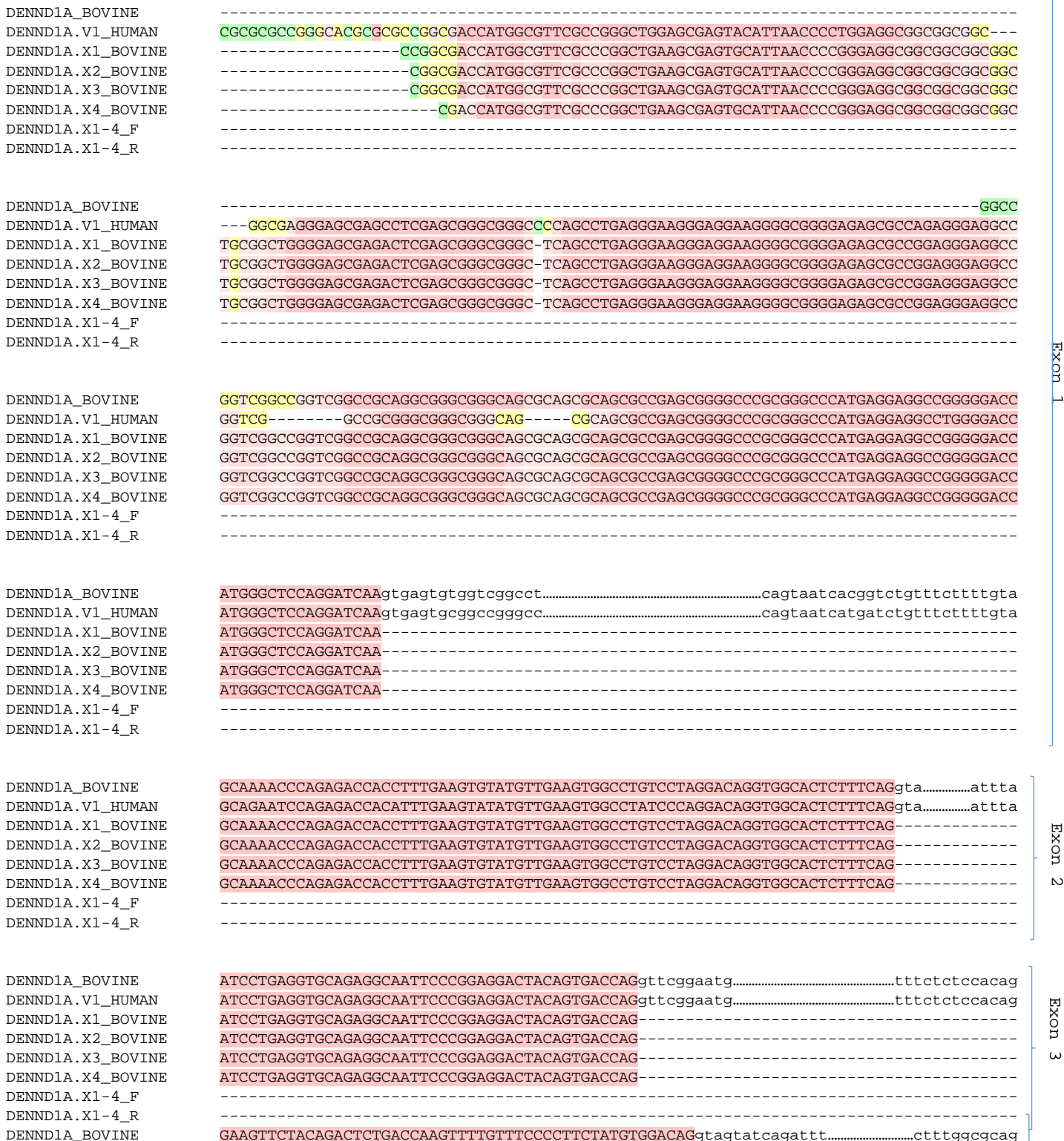


**Fig S2. Alignment of the exons of human *DENNDIA.V1*; bovine *DENNDIA*; predicted bovine *DENNDIA.X1,2,3,4*; and *DENNDIA.X1,2,3,4* primer sequences.** Alignment was generated with CLUSTAL O (1.2.4) multiple sequence alignment based on sequences available at Ensembl Asia with transcript ID: human *DENNDIA.V1* (ENST00000373624.6) and bovine *DENNDIA* (ENSBTAG00000003610) and at NCBI PubMed with accession numbers: predicted bovine *DENNDIA.X1* (XM\_005213126.4); *DENNDIA.X2* (XM\_015473579.2); *DENNDIA.X3* (XM\_015473580.2); and *DENNDIA.X4* (XM\_024998568.1). The alignment was analysed with T-COFFEE (1) and colored based on the consistency: red (high), yellow (average); green and blue (poor). Consistency is estimated from CORE index. Bright aqua highlighted areas represent the primer sequences. .... represent intronic areas not shown so as to reduce the size of this file.

1. Notredame C, Higgins DG, Heringa J. T-Coffee: A novel method for fast and accurate multiple sequence alignment. *J Mol Biol.* 2000;302(1):205-17. doi: 10.1006/jmbi.2000.4042.



DENND1A.V1\_HUMAN GAAGTTCTACAGACTTTGACCAAGTTTTGTTTCCCCTTCTATGTGGACAGgtagtagatcagattt.....ctttgctgcag  
DENND1A.X1\_BOVINE GAAGTTCTACAGACTCTGACCAAGTTTTGTTTCCCCTTCTATGTGGACAG-----  
DENND1A.X2\_BOVINE GAAGTTCTACAGACTCTGACCAAGTTTTGTTTCCCCTTCTATGTGGACAG-----  
DENND1A.X3\_BOVINE GAAGTTCTACAGACTCTGACCAAGTTTTGTTTCCCCTTCTATGTGGACAG-----  
DENND1A.X4\_BOVINE GAAGTTCTACAGACTCTGACCAAGTTTTGTTTCCCCTTCTATGTGGACAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 4

DENND1A\_BOVINE CCTCACAGTTAGCCAAGTTGGCCAGAACTTACATTCGTGCTCACTGACATTGACAGCAAACAGAGATTCGGGTTCTGCCGCTT  
DENND1A.V1\_HUMAN CCTCACAGTTAGCCAAGTTGGCCAGAACTTACATTCGTGCTCACTGACATTGACAGCAAACAGAGATTCGGGTTCTGCCGCTT  
DENND1A.X1\_BOVINE CCTCACAGTTAGCCAAGTTGGCCAGAACTTACATTCGTGCTCACTGACATTGACAGCAAACAGAGATTCGGGTTCTGCCGCTT  
DENND1A.X2\_BOVINE CCTCACAGTTAGCCAAGTTGGCCAGAACTTACATTCGTGCTCACTGACATTGACAGCAAACAGAGATTCGGGTTCTGCCGCTT  
DENND1A.X3\_BOVINE CCTCACAGTTAGCCAAGTTGGCCAGAACTTACATTCGTGCTCACTGACATTGACAGCAAACAGAGATTCGGGTTCTGCCGCTT  
DENND1A.X4\_BOVINE CCTCACAGTTAGCCAAGTTGGCCAGAACTTACATTCGTGCTCACTGACATTGACAGCAAACAGAGATTCGGGTTCTGCCGCTT  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 5

DENND1A\_BOVINE ATCTTCAGGAGCAAAGAGTTGCTTCTGTATCTTAAGgtaaggaaaatgg.....tcttcttccctcag  
DENND1A.V1\_HUMAN ATCTTCAGGAGCAAAGAGTTGCTTCTGTATCTTAAGgtaagggagaagg.....tcttcttccctcag  
DENND1A.X1\_BOVINE ATCTTCAGGAGCAAAGAGTTGCTTCTGTATCTTAAG-----  
DENND1A.X2\_BOVINE ATCTTCAGGAGCAAAGAGTTGCTTCTGTATCTTAAG-----  
DENND1A.X3\_BOVINE ATCTTCAGGAGCAAAGAGTTGCTTCTGTATCTTAAG-----  
DENND1A.X4\_BOVINE ATCTTCAGGAGCAAAGAGTTGCTTCTGTATCTTAAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 6

