

Asymmetric paralog evolution between the “cryptic” gene *Bmp16* and its well-studied sister genes *Bmp2* and *Bmp4*

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This file contains three genes of the inshore hagfish *Eptatretus burgeri* and three genes of the cloudy catshark *Scyliorhinus torazame*.

The following three sequences have been identified in tblastn searches against the whole-genome shotgun contigs (wgs) of *Eptatretus burgeri* at NCBI (Assembly ID, GCA_900186335.2). Open reading frames have been manually curated. Below we provide the fasta header of the contig in the original genome assembly, followed by the curated mRNA sequence.

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>Eptatretus burgeri Bmp2/4/16-A predicted coding sequence in  
contig FYBX02009429.1  
ATGATTCTCGGTAGCCTCTTGACGCTCATGACCCTGCTAGCGTCCCATCGCGTCTCGAGGGG  
CGACATCGGCCTCGTCCCACGAGACGTGGCGGGGCTCCGGCTAGCACGGAGAGGCGATCCGG  
CGCTGCCATCGCGGGCGGATGATGTGCAGCTCGCGGACTCTTTGCGCATCCTCGAACGGCGA  
CTCCTCGACCTTTTTTGGCCTCCAGCGACGGCCTCGGCCCTCCCCGAACGCCGTGGTGCCGGA  
ATACATGTGGGAACGTGTACAGAGGCGTCCGGCGGGTCCCGGCCGATCGCTCGCACGGCTCCT  
CTGGGCTGTCCGTTCCGCGCGGTCTCTTCTCCAACACGGCCAGGAGCTTCCACCACGAAGAA  
TTGCTCGAAGTCGTACCTCCGACGAGCTCGTCGTATCCCGGACGGCGCTACGTTTTCAACAT  
GAGCAGCATAACCCGAGAGAGAGGTCATTTTCGGCAGCTGAACTGCGTCTATATCGCGCCCGAT  
CATCCCCAGACCACCAGCGCCGGCAGAAGCAGCAGCGCATCAATGTGTACGAGGTCATGCGT  
CCGGGTGCAGCGCCAGACGGAGTGTCCGTCGCTCGTCTGCTTGACACCCGCCTCGTGTGGAC  
CAACGAGAGTGGGTGGGAGGCATTTGACGTTAGCCCGACGGTTTTTGCATGGACCGCAGCCA  
CGGCTCACAACCATGGCATCTTGGTGGAGGTGTTGCAGGGCAATGACGAACCTAACTCCCTGG
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CGAGACGAAAGCCACAACGTGCGTCTAAGTCGGTCGCTGCACGACTACGAATCGGCCACCTG
GGCACAGCAGCGGCCACTGCTCGTCACCTTTGGTCACGATGGACGAAAGGATGCGACCCACG
TGGACCGGAGCGAAGAGGATGGTCGGACACGGAGCAAACGCCGTGCGGGCAAGCATCGATCA
GGAGGAGGTGGAAGAGGTGGGAGAGGTAAAGGAGGGGGTGGAGGAGGAGGACGCCGCAGTCG
GGGGACCTGCAACCGGCACCCCTTTGTATGTCGATTTTCAGTGATGTGGGCTGGAACGACTGGA
TCGTGGCTCCACCAGGCTACCACGCGTTTTTCTGCCAAGGTGAATGTCCCTTTCCCCTGGCC
GAGCACCTCAACTCCACCAACCACGCCATCGTGCAGACCCCTCGTGAACCTCGGTGAACCCGGC
GGTGCCCCGGGCATGCTGCGTCCCGACGGAACCTGAGCGCCATCTCGCTACTTTACCTGGACG
AGTACGACAAGGTGGTACTGAAGAACTACCAAGACATGGTGGTGGAGGGTTGCGTTTTGCCGC
TAA

