGACCAGC
CTGGCCAACATGGTGAAACCCCGTCTCTATTAATAATACAAAAATTGGCCGGGCGCGGTG
GCTCACGCTGTAAATCCAGCACTTTGGGAGGCTGAGGTGGGTGGATCACCTGAGGTCAG
GAGTTCGAGACCAGCTGGCCAACATGGTGAAACCCCGTCTCTATTAATAATACAAAAAT
TGGCCGGGCGCGGTGGCTCACGCTGTAATCC 3'
```

At last, the sequence of ESR1 is shown

>TRINITY_DN20534_c0_g1_i5 (ESR1)

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5'CGAAGTGTTGGTGATATATTGACATTAATTTAAATTATTTTCAAGACAATATTTCTGTA
GGCAATGTTAGCACATCAAGCATCATCAAAACGGAAGCTACAACGGTGATGTAGCAACA
TATCAGCAGCATTCTAAACACATCAGACATCGACCAGCAGCACAAGCATACAACGCCA
AGACATCGAATTTTAGTACGACAAGTCGTCATGCGGATGAACCGGAATGGAAGAAGTG
AAAGATCATCCATGTCACAAAAATATGTCTACCACTGCAGATTTTATCATCAGTATTT
GGTGCAATTCGCGCATGGTGAAATGACATTAGTAACGCCATAGGACCATTTCGTGGCATTG
TGGGTCAATTACACAACCGGTGATGTCCAACAAGAGGAACAGTTGCAATCTGGATTCTA
GTTTATGGATCAGCTGGCGTAGCAGTCGGATTGTGGGTACTTGGGAAAAGAGTTATTGAG
ACAGTTGGCGGAGGACTTAACACCATTAACGGTTTCAAGTCGTTTACAATTGAAGTTGGT
TCAGCAACAACCGTTCTAGTTGCCTCCAACCTGGGAATACCAATAAGCACAACGCAATTGT
AAAGTAGGATCAGTGGTTGCGGTCGGATGGGTGAGAACAAAAACAGCAGTTGATTGGAAG
TTGTTCTATGGCATAATTGCAGCCTGGATCATCAGCTTCCTGCCACTGTTGGTCTTAGT
GCTCTGTCGATGTTCTGCTTCAGAAAACTGAGTGTGAACAGAGTTGGATTTTAATAAT
GGTGTATGATAACATAAGTCGTATCATATTATGTTTACCAGGAATACATAGGAATATC
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Introduction

Many investigations concerning the genome of Antedon bifida have been performed in our laboratory (Ref. 1, 2, 3). It seemed interesting to look for genes implicated in cancerology diagnosis which is a true problem of Human Society.

BRCA1, BRCA2, CASC8, CASC16, ESR1, CRP genes were mainly studied.They encode

for cancer susceptibility proteins as breast, ovarian cancers.

Materials And Methods

Animals (Antedon bifida)

were obtained from « the station marine » of Roscoff (France)

Obtention of crinoïd mRNA

Digestive coeca were excised from the A. bifida body.

A. bifida mRNA was obtained from Uptizol (Interchim). Quality control were operated.

Sequencing

Sequencing was made on Illumina Next Seq 500 with paired-end : 2. 75 bp. Transcriptome was assembled from RNA-Seq fastq files using Trinity v2.1.1 (Ref.4 with default parameters. A BLAST database was created with the assembled transcripts using makeblastdb application from ncbi-blast+ (v2.2.31+). The sequences of transcripts of interest were then blasted against this database using blastn application from ncbi-blast+ (Ref;5) with parameter word_size 7.