DENND1A\_BOVINE CTATCTCCCCTGGTTCGAAGTATTTTATAAGCTACTTAAACATCTTGGCAGATTACACGACAAAAGGACAGgtat.....tttcag  
DENND1A.V1\_HUMAN CTATCTCCCCTGGTTCGAAGTATTTTATAAGCTACTTAAACATCTTGGCAGATTACACGACAAAAGGACAGgtat.....tttcag  
DENND1A.X1\_BOVINE CTATCTCCCCTGGTTCGAAGTATTTTATAAGCTACTTAAACATCTTGGCAGATTACACGACAAAAGGACAG-----  
DENND1A.X2\_BOVINE CTATCTCCCCTGGTTCGAAGTATTTTATAAGCTACTTAAACATCTTGGCAGATTACACGACAAAAGGACAG-----  
DENND1A.X3\_BOVINE CTATCTCCCCTGGTTCGAAGTATTTTATAAGCTACTTAAACATCTTGGCAGATTACACGACAAAAGGACAG-----  
DENND1A.X4\_BOVINE CTATCTCCCCTGGTTCGAAGTATTTTATAAGCTACTTAAACATCTTGGCAGATTACACGACAAAAGGACAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 7

DENND1A\_BOVINE GAGAGTCAGTGAATGAGCTTCTTGAAACTCTGTACAAACTTCCATCCCTGACCCAGGAGTGTCTGTTTCATCTCAGTGTGg...g  
DENND1A.V1\_HUMAN GAAAATCAGTGAATGAGCTTCTTGAAACTCTGTACAAACTTCCATCCCTGACCCAGGAGTGTCTGTTTCATCTCAGCGTGg...g  
DENND1A.X1\_BOVINE GAGAGTCAGTGAATGAGCTTCTTGAAACTCTGTACAAACTTCCATCCCTGACCCAGGAGTGTCTGTTTCATCTCAGTGTGg...g  
DENND1A.X2\_BOVINE GAGAGTCAGTGAATGAGCTTCTTGAAACTCTGTACAAACTTCCATCCCTGACCCAGGAGTGTCTGTTTCATCTCAGTGTGg...g  
DENND1A.X3\_BOVINE GAGAGTCAGTGAATGAGCTTCTTGAAACTCTGTACAAACTTCCATCCCTGACCCAGGAGTGTCTGTTTCATCTCAGTGTGg...g  
DENND1A.X4\_BOVINE GAGAGTCAGTGAATGAGCTTCTTGAAACTCTGTACAAACTTCCATCCCTGACCCAGGAGTGTCTGTTTCATCTCAGTGTGg...g  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 8

DENND1A\_BOVINE CATTCTTATTTTACTGTGCCTGATACCAGAGAACTTCCCAGCATCCCTGAGAATgtaagtactt.....tttctcctag  
DENND1A.V1\_HUMAN CATTCTTATTTTACTGTGCCTGATACCAGAGAACTTCCCAGCATACCTGAGAATgtaagtactt.....tttctcctag  
DENND1A.X1\_BOVINE CATTCTTATTTTACTGTGCCTGATACCAGAGAACTTCCCAGCATCCCTGAGAAT-----  
DENND1A.X2\_BOVINE CATTCTTATTTTACTGTGCCTGATACCAGAGAACTTCCCAGCATCCCTGAGAAT-----  
DENND1A.X3\_BOVINE CATTCTTATTTTACTGTGCCTGATACCAGAGAACTTCCCAGCATCCCTGAGAAT-----  
DENND1A.X4\_BOVINE CATTCTTATTTTACTGTGCCTGATACCAGAGAACTTCCCAGCATCCCTGAGAAT-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 9

DENND1A\_BOVINE AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTAACAACATGTTACATCTGTATGCCAGTATGCTCTACGAACGCCGGATA  
DENND1A.V1\_HUMAN AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTAACAACATGTTACATCTGTATGCCAGTATGCTCTACGAACGCCGGATA  
DENND1A.X1\_BOVINE AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTAACAACATGTTACATCTGTATGCCAGTATGCTCTACGAACGCCGGATA  
DENND1A.X2\_BOVINE AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTAACAACATGTTACATCTGTATGCCAGTATGCTCTACGAACGCCGGATA  
DENND1A.X3\_BOVINE AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTAACAACATGTTACATCTGTATGCCAGTATGCTCTACGAACGCCGGATA  
DENND1A.X4\_BOVINE AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTAACAACATGTTACATCTGTATGCCAGTATGCTCTACGAACGCCGGATA  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 9

DENND1A\_BOVINE CTCATCATTTCAGCAAACCTCAGCACTgtgagtagacagctt.....aatctttaatctctgttgcag  
DENND1A.V1\_HUMAN CTCATCATTTCAGCAAACCTCAGCACTgtgagtagacagctt.....ctctgcttctctctgttccag  
DENND1A.X1\_BOVINE CTCATCATTTCAGCAAACCTCAGCACT-----  
DENND1A.X2\_BOVINE CTCATCATTTCAGCAAACCTCAGCACT-----  
DENND1A.X3\_BOVINE CTCATCATTTCAGCAAACCTCAGCACT-----  
DENND1A.X4\_BOVINE CTCATCATTTCAGCAAACCTCAGCACT-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE TTGACTGCCTGCATCCACGGGTCTGCTGCGATGCTCTACCCCATGTTCTGGCAGCACGTGTACATCCCTGTCTGCCTCCACAT  
DENND1A.V1\_HUMAN CTGACTGCCTGCATCCACGGGTCTGCGGCGATGCTCTACCCCATGTACTGGCAGCACGTGTACATCCCCGTCTGCCGCCGAT  
DENND1A.X1\_BOVINE TTGACTGCCTGCATCCACGGGTCTGCTGCGATGCTCTACCCCATGTTCTGGCAGCACGTGTACATCCCTGTCTGCCTCCACAT  
DENND1A.X2\_BOVINE TTGACTGCCTGCATCCACGGGTCTGCTGCGATGCTCTACCCCATGTTCTGGCAGCACGTGTACATCCCTGTCTGCCTCCACAT  
DENND1A.X3\_BOVINE TTGACTGCCTGCATCCACGGGTCTGCTGCGATGCTCTACCCCATGTTCTGGCAGCACGTGTACATCCCTGTCTGCCTCCACAT  
DENND1A.X4\_BOVINE TTGACTGCCTGCATCCACGGGTCTGCTGCGATGCTCTACCCCATGTTCTGGCAGCACGTGTACATCCCTGTCTGCCTCCACAT  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 10

DENND1A\_BOVINE CTGCTGGACTACTGCTGgtaaggccactg.....gtctctgtttctcttcacag  
DENND1A.V1\_HUMAN CTGCTGGACTACTGCTGgtaaggccactg.....gtctctgtttctcttcacag  
DENND1A.X1\_BOVINE CTGCTGGACTACTGCTG-----  
DENND1A.X2\_BOVINE CTGCTGGACTACTGCTG-----  
DENND1A.X3\_BOVINE CTGCTGGACTACTGCTG-----  
DENND1A.X4\_BOVINE CTGCTGGACTACTGCTG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAATGGAGgtaagttgacttct.....tttacttgcag  
DENND1A.V1\_HUMAN TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAATGGAGgtaagttgacttct.....tttacttgcag  
DENND1A.X1\_BOVINE TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAATGGAG-----  
DENND1A.X2\_BOVINE TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAATGGAG-----  
DENND1A.X3\_BOVINE TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAATGGAG-----  
DENND1A.X4\_BOVINE TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAATGGAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 11

DENND1A\_BOVINE AAAGTCAGAAGCATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCTGGAAACCCCTTTGATGACCTCCAG  
DENND1A.V1\_HUMAN AAAGTCAGAAACATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCTGGAAACCCCTTTGATGACCTCCAG  
DENND1A.X1\_BOVINE AAAGTCAGAAGCATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCTGGAAACCCCTTTGATGACCTCCAG  
DENND1A.X2\_BOVINE AAAGTCAGAAGCATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCTGGAAACCCCTTTGATGACCTCCAG  
DENND1A.X3\_BOVINE AAAGTCAGAAGCATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCTGGAAACCCCTTTGATGACCTCCAG  
DENND1A.X4\_BOVINE AAAGTCAGAAGCATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCTGGAAACCCCTTTGATGACCTCCAG  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 12