>Eptatretus burgeri Bmp2/4/16-B predicted coding sequence in
contig ScVlheP_9746

ATGACCATGCCGCCTACTCGAACCCTCTCATGGTGTTCGCGCTCTGCAGCACTCTGATCTA
CGATCTCGTCCACGGAACCATGCCGAGCTCGCACCTGGACACTGGTAGTTTACTGCCGCACC
TGGAAGCTCAACTTCTGGGGGTATTTCGGTCTCAGGCGGCGGCCTCGGCCGCGAAGAGACGCT
GTGATCCCTCCCTACCTGCTTGAGATGTATCGATTGCACTCTGGGGAGCAACCTTCCGCAGG
AACCTTGAAGGACTTCGCCTTCTCGGAACGCGCGGCCTCTATTGCCAACACAGTTCGCGCTT
TCTATCATGAAGAATCGATTGAAGAACTAGATGTCTCGCCTGCAAATGCAGTATTTTCGTGCC
ACGTTCAATCTAAGCAGCATACTCCTGGGGAGGCTGTGCTGGCAGGTGAGCTGCGAATATT
CCGCGAAGGACATCGTGTGGCAGCTCCAGACTATAATGGACACCTCCGCATCAACGTATACG
AAAACCGGCAGATGGGGCGCGATCTAACCCTCGTCTATTGGACACACGTGTCTTCCATGTT
GGCTCCACCAGGTGGGAAAGTTTTGACGTGAGTCTGGCCTTGCTGAGGTGGACCCGTGTCCC
TGACTCCAACCTGGGACTTACGTTGGAGGTCACATCCCTCAACGGCACTTCTGATGGTATCC
TGCAAAGGACGTGGCACCACGTTTCGCATCAGCCGCTCTGTGGGAGCACCACAACATAACCTA
GACACTCACTGGCCACTGCTGCGTCCGCTCCTGGTCACCTACAGCCACGATGGTAAAGGTCA
GGCTCTGAGAGGGTTCGAGGCGTAAAAGGCGTGCAAGGCGCGGTAAGAAACATTTGAGGCGAC
TACGAGCGAACTGTCAGCGACATATGCTTTATGTGAACTTCACTGAGGTCAACTGGAATGAT
TGGATAGTTGCGCCACCCGGCTATCAAGCTTATTATTGCCAGGGCCAATGTCTTTTCCACT
GGCTGAACACCTTAACTCCACAAACCATGCAATTGTGCAGACACTTGTGAACTCGGTGATTG
CGAGCATTCACGCTGCTTGCTGTGTCCCAACCACCCTGAGTCCCATCTCACTGTTGTATCTG
GATGAAGACGATAAGGTGGTTCTCAAAAACCTATCAAGATATGGTGGTAGAAGGTTGTGGTTG
TCGATAG

>Eptatretus burgeri Bmp2/4/16-C predicted coding sequence in
contig ScVlheP_10101

ATGTTGGCGAGCCCGCCATGCGCATTCGGCGCTCTGGATAACTCGGGCGAGGTGACCGGGTC
CAGCAGCTCAAACGAGCGGCTGTGGAAGGAGACCAGCTCGACCGCGCCACAGCTTTTGCCCA
CACTTGAGTCCCACCTCCTGGGAATGTTTCGGGCTCGAGAAGAGGCCCCGGCCAGGGAGACGT
CCCGTTATCCCTCGATACCTGCTCGACCTCTACAGGCTGCAATCAGGAGAGGCTCCCTGGCC
GAGTTCCGAGTTGGAGTTGCCCCTGGGAGCGAGCCGAGCGAACACCGTGCAGACATTTTCACT
ACGACGAGTCATTGGATGAAAACGTTGACACATCATCATCATCATCATCATCATCATCT
GAGGTGCATCGGTTTCATCTTCCCGCTGGACAGCGTCCCTGCAGGCGAGGAGGTCACGGCAGC
AGAGTTGAGGCTTTTCCGTTACCACTTCACGACGCTGCTGACTCTGCTCGATGCTTCCACC
GTATCAACGTGTATGAGGTTTTACAGGGAAGAATGATGGAGGGAGTGGGATCGAGCACCATG
GGAGTGTGGATGGAGCAGTACGCGAGGGGACAAAATCGTCGGACAGAGCCATTACTCGCTT
ACTGGACTCCAAACGCGTTTCGTCATAACCAGACTCGTTGGGAAAGTTTTGACGTGAGTCCTG

CTGTGTTACGGTGGACAAGAGGTCAGGCACCAAACCTCGGTCTCCACGTTGAGATTGTGGCC
GAAGAAGGCTGCGAAGGAACCAATAGCACTGGGCATGTGCGGGTGAGCCGCTCGGTGTACAC
CAAGGACCAGGAGCGATGGTCACAGGTACAGCCACTGCTTGTTCCTACAGCCATGATGGTG
GTGGCGCGACACTGATCCACAGATCCAAGAGGAGCCGAAAACGACCCAAAGGACGCAGGAGA
CACAAGCAGAACTGCCGGCGGCGCCACCTCTTCGCCAACTTTACCGAGCTCCGCTGGAACGA
TTGGATTGTTGCTCCACTGGGATACAACGCTTATTATTGTCAGGGTGAGTGTCCCTTCCCAT
TGGCAGAACATTTGAACTCCACGAATCATGCCATTGTACAACTCTCGTGAACCTCGGTGAAT
GAGAGCATCCACGCGCTTGCTGTGTGCCCACCGAGCTGAGCGCAATCGCCATGCTCTACCT
GGATGAGTACAACAAAGTGGTGCTGAAGAACTACCAGGATATGGTGGTAGAAGGTTGCGGAT
GCCGCTAG

The following three sequences have been identified in assembled RNA-seq data of *Scyliorhinus torazame* embryos.