CGGTAATACAAGGTCATGTGTGGCACAAAGTGTGGCTGTATCATGTAAGGTTAAGAGATGA
GTATGGCCTATGATACTAGGCAATACATGTGGAGTCCATGTGTATACCAAATA
TCCATGTGATACTGGGAAATTTAGATAGAACAGAGAATCGGGTGCTGTTTGGAAAT
CCAATCCATAAGAAAAACAAAAGCCAGTAGCCTATGTCCACACAATGAGAATTCAGC
AACTTTATTTATTTATGATTACAGGAAGCTAATATGGAATTAATAAGAGGGGAGGTTATTG
TATATACGATTGATTGGTATTCCTAGTGACTGAGGGTATAGATGCCGGATATTGGCTG
ATGTCGTCTTTGATGGTTAATGCATCCCTGGCCATCAAAAATGATTGCAGATAATAAA
AGTTAACAATGATCTGAACAGTATCGACTGTAACCTGTGACGTCAGGATAAGAAATGGG
GAGGCAGTGAACAAGTAATTTGGGAGAATTATCTGTAATTTTATTTTATCACTTTCTGATG
TACTGTACAAGTGCATATTGCACAATCCAAAATTTAAATTTAAAAAAAATCATCATAA
TATATTGTATATGCATTAATAACAACTATATAGATAATAGTAATTTTAAATTTAC
ATTTTGTGAAATGAATACTTGTCTGTGAGAAGAAATATACTATTGTTGATCTAAAGTT
AGTTATACCTTCATAATAAATTTGATAACATTAACAATAAATAAGATGTATCTATATG
TGCTTCTTTATAATGGTAATTTGAGTCAATATTTGAATTTAGCAAACCTCAACAGACTGCA
CAAACGTGTGATGCTTGAGTACAAAATATCTCGATGGTAAAAATCATGTGACAAGGTGTTT
TTGTAATAATTTAGTTAAACATTTAGTAAATCCGAAAAAAAACAACATTTTACTGGTC
CTCTTACGAGAGACTGATCTACTACCTTTATTTCTATTATTACTTCTATTATTAATTAATAC
TACTAAAACGTGATAATCCATAATCATATTAAACCTTCTAGTGTTTTCTTCAATTTTA
CTTAATGTATTAAATTTGTTTGTGGAAGTAGAAATGTGACAACCATCAGCTCAAATC

CAACTTGTAAACATGCATTATTATTGGATTCAATAAAAAAAGAAGAATATATTTAAATA
CACCGTATTTTACTTCAGTTTGTGCCTTACATAAGGTATTTGAAATACCTTACTACTT
AAAAATAATACCTTACAGTGGTACTACAATAAACCAACCTTTGTCAAATCAAATTAC
GAAAAGTAATCTATTAATTGATTCTCAGAATACTAAATTAGTAATCCTTTAATCTTAA
CCATATTTCCCTAAAACCACCAAGGAAAAATTACAAATGTGCCAAGGATTACTCAGATT
ATAAAAAATACAGTATATGTACAGTACAAGTTAAATTTTAGTTTAAATGAAAAATATT
GATTGAACGGGTTAAAAATCTTTCAGTTGTTACAAGTTTGTGCCATATGACCTACTAAC
CAATTGAATACAACCTGTGGAAGCTGATTATATAATTAACCAGCAAATTAATTTCTAAGAA
ATCCCATAGTTCTTGTACCAATCTGTATATTACATTGTTGTGAGGCTTTGAAGATAGGTA
TCGGCGCATGGAAGGTGATGTCAGGTCGGAATGTGCTTTCCAGACAGGTTACCAACA
AACATCGCATAGCTTGTATGTAATCTTGTATCCAAGGTGAAGCGATGTTATTTCTT
GCAGGCAACACAATCAGGTCGTTCTTCTCCACGCAATCTCACCAACGTTTCATCCGGA
TCTCTAAATCAAAGTAACCACTTCCATCCAGAACAAACCGAATCTCCTCATCCGTATGA
AGATGTTCTCGAAAAAGATTTTATTTTCTTCTCATAATTGGGAAGTTTCTCTGGAGAA
ACAGTTATACAATCTTCATAGGAATATCTCTTCTTTCGCTATTTTGTCAAGCAACCTT
TCTTTTGTGTAATTTTCTGCATCTACCAGCAATATTTATACCATGTAATCCAAATAG
TCTAAATCCAACATTTGCACAGGCTCTAGATGGTGTTCAGGCGTTGATCTTTTCTTTA
TCATTATCCATAAACCAAGGCTTTCCACATGTTGACGACTTTTAGTAGACCTATTAGGCC
AAAGTATCTTTGATTGAGTCGAGAGCCGCTTGGGAAATATGAC3

Table 01 :

Query ID	Query Name	Subject ID	Identity (%)	Length	Mismatch	Gapopen	Query cover	E-value	Bitscore
NM_007298.3	BRCA1	TRINITY_DN19334_c8_g2_i1	85.3	279	36	3	8	4,00E-75	283
NM_000059.3	BRCA2	TRINITY_DN19334_c8_g1_i1	84.07	113	18	0	1	2,00E-22	110
NM_000125.3	ESR1	TRINITY_DN20534_c0_g1_i5	89.74	39	0	4	1	1,00E-03	47,3

Conclusion And Discussion

In humans, BRCA1 and BRCA2 genes can be considered as oncologic markers. It is said that mutations of these genes are more common in certain ethnic populations than others ; they increase a woman's risk of breast and ovarian cancer.

As for ESR1 gene, it encodes an estrogen receptor, a ligand activated transcription factor, composed of several domains important for hormone binding.

To find such genes in an invertebrate remains enigmatic but seems interesting from a point of view of the phylogeny of proteins and genomics

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