DENND1A\_BOVINE AGCCTCCCAAATGATGTGgtgggtaatgagctctcgagt.....ctccttctgtcatcag  
DENND1A.V1\_HUMAN AGCCTCCCAAACGACGTGgtaggtaatgagcttgcgagg.....cttctctccatcaccag  
DENND1A.X1\_BOVINE AGCCTCCCAAATGATGTG-----  
DENND1A.X2\_BOVINE AGCCTCCCAAATGATGTG-----  
DENND1A.X3\_BOVINE AGCCTCCCAAATGATGTG-----  
DENND1A.X4\_BOVINE AGCCTCCCAAATGATGTG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE ATCTCTTCCTTGAAGAGCCGGCTGAAGAAGGTGTCCACGACAACCTGGTGATGGTGTGGCCAGAGCCTTCTCAAGGCCAGGCC  
DENND1A.V1\_HUMAN ATCTCTTCCTTGAAGAAGAGGCTGAAAAAGTCTCCACAACCCTGGGGATGGTGTGGCCAGAGCCTTCTCAAGGCCAGGCC  
DENND1A.X1\_BOVINE ATCTCTTCCTTGAAGAGCCGGCTGAAGAAGGTGTCCACGACAACCTGGTGATGGTGTGGCCAGAGCCTTCTCAAGGCCAGGCC  
DENND1A.X2\_BOVINE ATCTCTTCCTTGAAGAGCCGGCTGAAGAAGGTGTCCACGACAACCTGGTGATGGTGTGGCCAGAGCCTTCTCAAGGCCAGGCC  
DENND1A.X3\_BOVINE ATCTCTTCCTTGAAGAGCCGGCTGAAGAAGGTGTCCACGACAACCTGGTGATGGTGTGGCCAGAGCCTTCTCAAGGCCAGGCC  
DENND1A.X4\_BOVINE ATCTCTTCCTTGAAGAGCCGGCTGAAGAAGGTGTCCACGACAACCTGGTGATGGTGTGGCCAGAGCCTTCTCAAGGCCAGGCC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 13

DENND1A\_BOVINE GCTTTCTTCGCGAGCTACCGAAACGCTCTGAAAATCGAGCCGgtgagtagc.....tctctgtctccag  
DENND1A.V1\_HUMAN GCTTTCTTCGCTAGCTACCGAAACGCTCTGAAAATCGAGCCGgtgagtagc.....tctctgtctccag  
DENND1A.X1\_BOVINE GCTTTCTTCGCGAGCTACCGAAACGCTCTGAAAATCGAGCCG-----  
DENND1A.X2\_BOVINE GCTTTCTTCGCGAGCTACCGAAACGCTCTGAAAATCGAGCCG-----  
DENND1A.X3\_BOVINE GCTTTCTTCGCGAGCTACCGAAACGCTCTGAAAATCGAGCCG-----  
DENND1A.X4\_BOVINE GCTTTCTTCGCGAGCTACCGAAACGCTCTGAAAATCGAGCCG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 14

DENND1A\_BOVINE GAGGAGCCAATCACCTTCTGCGAGGAAGCCTTCGTGTCGCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACC  
DENND1A.V1\_HUMAN GAGGAGCCGATCACTTCTGTGAGGAAGCCTTCGTGTCGCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACA  
DENND1A.X1\_BOVINE GAGGAGCCAATCACCTTCTGCGAGGAAGCCTTCGTGTCGCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACC  
DENND1A.X2\_BOVINE GAGGAGCCAATCACCTTCTGCGAGGAAGCCTTCGTGTCGCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACC  
DENND1A.X3\_BOVINE GAGGAGCCAATCACCTTCTGCGAGGAAGCCTTCGTGTCGCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACC  
DENND1A.X4\_BOVINE GAGGAGCCAATCACCTTCTGCGAGGAAGCCTTCGTGTCGCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE CAGCTGCAGCTCTTTAAACAGgtgcccagcctcccttg.....ttctttctttgtatag  
DENND1A.V1\_HUMAN CAGCTGCAGCTCTTCAAGCAGgtgcctc-cctccctgg.....ttccttctttctatag  
DENND1A.X1\_BOVINE CAGCTGCAGCTCTTTAAACAG-----  
DENND1A.X2\_BOVINE CAGCTGCAGCTCTTTAAACAG-----  
DENND1A.X3\_BOVINE CAGCTGCAGCTCTTTAAACAG-----  
DENND1A.X4\_BOVINE CAGCTGCAGCTCTTTAAACAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 14

DENND1A\_BOVINE TTTATCGATGGTAGATTAGACCTTCTCAATCTGGCGAGGGCTTCAGTGATGTTTTGAAGAGGAGATCAACATGAGCGAGTAT  
DENND1A.V1\_HUMAN TTTATCGATGGTAGATTAGATCTTCTCAATCTCCGGCGAAGGTTTCAGTGATGTTTTGAAGAGGAAATCAACATGGGCGAGTAC  
DENND1A.X1\_BOVINE TTTATCGATGGTAGATTAGACCTTCTCAATCTGGCGAGGGCTTCAGTGATGTTTTGAAGAGGAGATCAACATGAGCGAGTAT  
DENND1A.X2\_BOVINE TTTATCGATGGTAGATTAGACCTTCTCAATCTGGCGAGGGCTTCAGTGATGTTTTGAAGAGGAGATCAACATGAGCGAGTAT  
DENND1A.X3\_BOVINE TTTATCGATGGTAGATTAGACCTTCTCAATCTGGCGAGGGCTTCAGTGATGTTTTGAAGAGGAGATCAACATGAGCGAGTAT  
DENND1A.X4\_BOVINE TTTATCGATGGTAGATTAGACCTTCTCAATCTGGCGAGGGCTTCAGTGATGTTTTGAAGAGGAGATCAACATGAGCGAGTAT  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 15

DENND1A\_BOVINE GCTGgtaagg-gcagttcatttttcttta.....cttctctgctcctctttcccag  
DENND1A.V1\_HUMAN GCTGgtgagaagcaactcattttccttcc.....cttctctgaattctctttcccag  
DENND1A.X1\_BOVINE GCTG-----  
DENND1A.X2\_BOVINE GCTG-----  
DENND1A.X3\_BOVINE GCTG-----  
DENND1A.X4\_BOVINE GCTG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 15

DENND1A\_BOVINE GGAGTGATAAGCTATACCACAGTGGCTCTCCACAGTCCGGgtaag-tgccaccccc.....tttttattatag  
DENND1A.V1\_HUMAN GCAGTGACAAACTGTACCATCAGTGGCTCTCCACTGTCCGGgtaagcatgcacccaa.....tttttattatag  
DENND1A.X1\_BOVINE GGAGTGATAAGCTATACCACAGTGGCTCTCCACAGTCCGG-----  
DENND1A.X2\_BOVINE GGAGTGATAAGCTATACCACAGTGGCTCTCCACAGTCCGG-----  
DENND1A.X3\_BOVINE GGAGTGATAAGCTATACCACAGTGGCTCTCCACAGTCCGG-----  
DENND1A.X4\_BOVINE GGAGTGATAAGCTATACCACAGTGGCTCTCCACAGTCCGG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 16

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DENND1A.V1\_HUMAN AAAGGAAGTGGAGCAATTTCTGAATACTGTAAAGACCAAAGCAAATCCGGCCATGAAGACTGTCTACAAGTTCgtaa.....gcag  
DENND1A.X1\_BOVINE AAAGGAAGTGGAGCAATTTGAATACTGTAAAAACGAAAGCAAACCCGGCCATGAAGACTGTCTATAAGTTC-----  
DENND1A.X2\_BOVINE AAAGGAAGTGGAGCAATTTGAATACTGTAAAAACGAAAGCAAACCCGGCCATGAAGACTGTCTATAAGTTC-----  
DENND1A.X3\_BOVINE AAAGGAAGTGGAGCAATTTGAATACTGTAAAAACGAAAGCAAACCCGGCCATGAAGACTGTCTATAAGTTC-----  
DENND1A.X4\_BOVINE AAAGGAAGTGGAGCAATTTGAATACTGTAAAAACGAAAGCAAACCCGGCCATGAAGACTGTCTATAAGTTC-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 17

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DENND1A.X1\_BOVINE GCAAAAAGATCATGCAAAAATGGGAATAAAAAGAGGTGAAAAACCGCTTGAAGCAAAA-----  
DENND1A.X2\_BOVINE GCAAAAAGATCATGCAAAAATGGGAATAAAAAGAGGTGAAAAACCGCTTGAAGCAAAA-----  
DENND1A.X3\_BOVINE GCAAAAAGATCATGCAAAAATGGGAATAAAAAGAGGTGAAAAACCGCTTGAAGCAAAA-----  
DENND1A.X4\_BOVINE GCAAAAAGATCATGCAAAAATGGGAATAAAAAGAGGTGAAAAACCGCTTGAAGCAAAA-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 18