>*Scyliorhinus torazame Bmp2*

ATGACCGCGGGCAGACGACCTCTGATGGTGCTCCTGCTTTGTCAGGTCCTCTTCGGAGGCTC
GGCCGGGCTCATCCCCGAGATGGGCCGGAGGAAGTTCACCCAGCAGCAGGAGGCCAACTCGG
GGGGCCGGGCGAGCCCCCTGCAGACCGAGGGCATGCTCCAGGAGTTCGAGCTGCGGCTGCTC
AACATGTTTCGGCCTGCGGCGCCGCCCTCAGCCCGGCAAGGAGCCGCTGATCCCGCACTACAT
GCTGGAGCTGTACCGGCTGCATTCGGAGGAGGAAGGGCAGCCTGGCACGCTCCTGCCCCGGT
TCCCCGAGAGGCCAGCCAGCCACGCCAACACAGTCAGGAGCTTCCACCACGAAGAACCAATG
GAGAAGCTGCCTGGAGCCAGAGGAGAGACAACCCGCCGATTTTTCTTCAGTTTGAACCTCTAT
ACCGCATGAGGAGCTCATCACCTCGGCAGAATTGAGGATCTACCGCGAGCAGGAGCAAGAGG
CCTGTGCAAATAGCAGCGGTGGTTACCACCGCATCAACGTTTATGAGATTCTCAAGGCAGAA
GGATCCCCTGGCAGTGATCCGATCACGCGATTGCTGGACACAAAACCTGGTGCACCACAACGT
GAGCAAGTGGGAGAGCTTTGACGTCAGTCCTTCTGTCATGAGATGGACCGTACAGGGGCAGC
CCAACCATGGGTTTATGGTGGAAGTCATTCACTTGGAGCAGGAGTGCAGACACTCAAAGCGA
CATGTCAGGATCAGTCGGTCTTGCACCAAGATGAAGAAAGCTGGCCTCAGATGAGGCCTTT
GTTGGTAACGTTTAGCCACAATGGCAAAGGACATACTCTTGAGAAAAGAGTGAGGCGTCAGG
CCAAACACAAGCAGAAGAAAAGGCACAGGTCGAGCTGCAAGCGGCATCCTTTATACGTGGAT
TTCAGTGACGTGGGGTGGAATGACTGGATAGTGGCACCTCCAGGATATCACGCCTTTTACTG
CCAAGGGGAGTGTCCCTTTCCATTGGCAGATCACTTGAACCTCAACGAACCATGCCATTGTGC
AGACATTGGTAAACTCTGTCAATGCAAACATTCCCAGGGCATGCTGCGTCCCAACGGACCTC
AGTCCCATCTCAATGCTTTATCTTGATGAATACGACAAAGTTGTATTAAAGAACTACCAAGA
TATGGTTGTGGAAGGTTGTGGATGTCGT

>*Scyliorhinus torazame Bmp4*

ATGATTCCCTGGTAACCGAATGCTGATGGTAATTTTATTATGCCAAGTCTTACTGGGAGGTAA
TGCTAGTCTGATACCAGAGGAAGGGAGGAAAAAGTTTCGCTGAGCAAAACCAGGCGGGTGGAC
GTCGCTCTCCGCAAAACCATGAACTGCTACGCGAATTTCGAGGCCACTTTACTCAACATGTTT
GGGCTGCAGAGGCGCCCGCAGCCCAGCAAGTCTGCGGTCTGCCCCAGTACATGCTGGATCT
CTACAGGCTGCAGTCCGGGGACGAGATCACCCACGACATTAGCTTCGAGTATCCCGAGAGAT
CCACGAGCCGGGCCAACACCGTGAGGAGCTTTCACCACGAAGAACACTTGGAGCTGATGCCA
GGGCAGAGGGAAGACACCCAGCTTCGCTTTGTCTTTAATATCAGCGTGGTGGCCGAGAACGA
GGTGCTCTCTTCTGCGGAGCTGCGGCTGTACCGGGAGCAGATCGACAGCGTTTGGAGCAGCG

AGGAGGATGGGTTCATCGCATCAACGTTTACGAGATCATGAGAGCCCCAGCGAGAAGGGA
GGGCTGATCAGCAGGCTCCTCGACACCAGGCTGGTGCACCAGAACAGGACGCGCTGGGAGAG
CTTTGACGTGAGCCCGGCGGTGCTGAGGTGGACCATGCAGAGAGAGCCCAACCACGGCCTGG
CCGTTCGAGGTGATCCACCTGAACGAGACTACCAAGAGGCGGCACGTCCGGATTAGCAGGTGC
CTGCACCAAAGGCACGCCGGCGACTCGTCCCAGCTCAGGCCTTTACTTGTAACCTTCAGCCA
CGACGGCAAGGGACACGCTCTCACGCGGAGGGTGAAACGGAGCAGCAAGGGGCAGAGGCGCA
AGAAGAACAAATCTCACTGCAGGAGGCACTCCCTCTACGTGGATTTCAGCGACGTGGGCTGG
AACGACTGGATCGTCGCGCCGCGCGGTTACCAAGCTTTTTTACTGCCACGGGGACTGCCCTT
CCCCTGGCGGACCACCTGAACTCGACGAACCACGCCATCGTGCAGACACTCGTCAATTTCGG
TGAACCTCAACATCCCCAAGGCTTGCTGCGTCCCCACAGAACTCAGCCCCATCTCAATGCTT
TACTTGACGAGTATGACAAAGTTGTGCTGAAAACTATCAGGAGATGGTCGTGGAGGGATG
TGGCTGCCGC

>*Scyliorhinus torazame Bmp16*

ATGCTCCCTGCTAGCTTTCTACAGATGGTCGTGCTGTCTGCCCGGCTCCTGGTCGCTGGAGA
GATCAACTCGTCCTCTGAGGGAGGGAGGAGGGCATCTTCGAGTGCCAGCCGGGAGGAAGGTG
CCTCCCGCTCCTCGCCCGATGCGGAGCTGGTCCACACCCTCCGCCGGACGCTGCTGGGCAGG
TTTGGCCTGAGCCGCCTCCCCAAGCCAGGCCTGGCCGCCGTCGTCCCTCAGTACATGCGTGA
CCTGTACCACCTCCACACCGGCGATCACGACAACATCCAGGGCTCCAGCTTCGCCTTCCTGG
AGCGGCACGCGGGCGACGCCAACACAGTCCGGAGCTTCCATCATCTGGAACACGTCCAGGGG
GCGCCCCATTTCAGAGGGAGGAAATTTCCACCAGATTGTCTTCAACCTGACCAACATTCCCAA
CCACGAGCGAGTCACTTCGGCCGAGCTGCGTTTATTCAGGGAAGATAATGGTGGAGCACGTC
CTGGGCTGGAAGCGGTCGCCGTCTACGAACTGCGGGGGCCCCCAGGCGGCCAGGTGGGGCGC
CGGCTGCTGGAGAGGAGGCTACTGCCCGCCAACCGCACCCAATGGGAAAGCTTCAACGTGGG
CCCGACTGTGGCCGGCTCCAGGAAGGGGCGCGGGGGCCTCGTCACCTTCCTGGTCGAGTGGC
CGCCGGGGCGGCGGAGGGTGGGCAGGTCGCTGTGGGGGCGGCCGGCCAGCCGGGTGCGC
AGGCCGCTCCTGGTCACCTACGGGCAGGACGGCAGCGGGAGGGCCCTGGGCCCCAGGGGCAA
GCGGCCCCGGCGGGCGGCGGAGGACGCGGAAGAGGAGCCGGGGCCACAGCCGCTGCCGGAGGC
GGCCGCTCTACGTGGACTTTGAGCGGGTGGGCTGGACGGAGTGGATCATTGCCCCCGTGGC
TACAACGCCTTCTACTGCCAGGGCGAGTGCCGCTTCCCCTTGGCCGACCACATGAACTCCTC
CAGCCATGCCATCGTGCAGACGCTGGTGAACCTCTGTCAACACCAACATTCCCAGGGCCTGCT
GCGTGCCAACCGAGCTGAGCCCAGTGCCATGCTCTACTTGACGACGATGACAGGGTCGTC
CTGAAGAATTACCAGGAGATGGTTGTCTGAAGGGTGTGGATGCCGC