DENND1A\_BOVINE GACATCACTGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGTGCCGTCCCCACTGGTAGAGGCCAAGGAC  
DENND1A.V1\_HUMAN GACATGCCGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGCACCGTCCCCACTGGTAGAGGCCAAGGAC  
DENND1A.X1\_BOVINE GACATCACTGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGTGCCGTCCCCACTGGTAGAGGCCAAGGAC  
DENND1A.X2\_BOVINE GACATCACTGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGTGCCGTCCCCACTGGTAGAGGCCAAGGAC  
DENND1A.X3\_BOVINE GACATCACTGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGTGCCGTCCCCACTGGTAGAGGCCAAGGAC  
DENND1A.X4\_BOVINE GACATCACTGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGTGCCGTCCCCACTGGTAGAGGCCAAGGAC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 19

DENND1A\_BOVINE CCCAAGTTCGAGAGGACCGGCGGCAATCACAGTCCACTTTGGACAGgtatgta.....cagccacagagactccgtcccactc  
DENND1A.V1\_HUMAN CCCAAGCTCCGAGAAGACCGGCGGCAATCACAGTCCACTTTGGACAGgtgtgta.....cagctgcagagactgcgtcccacc  
DENND1A.X1\_BOVINE CCCAAGTTCGAGAGGACCGGCGGCAATCACAGTCCACTTTGGACAG-----CCACAGAGACTCCGTCCACTC  
DENND1A.X2\_BOVINE CCCAAGTTCGAGAGGACCGGCGGCAATCACAGTCCACTTTGGACAG-----  
DENND1A.X3\_BOVINE CCCAAGTTCGAGAGGACCGGCGGCAATCACAGTCCACTTTGGACAG-----CCACAGAGACTCCGTCCACTC

DENND1A.X4\_BOVINE CCCAAGTTCGAGAGGACCGGCGCCAATCACAGTCCACTTTGGACAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE gcccactgctcccaagatacagcgctcgagggccgtgagtag.....atcttcccc-atgccattctag  
DENND1A.V1\_HUMAN g---accgctcccaagatacagcgctcgagggccgtgagtag.....ctctccccctgtacctctctag  
DENND1A.X1\_BOVINE GCCCACTGCCTCCCAAGATACAGCGCTCGAGGCC-----  
DENND1A.X2\_BOVINE -----  
DENND1A.X3\_BOVINE GCCCACTGCCTCCCAAGATACAGCGCTCGAGGCC-----  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 19

DENND1A\_BOVINE GTGCGCCCTCCCCGTCCACACGTCGTTAAAAGACCGAAGAGCAACATCACAGTGGAGCCCGAAGGACGTCCGTCTCGAGCCCC  
DENND1A.V1\_HUMAN GTGCGCCCACTCTGTCACATGTTGTTAAGAGACCAAAGAGCAACATCGCAGTGGAGCCCGGAGGACGTCTGTGCCGAGCCCT  
DENND1A.X1\_BOVINE GTGCGCCCTCCCCGTCCACACGTCGTTAAAAGACCGAAGAGCAACATCACAGTGGAGCCCGAAGGACGTCCGTCTCGAGCCCC  
DENND1A.X2\_BOVINE GTGCGCCCTCCCCGTCCACACGTCGTTAAAAGACCGAAGAGCAACATCACAGTGGAGCCCGAAGGACGTCCGTCTCGAGCCCC  
DENND1A.X3\_BOVINE GTGCGCCCTCCCCGTCCACACGTCGTTAAAAGACCGAAGAGCAACATCACAGTGGAGCCCGAAGGACGTCCGTCTCGAGCCCC  
DENND1A.X4\_BOVINE GTGCGCCCTCCCCGTCCACACGTCGTTAAAAGACCGAAGAGCAACATCACAGTGGAGCCCGAAGGACGTCCGTCTCGAGCCCC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE GACCAgtgagtag.....gcccagcctcgtaaggccttgcgacactatgctgtcttctctccgaagactcctctgacgatg  
DENND1A.V1\_HUMAN GAGCAgtgagtag.....gcccagcctgtaaggccttgcgacactatgctgtcttctctccgaagactcctctgatgatg  
DENND1A.X1\_BOVINE GACCA-----CCTCGTAAGGCCCTTGGCAGACTATGCTGTCTTCTCTCCGAAGACTCCTCTGACGATG  
DENND1A.X2\_BOVINE GACCA-----CCTCGTAAGGCCCTTGGCAGACTATGCTGTCTTCTCTCCGAAGACTCCTCTGACGATG  
DENND1A.X3\_BOVINE GACCA-----  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 20

DENND1A\_BOVINE agtgccagcgggaagagggcccgagctctggcttaccgaaagcttttcttctccactccttggatggtctc...ccccccag  
DENND1A.V1\_HUMAN aatgcccagcgggaagagggcccgagctctggcttaccgaaagcttttcttctccgctccttggatggtctc...cccagacag  
DENND1A.X1\_BOVINE AGTGCCAGCGGGAAGAGGGCCCGAGCTCTGGCTTACCAGAAAGCTTTTCTTCTCCACTCCCTTTGAATGG-----  
DENND1A.X2\_BOVINE AGTGCCAGCGGGAAGAGGGCCCGAGCTCTGGCTTACCAGAAAGCTTTTCTTCTCCACTCCCTTTGAATGG-----  
DENND1A.X3\_BOVINE -----  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE GCCACAGCCATATCGGACACTCAAGGAGTCAGACAGTGC---AGGGGACGAGGCCGAAAGCCCGGAGCAGCGAGCGGGGAGCC  
DENND1A.V1\_HUMAN GCCCGAGCCGTATCGGACACTCAGGAGTCAGACAGCGCGGAAGGGCAGGAGCAGAGAGTCCAGAGCAGCAAGTGCAGGAGTC  
DENND1A.X1\_BOVINE -CCACAGCCATATCGGACACTCAAGGAGTCAGACAGTGC---AGGGGACGAGGCCGAAAGCCCGGAGCAGCGAGCGGGGAGCC  
DENND1A.X2\_BOVINE -CCACAGCCATATCGGACACTCAAGGAGTCAGACAGTGC---AGGGGACGAGGCCGAAAGCCCGGAGCAGCGAGCGGGGAGCC  
DENND1A.X3\_BOVINE GCCACAGCCATATCGGACACTCAAGGAGTCAGACAGTGC---AGGGGACGAGGCCGAAAGCCCGGAGCAGCGAGCGGGGAGCC  
DENND1A.X4\_BOVINE GCCACAGCCATATCGGACACTCAAGGAGTCAGACAGTGC---AGGGGACGAGGCCGAAAGCCCGGAGCAGCGAGCGGGGAGCC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE TGTGGGCCCCACCCAGCTCCACACGACCGGGCCGCGCAGCATCAACCTCCTGGAGGATGTCTTTCAGCAACCTCGACATGGAAGT  
DENND1A.V1\_HUMAN CACAGGCCCTGTCCAGCTCCCCCTGACCGGGTGCAGCATCGACCTTCTGGAAGACGTCTTTCAGCAACCTCGACATGGAAGT  
DENND1A.X1\_BOVINE TGTGGGCCCCACCCAGCTCCACACGACCGGGCCGCGCAGCATCAACCTCCTGGAGGATGTCTTTCAGCAACCTCGACATGGAAGT  
DENND1A.X2\_BOVINE TGTGGGCCCCACCCAGCTCCACACGACCGGGCCGCGCAGCATCAACCTCCTGGAGGATGTCTTTCAGCAACCTCGACATGGAAGT  
DENND1A.X3\_BOVINE TGTGGGCCCCACCCAGCTCCACACGACCGGGCCGCGCAGCATCAACCTCCTGGAGGATGTCTTTCAGCAACCTCGACATGGAAGT  
DENND1A.X4\_BOVINE TGTGGGCCCCACCCAGCTCCACACGACCGGGCCGCGCAGCATCAACCTCCTGGAGGATGTCTTTCAGCAACCTCGACATGGAAGT  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE CCCGCTGCAGCAGCTGGGCCAGGCCAAAAGCTTGAAGACCTTCGGACCCCAAAGACCTGAGGGAGCAGCCGGGGACCTTTGA  
DENND1A.V1\_HUMAN CGCACTGCAGCCACTGGGCCAGGCCAAGAGCTTAGAGGACCTTCGTGCCCCCAAAGACCTGAGGGAGCAGCCAGGGACCTTTGA  
DENND1A.X1\_BOVINE CCCGCTGCAGCAGCTGGGCCAGGCCAAAAGCTTGAAGACCTTCGGACCCCAAAGACCTGAGGGAGCAGCCGGGGACCTTTGA  
DENND1A.X2\_BOVINE CCCGCTGCAGCAGCTGGGCCAGGCCAAAAGCTTGAAGACCTTCGGACCCCAAAGACCTGAGGGAGCAGCCGGGGACCTTTGA  
DENND1A.X3\_BOVINE CCCGCTGCAGCAGCTGGGCCAGGCCAAAAGCTTGAAGACCTTCGGACCCCAAAGACCTGAGGGAGCAGCCGGGGACCTTTGA  
DENND1A.X4\_BOVINE CCCGCTGCAGCAGCTGGGCCAGGCCAAAAGCTTGAAGACCTTCGGACCCCAAAGACCTGAGGGAGCAGCCGGGGACCTTTGA  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

Exon 21

DENND1A\_BOVINE CTATCAGgtatgg--tggttgag.....gcagtcattgctcctctgctctctcc-ggcag  
DENND1A.V1\_HUMAN CTATCAGgtatggcatgggaagg.....gtggtcactgcccctcctctcctcccaacag  
DENND1A.X1\_BOVINE CTATCAG-----  
DENND1A.X2\_BOVINE CTATCAG-----

DENND1A.X3\_BOVINE CTATCAG-----  
DENND1A.X4\_BOVINE CTATCAG-----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE AGGCTGGACCTGGGCAGAAGTGACAGGAGCCGTGGGACACCAGGGGCCTTGAAGCTCGCCACCCGCACAGCAGGCTCTGGAGC  
DENND1A.V1\_HUMAN AGGCTGGATCTGGGCGGGAGTGAGAGGAGCCGCGGGGTGACAGTGGCCTTGAAGCTTACCCACCCGTACAACAAGCTCTGGAGC  
DENND1A.X1\_BOVINE AGGCTGGACCTGGGCAGAAGTGACAGGAGCCGTGGGACACCAGGGGCCTTGAAGCTCGCCACCCGCACAGCAGGCTCTGGAGC  
DENND1A.X2\_BOVINE AGGCTGGACCTGGGCAGAAGTGACAGGAGCCGTGGGACACCAGGGGCCTTGAAGCTCGCCACCCGCACAGCAGGCTCTGGAGC  
DENND1A.X3\_BOVINE AGGCTGGACCTGGGCAGAAGTGACAGGAGCCGTGGGACACCAGGGGCCTTGAAGCTCGCCACCCGCACAGCAGGCTCTGGAGC  
DENND1A.X4\_BOVINE AGGCTGGACCTGGGCAGAAGTGACAGGAGCCGTGGGACACCAGGGGCCTTGAAGCTCGCCACCCGCACAGCAGGCTCTGGAGC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE CTAGGCCAGGATGACATGGCCATCCCCAGCAAGCCGCCCGCCCTGCCCCGAGAAGCCCTCAGCCCTGCTCGGGAACCTCCCTG  
DENND1A.V1\_HUMAN CTGGGCCAGGACGACATGGCCATCCCCAGCAAGCCCCAGCTGCCTCCCTGAGAAGCCCTCGGCCCTGCTCGGGAACCTCCCTG  
DENND1A.X1\_BOVINE CTAGGCCAGGATGACATGGCCATCCCCAGCAAGCCGCCCGCCCTGCCCCGAGAAGCCCTCAGCCCTGCTCGGGAACCTCCCTG  
DENND1A.X2\_BOVINE CTAGGCCAGGATGACATGGCCATCCCCAGCAAGCCGCCCGCCCTGCCCCGAGAAGCCCTCAGCCCTGCTCGGGAACCTCCCTG  
DENND1A.X3\_BOVINE CTAGGCCAGGATGACATGGCCATCCCCAGCAAGCCGCCCGCCCTGCCCCGAGAAGCCCTCAGCCCTGCTCGGGAACCTCCCTG  
DENND1A.X4\_BOVINE CTAGGCCAGGATGACATGGCCATCCCCAGCAAGCCGCCCGCCCTGCCCCGAGAAGCCCTCAGCCCTGCTCGGGAACCTCCCTG  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE GCCTCACCTGCAGGCCCCAGAACCAGAATGGCCTCCTGAACCCAGCGACAAGGAGGAGGTGCCACACCCACCTGGGCAGC  
DENND1A.V1\_HUMAN GCCCTGCCTCGAAGGCCCAAGACCAGGACAGCATCCTGAACCCAGTGAACAAGGAGGAGGTGCCACACCCCTACTCTGGGCAGC  
DENND1A.X1\_BOVINE GCCTCACCTGCAGGCCCCAGAACCAGAATGGCCTCCTGAACCCAGCGACAAGGAGGAGGTGCCACACCCACCTGGGCAGC  
DENND1A.X2\_BOVINE GCCTCACCTGCAGGCCCCAGAACCAGAATGGCCTCCTGAACCCAGCGACAAGGAGGAGGTGCCACACCCACCTGGGCAGC  
DENND1A.X3\_BOVINE GCCTCACCTGCAGGCCCCAGAACCAGAATGGCCTCCTGAACCCAGCGACAAGGAGGAGGTGCCACACCCACCTGGGCAGC  
DENND1A.X4\_BOVINE GCCTCACCTGCAGGCCCCAGAACCAGAATGGCCTCCTGAACCCAGCGACAAGGAGGAGGTGCCACACCCACCTGGGCAGC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE ATCACTATCCCCGGCCCCAGGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCCGCTCCTACTGCCCGCCAGCCAAGCTC  
DENND1A.V1\_HUMAN ATCACCATCCCCGGCCCCAAGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCTCCACCGCCATTCCCGCCCGGCAAGCTC  
DENND1A.X1\_BOVINE ATCACTATCCCCGGCCCCAGGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCCGCTCCTACTGCCCGCCAGCCAAGCTC  
DENND1A.X2\_BOVINE ATCACTATCCCCGGCCCCAGGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCCGCTCCTACTGCCCGCCAGCCAAGCTC  
DENND1A.X3\_BOVINE ATCACTATCCCCGGCCCCAGGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCCGCTCCTACTGCCCGCCAGCCAAGCTC  
DENND1A.X4\_BOVINE ATCACTATCCCCGGCCCCAGGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCCGCTCCTACTGCCCGCCAGCCAAGCTC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE CAGGCCCCGGCATCGCCCTTGGCGACTTCTTGAACAACCTGCCGGCTGAGCGGAAAGGCGGGCTGCCCTCAGCTCAACCCCA  
DENND1A.V1\_HUMAN CAGGCTGCCGGCGCCGCACTTGGTGACGTCCTCAGAGCGGCTGCAGACGGATCGGGACAGGCGAGCTGCCCTGAGTCC-----  
DENND1A.X1\_BOVINE CAGGCCCCGGCATCGCCCTTGGCGACTTCTTGAACAACCTGCCGGCTGAGCGGAAAGGCGGGCTGCCCTCAGCTCAACCCCA  
DENND1A.X2\_BOVINE CAGGCCCCGGCATCGCCCTTGGCGACTTCTTGAACAACCTGCCGGCTGAGCGGAAAGGCGGGCTGCCCTCAGCTCAACCCCA  
DENND1A.X3\_BOVINE CAGGCCCCGGCATCGCCCTTGGCGACTTCTTGAACAACCTGCCGGCTGAGCGGAAAGGCGGGCTGCCCTCAGCTCAACCCCA  
DENND1A.X4\_BOVINE CAGGCCCCGGCATCGCCCTTGGCGACTTCTTGAACAACCTGCCGGCTGAGCGGAAAGGCGGGCTGCCCTCAGCTCAACCCCA  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE TTCCCTGGGCTCCTCTCCAGTGTGCACCCCAAGACCCCACTGAAGTGTCCAGCCACTCAGCCTGGCCCCAGGGGTGCCGGC  
DENND1A.V1\_HUMAN -----AGGGCTCCTGCCTGGTGTGTGCCCAAGGCCCACTGAAGTGTCCAGCCACTCAGCCTGGGCCCGGGGTGCCGGC  
DENND1A.X1\_BOVINE TTCCCTGGGCTCCTCTCCAGTGTGCACCCCAAGACCCCACTGAAGTGTCCAGCCACTCAGCCTGGCCCCAGGGGTGCCGGC  
DENND1A.X2\_BOVINE TTCCCTGGGCTCCTCTCCAGTGTGCACCCCAAGACCCCACTGAAGTGTCCAGCCACTCAGCCTGGCCCCAGGGGTGCCGGC  
DENND1A.X3\_BOVINE TTCCCTGGGCTCCTCTCCAGTGTGCACCCCAAGACCCCACTGAAGTGTCCAGCCACTCAGCCTGGCCCCAGGGGTGCCGGC  
DENND1A.X4\_BOVINE TTCCCTGGGCTCCTCTCCAGTGTGCACCCCAAGACCCCACTGAAGTGTCCAGCCACTCAGCCTGGCCCCAGGGGTGCCGGC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE AGCAGCAGTGTGACCTGCTGGCCCTGCTGGATCCACTTAACACAACCTGGTCGGGCAGCTCCCTTCCACCAGGCCCTACAGCC  
DENND1A.V1\_HUMAN ACGAGCAGTGTGACCCCTGCTCGCCCTCCTGGACCCGCTCAGCACAGCCTGGTCAGGCGAGCACCCTCCCGTACAGCCCGCCACC  
DENND1A.X1\_BOVINE AGCAGCAGTGTGACCTGCTGGCCCTGCTGGATCCACTTAACACAACCTGGTCGGGCAGCTCCCTTCCACCAGGCCCTACAGCC  
DENND1A.X2\_BOVINE AGCAGCAGTGTGACCTGCTGGCCCTGCTGGATCCACTTAACACAACCTGGTCGGGCAGCTCCCTTCCACCAGGCCCTACAGCC  
DENND1A.X3\_BOVINE AGCAGCAGTGTGACCTGCTGGCCCTGCTGGATCCACTTAACACAACCTGGTCGGGCAGCTCCCTTCCACCAGGCCCTACAGCC  
DENND1A.X4\_BOVINE AGCAGCAGTGTGACCTGCTGGCCCTGCTGGATCCACTTAACACAACCTGGTCGGGCAGCTCCCTTCCACCAGGCCCTACAGCC  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE CCAATGTAGCCACCCCATTTACTCCCAATTTAGTTTTCCTCCATGGGGACCCCAACCCATTTCCACAGCCATCACTCAAC  
DENND1A.V1\_HUMAN CCGAATGTAGCCACCCCATTTACTCCCAATTTAGTTTTCCTCCATGGGGACCCCAACCCATTTCCACAGCCACCACTCAAC  
DENND1A.X1\_BOVINE CCAATGTAGCCACCCCATTTACTCCCAATTTAGTTTTCCTCCATGGGGACCCCAACCCATTTCCACAGCCATCACTCAAC



DENND1A.X2\_BOVINE CCAAATGTAGCCACCCATTACTCCCCAATTTAGTTTCCCCCATGGGGACCCACCCCATTTCCACAGCCATCACTCAAC

DENND1A.X3\_BOVINE CCAAATGTAGCCACCCATTACTCCCCAATTTAGTTTCCCCCATGGGGACCCACCCCATTTCCACAGCCATCACTCAAC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE CCCTTTGTCCCACCTCTGCCAGCGACTGCCACCATGCCCTGGTCTCTGCACCAGCTGGGCCTTTGGGGCCCTCCTGCT

DENND1A.V1\_HUMAN CCCTTTGTCCCACCTCTGCCAGCGACTGCCACCATGCCCTGGTCTCTGCACCAGCTGGGCCTTTGGGGCCCTCCTGCT

DENND1A.X1\_BOVINE CCCTTTGTCCCACCTCTGCCAGCGACTGCCACCATGCCCTGGTCTCTGCACCAGCTGGGCCTTTGGGGCCCTCCTGCT

DENND1A.X2\_BOVINE CCCTTTGTCCCACCTCTGCCAGCGACTGCCACCATGCCCTGGTCTCTGCACCAGCTGGGCCTTTGGGGCCCTCCTGCT

DENND1A.X3\_BOVINE CCCTTTGTCCCACCTCTGCCAGCGACTGCCACCATGCCCTGGTCTCTGCACCAGCTGGGCCTTTGGGGCCCTCCTGCT

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE TCCCTGGGGCCAGCCTTTGCCCCAGCCTCCTGCTGTCCAATTCTGGCTTCTGTGCCACATCGATCTCAGCCCAACCTGTCT

DENND1A.V1\_HUMAN TCCCTGGGGCCAGCCTTTGGCTCCGGCTCCTGCTGTCCAATTCTGGCTTCTGTGCCCTCACAGGCTCAGCCCAACCTGTCT

DENND1A.X1\_BOVINE TCCCTGGGGCCAGCCTTTGCCCCAGCCTCCTGCTGTCCAATTCTGGCTTCTGTGCCACATCGATCTCAGCCCAACCTGTCT

DENND1A.X2\_BOVINE TCCCTGGGGCCAGCCTTTGCCCCAGCCTCCTGCTGTCCAATTCTGGCTTCTGTGCCCTCACATCGATCTCAGCCCAACCTGTCT

DENND1A.X3\_BOVINE TCCCTGGGGCCAGCCTTTGCCCCAGCCTCCTGCTGTCCAATTCTGGCTTCTGTGCCACATCGATCTCAGCCCAACCTGTCT

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE GCCCTCTCCATGCCCAACCTCTTTGGCCAAGTGCCCATGGGTACCCAC-----TCCTGCAGCCTCTGGGTCCCCAGCAGTC

DENND1A.V1\_HUMAN GCCCTCTCCATGCCCAACCTCTTTGGCCAAGTGCCCATGGGTACCCACACGAGCCCTTACAGCCGCTGGGTCCCCAGCAGTC

DENND1A.X1\_BOVINE GCCCTCTCCATGCCCAACCTCTTTGGCCAAGTGCCCATGGGTACCCAC-----TCCTGCAGCCTCTGGGTCCCCAGCAGTC

DENND1A.X2\_BOVINE GCCCTCTCCATGCCCAACCTCTTTGGCCAAGTGCCCATGGGTACCCAC-----TCCTGCAGCCTCTGGGTCCCCAGCAGTC

DENND1A.X3\_BOVINE GCCCTCTCCATGCCCAACCTCTTTGGCCAAGTGCCCATGGGTACCCAC-----TCCTGCAGCCTCTGGGTCCCCAGCAGTC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE GCCCCTCAAGGATCCGAACATTGCCCTGGCCCGTCAAGTGCCAGGGCCGCGAGGCCAAGCAAGGGCTGGCCCTGAGGCCT

DENND1A.V1\_HUMAN GCCCCTCAAGGATCCGAACATTGCCCTGGCCCGTCAAGTGCCAGGGCTGTGTGAGCAAGCAGGGGCTGGCCCTGAGGCCT

DENND1A.X1\_BOVINE GCCCCTCAAGGATCCGAACATTGCCCTGGCCCGTCAAGTGCCAGGGCCGCGAGGCCAAGCAAGGGCTGGCCCTGAGGCCT

DENND1A.X2\_BOVINE GCCCCTCAAGGATCCGAACATTGCCCTGGCCCGTCAAGTGCCAGGGCCGCGAGGCCAAGCAAGGGCTGGCCCTGAGGCCT

DENND1A.X3\_BOVINE GCCCCTCAAGGATCCGAACATTGCCCTGGCCCGTCAAGTGCCAGGGCCGCGAGGCCAAGCAAGGGCTGGCCCTGAGGCCT

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE GGAGAACCCCCACTCTCCAGCCAGGCCCCCCAGGGCCTGGAGCCAGCACTGCAGCCCTCTGCTCCACGAGAGGCCAGAGAC

DENND1A.V1\_HUMAN GGAGAACCCCCGCTTCTGCCTCCAGGCCCTCAAGGCCTGGAGCCAACACTGCAGCCCTCTGCTCCTCAACAGGCCAGAGAC

DENND1A.X1\_BOVINE GGAGAACCCCCACTCTCCAGCCAGGCCCCCCAGGGCCTGGAGCCAGCACTGCAGCCCTCTGCTCCACGAGAGGCCAGAGAC

DENND1A.X2\_BOVINE GGAGAACCCCCACTCTCCAGCCAGGCCCCCCAGGGCCTGGAGCCAGCACTGCAGCCCTCTGCTCCACGAGAGGCCAGAGAC

DENND1A.X3\_BOVINE GGAGAACCCCCACTCTCCAGCCAGGCCCCCCAGGGCCTGGAGCCAGCACTGCAGCCCTCTGCTCCACGAGAGGCCAGAGAC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE CCCTTTGAGGATTTGTTACGAAAACCAAGCAAGATGTGAGCTCG-----GCCCCAGCCCCGGCTCCGTGGAGCAG

DENND1A.V1\_HUMAN CCCTTTGAGGATTTGTTACAGAAAACCAAGCAAGAGCTGAGCCGAGTCCGGCCCTGGCCCGGCCCCAGACTCGGTGGAGCAG

DENND1A.X1\_BOVINE CCCTTTGAGGATTTGTTACGAAAACCAAGCAAGATGTGAGCTCG-----GCCCCAGCCCCGGCTCCGTGGAGCAG

DENND1A.X2\_BOVINE CCCTTTGAGGATTTGTTACGAAAACCAAGCAAGATGTGAGCTCG-----GCCCCAGCCCCGGCTCCGTGGAGCAG

DENND1A.X3\_BOVINE CCCTTTGAGGATTTGTTACGAAAACCAAGCAAGATGTGAGCTCG-----GCCCCAGCCCCGGCTCCGTGGAGCAG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE CTCAGGAAGCAATGGGAGACCTTCGAGTGAGCAGC--GCTGAGGGTGGGGCGAG--CCAAGGCCGGCCGGCCTGCTTCCCTTG

DENND1A.V1\_HUMAN CTCAGGAAGCAATGGGAGACCTTCGAGTGAGCAGC--GCTGAGGGTGGGGGATGCA--CCAAGGCCGGAGGG--TCCGTCCACTTG

DENND1A.X1\_BOVINE CTCAGGAAGCAATGGGAGACCTTCGAGTGAGCAGC--GCTGAGGGTGGGGCGAG--CCAAGGCCGGCCGGCCTGCTTCCCTTG

DENND1A.X2\_BOVINE CTCAGGAAGCAATGGGAGACCTTCGAGTGAGCAGC--GCTGAGGGTGGGGCGAG--CCAAGGCCGGCCGGCCTGCTTCCCTTG

DENND1A.X3\_BOVINE CTCAGGAAGCAATGGGAGACCTTCGAGTGAGCAGC--GCTGAGGGTGGGGCGAG--CCAAGGCCGGCCGGCCTGCTTCCCTTG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE CTG-----CTGTTTCTACCCAGGTTCTACTGGTGGGAAGGGATGGGAACCCCTCTCTGCCGCC--CC

DENND1A.V1\_HUMAN CTGCGGTTCCGAGGCTCCCCGCCACTCTCTCTGCCCCAGGTTCTGCTGGTGGGAAGGGATGGGACCCCTCTCTGCTGCCGCC

DENND1A.X1\_BOVINE CTG-----CTGTTTCTACCCAGGTTCTACTGGTGGGAAGGGATGGGAACCCCTCTCTGCCGCC--CC

DENND1A.X2\_BOVINE CTG-----CTGTTTCTACCCAGGTTCTACTGGTGGGAAGGGATGGGAACCCCTCTCTGCCGCC--CC

DENND1A.X3\_BOVINE CTG-----CTGTTTCTACCCAGGTTCTACTGGTGGGAAGGGATGGGAACCCCTCTCTGCCGCC--CC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE TCCTCCTTTCCACACTGCCCATCTCT-----GGAGAATGGCGCCAGTTCCAGCCTGGGAATCGACCCAGCTCCTGG

DENND1A.V1\_HUMAN TCCTCCCCTCCACACTGCCCATCTCTGATGCTGGCCCTGGGAATGGCACCAGTTCCAGCCTGGGAATCAACCCAGTTCTCTGA

DENND1A.X1\_BOVINE TCCTCCTTTCCACACTGCCCATCTCT-----GGAGAATGGCGCCAGTTCCAGCCTGGGAATCGACCCAGCTCCTGG

DENND1A.X2\_BOVINE TCCTCCTTTCCACACTGCCCATCTCT-----GGAGAATGGCGCCAGTTCCAGCCTGGGAATCGACCCAGCTCCTGG

DENND1A.X3\_BOVINE TCCTCCTTTCCACACTGCCCATCTCT-----GGAGAATGGCGCCAGTTCCAGCCTGGGAATCGACCCAGCTCCTGG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE GTGCCTGTCTGTCCCGACC-----TTCCCTGCCCCCTAGTTGGGTTTTGCACTAAAGAGGTGAGCTGGGCCAGCG--ATT

DENND1A.V1\_HUMAN GTGCCATCCACCCCGCGGTGGCTCTCCCTCGGCACCCCTTGATTGGGTTTTGCACTAAAGAGGTGAGCTGGGCCAATGATATT

DENND1A.X1\_BOVINE GTGCCTGTCTGTCCCGACC-----TTCCCTGCCCCCTAGTTGGGTTTTGCACTAAAGAGGTGAGCTGGGCCAGCG--ATT

DENND1A.X2\_BOVINE GTGCCTGTCTGTCCCGACC-----TTCCCTGCCCCCTAGTTGGGTTTTGCACTAAAGAGGTGAGCTGGGCCAGCG--ATT

DENND1A.X3\_BOVINE GTGCCTGTCTGTCCCGACC-----TTCCCTGCCCCCTAGTTGGGTTTTGCACTAAAGAGGTGAGCTGGGCCAGCG--ATT

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE GCCCAGGCCACATCTTACCCACCTTCCCTCTGAAACTGCCACCAGGAGCCCGCGCTCTCAGGATGTCTC-CTCCTGAG

DENND1A.V1\_HUMAN GCTCCAGACCGAGTCTTACCCACCTTCCCTCGGAAG-TGTCCCAAGAGGCTCC-----GAAGGCTCCCTCCGAG

DENND1A.X1\_BOVINE GCCCAGGCCACATCTTACCCACCTTCCCTCTGAAACTGCCACCAGGAGCCCGCGCTCTCAGGATGTCTC-CTCCTGAG

DENND1A.X2\_BOVINE GCCCAGGCCACATCTTACCCACCTTCCCTCTGAAACTGCCACCAGGAGCCCGCGCTCTCAGGATGTCTC-CTCCTGAG

DENND1A.X3\_BOVINE GCCCAGGCCACATCTTACCCACCTTCCCTCTGAAACTGCCACCAGGAGCCCGCGCTCTCAGGATGTCTC-CTCCTGAG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE CCCCCTTCTCTTGCCCCAGCTGCAGCCAGCCCGCACACCCACCTTGATGGGCACGAGTGTGGCGGTACA-----CCAG

DENND1A.V1\_HUMAN CCCAGCTCTCTGTCTCTCCACAGCCAGGCCTGTCAGCCACCTCTCGGACACAGGTGACAGGTTACCTCCAGTTTGAG

DENND1A.X1\_BOVINE CCCCCTTCTCTTGCCCCAGCTGCAGCCAGCCCGCACACCCACCTTGATGGGCACGAGTGTGGCGGTACA-----CCAG

DENND1A.X2\_BOVINE CCCCCTTCTCTTGCCCCAGCTGCAGCCAGCCCGCACACCCACCTTGATGGGCACGAGTGTGGCGGTACA-----CCAG

DENND1A.X3\_BOVINE CCCCCTTCTCTTGCCCCAGCTGCAGCCAGCCCGCACACCCACCTTGATGGGCACGAGTGTGGCGGTACA-----CCAG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE CTCGTCTGCACGAGAGGCACGTGGTTTGGAGTTTGAAGTAAGGAACCCCTCCCCACCCCTCCCCAGCTGGAGGATCTACCT

DENND1A.V1\_HUMAN CTCATCTGCACGAGACACAGGTAGCTGGGGT-TGAAGTTAGGACT-----CTCTCTGGGCTGGAGGATTTACCT

DENND1A.X1\_BOVINE CTCGTCTGCACGAGAGGCACGTGGTTTGGAGTTTGAAGTAAGGAACCCCTCCCCACCCCTCCCCAGCTGGAGGATCTACCT

DENND1A.X2\_BOVINE CTCGTCTGCACGAGAGGCACGTGGTTTGGAGTTTGAAGTAAGGAACCCCTCCCCACCCCTCCCCAGCTGGAGGATCTACCT

DENND1A.X3\_BOVINE CTCGTCTGCACGAGAGGCACGTGGTTTGGAGTTTGAAGTAAGGAACCCCTCCCCACCCCTCCCCAGCTGGAGGATCTACCT

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE GGCGAGGCATTTCCAAACCCTGTCTAGCAATATGCACACTTTCTTTACTGAGTCTTACCCCAACCCCTCCACCTCCG-TTT

DENND1A.V1\_HUMAN GGTGGGCACTTCCAGACTGTTTCTAGCAATATACACACAGTCTTTCTGTGTCTTACCCCAAAACTTC-----AGTTGA

DENND1A.X1\_BOVINE GGCGAGGCATTTCCAAACCCTGTCTAGCAATATGCACACTTTCTTTACTGAGTCTTACCCCAACCCCTCCACCTCCG-TTT

DENND1A.X2\_BOVINE GGCGAGGCATTTCCAAACCCTGTCTAGCAATATGCACACTTTCTTTACTGAGTCTTACCCCAACCCCTCCACCTCCG-TTT

DENND1A.X3\_BOVINE GGCGAGGCATTTCCAAACCCTGTCTAGCAATATGCACACTTTCTTTACTGAGTCTTACCCCAACCCCTCCACCTCCG-TTT

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE TTCTGACTTGGTTGGGATCTGGGGG-----

DENND1A.V1\_HUMAN TTCTGACTTGGG-AGGATCTGGGACCAGGGG-TCTTGGGCTGCCTTGTGATACAC-----AGCCCCAGCCA-CCCTGCATG

DENND1A.X1\_BOVINE TTCTGACTTGGTTGGGATCTGGGGGCTGAGGGATCCACGGGATCCCTTGTGGTAACCAAACCAAGCCCAGCCAGCCCTGCATG

DENND1A.X2\_BOVINE TTCTGACTTGGTTGGGATCTGGGGGCTGAGGGATCCACGGGATCCCTTGTGGTAACCAAACCAAGCCCAGCCAGCCCTGCATG

DENND1A.X3\_BOVINE TTCTGACTTGGTTGGGATCTGGGGGCTGAGGGATCCACGGGATCCCTTGTGGTAACCAAACCAAGCCCAGCCAGCCCTGCATG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN GGGGCTGCGAGCACCAGCAACTTTGATTTATAGAAGGAAA-ATGGAAACCC--CATCTGAGTATTTTGGGAGGAGCCCCAGC



DENND1A.X1\_BOVINE AGGGCCGGGAGCACCAGCAACTTTGATT-ATAGAAGACAAGACGGCAACAGGCAAACCCAAGAGCATTGGGACGGGTCCG--GC

DENND1A.X2\_BOVINE AGGGCCGGGAGCACCAGCAACTTTGATT-ATAGAAGACAAGACGGCAACAGGCAAACCCAAGAGCATTGGGACGGGTCCG--GC

DENND1A.X3\_BOVINE AGGGCCGGGAGCACCAGCAACTTTGATT-ATAGAAGACAAGACGGCAACAGGCAAACCCAAGAGCATTGGGACGGGTCCG--GC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN CCTCATCCAGTCTGGCACGCTGATACCTCCAGGTACTCCC-----CTCACTGTCAAAGCTGGGGCTCAGCCTTTGTTCAT

DENND1A.X1\_BOVINE CGCTGTCCA-CACTCTCCCTTGGGTCCCTAGAGGTTCTCCTGGTCTCCAGTTATGATC--ACATGAGGCTCAGACTTTGTCTGA

DENND1A.X2\_BOVINE CGCTGTCCA-CACTCTCCCTTGGGTCCCTAGAGGTTCTCCTGGTCTCCAGTTATGATC--ACATGAGGCTCAGACTTTGTCTGA

DENND1A.X3\_BOVINE CGCTGTCCA-CACTCTCCCTTGGGTCCCTAGAGGTTCTCCTGGTCTCCAGTTATGATC--ACATGAGGCTCAGACTTTGTCTGA

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN CTGGAGCTTTGTGGCAAAGCTGAGAAGCTGCAACCCAGATTTCAACCCAAAAAGGTCAAGCTGAATGCCTCAGACTGATGTGG

DENND1A.X1\_BOVINE GTGGGTCTCAGGGGCAGAGCTGAGAAGCAGACACCCAGACCCCCACT--GGAAGGCCAAGCTTACCACCACAGA---GATGC

DENND1A.X2\_BOVINE GTGGGTCTCAGGGGCAGAGCTGAGAAGCAGACACCCAGACCCCCACT--GGAAGGCCAAGCTTACCACCACAGA---GATGC

DENND1A.X3\_BOVINE GTGGGTCTCAGGGGCAGAGCTGAGAAGCAGACACCCAGACCCCCACT--GGAAGGCCAAGCTTACCACCACAGA---GATGC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN AAGGCAG-----CTGGCCTTCTGGGTGGAAACGAGGCAGTGGCCCTGAGCCCTTCTCCAGGGCAGGTAGAAAGGACAAAC

DENND1A.X1\_BOVINE AAGGTTCCCAAGTGCCTGGCTCCTTGGGGCAGGAGGGGGCAG--GGCACTAAGCC--CCTCTCCAGGCCCTGGTGAGTGAGCAGGC

DENND1A.X2\_BOVINE AAGGTTCCCAAGTGCCTGGCTCCTTGGGGCAGGAGGGGGCAG--GGCACTAAGCC--CCTCTCCAGGCCCTGGTGAGTGAGCAGGC

DENND1A.X3\_BOVINE AAGGTTCCCAAGTGCCTGGCTCCTTGGGGCAGGAGGGGGCAG--GGCACTAAGCC--CCTCTCCAGGCCCTGGTGAGTGAGCAGGC

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN TTGGTCTCTGCCTCG--GGGAAGCAGGAGGAGGGCTAGAAGCCAGTCCCTCCCACCTGCCAGAGCTCCAGGCCAGCAGAGAAA

DENND1A.X1\_BOVINE TTGGTCTCTGCAGCCTGGAG--GCAGGAGGGCTTGGAGTCAACCCCTCCTGCCACCTTGTGATTCTGCCAGCATAGAAG

DENND1A.X2\_BOVINE TTGGTCTCTGCAGCCTGGAG--GCAGGAGGGCTTGGAGTCAACCCCTCCTGCCACCTTGTGATTCTGCCAGCATAGAAG

DENND1A.X3\_BOVINE TTGGTCTCTGCAGCCTGGAG--GCAGGAGGGCTTGGAGTCAACCCCTCCTGCCACCTTGTGATTCTGCCAGCATAGAAG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN TTCCTGAGGCCAACGTCACCAAAGTGTAGATTGAAT-GTT-----TATTATCTTTCTTTTCTTTTACCTTATTG

DENND1A.X1\_BOVINE TTCCTGAGGCCAACATCACCAAAGCTGAATTGAAATGTTTTGTTATTATTCTTTTATCTTTCTTTTCTTTTACCTTTATTG

DENND1A.X2\_BOVINE TTCCTGAGGCCAACATCACCAAAGCTGAATTGAAATGTTTTGTTATTATTCTTTTATCTTTCTTTTCTTTTACCTTTATTG

DENND1A.X3\_BOVINE TTCCTGAGGCCAACATCACCAAAGCTGAATTGAAATGTTTTGTTATTATTCTTTTATCTTTCTTTTCTTTTACCTTTATTG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN ATTTGATG-AATCTTGAAATGGATTCAATTTCCATAAACCAAGTTAAAGTATGGCCCGACCATTTAAGAAAACAACCATCTGAGA

DENND1A.X1\_BOVINE ATTTGATGGAATCTTGAAATGACTAGTTTCAATAAACCAAGTTAAATATGGCCCAACCATTTAAGAAAACAACCATCTGAGA

DENND1A.X2\_BOVINE ATTTGATGGAATCTTGAAATGACTAGTTTCAATAAACCAAGTTAAATATGGCCCAACCATTTAAGAAAACAACCATCTGAGA

DENND1A.X3\_BOVINE ATTTGATGGAATCTTGAAATGACTAGTTTCAATAAACCAAGTTAAATATGGCCCAACCATTTAAGAAAACAACCATCTGAGA

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN CACGCAGGAAATTGTGAGCATTTTCGACCCGAGCTCTCATTTCCTATTTGTGAAGGGTCAGACACAGTCTACCAGGGGTGTCTG

DENND1A.X1\_BOVINE CATGCAGGAAATTGTGAACATTTTGACCTGATTTCTCATTTCCTATTTGTGAATGGTCAGACACACAGT-CTCAGGGGTGTCTG

DENND1A.X2\_BOVINE CATGCAGGAAATTGTGAACATTTTGACCTGATTTCTCATTTCCTATTTGTGAATGGTCAGACACACAGT-CTCAGGGGTGTCTG

DENND1A.X3\_BOVINE CATGCAGGAAATTGTGAACATTTTGACCTGATTTCTCATTTCCTATTTGTGAATGGTCAGACACACAGT-CTCAGGGGTGTCTG

DENND1A.X4\_BOVINE -----

DENND1A.X1-4\_F -----

DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----

DENND1A.V1\_HUMAN GG-GGACAAGGGGTCTCTGGAGATG---TC-ACCAGGGAGCCCCCTCTATGTCTGAGAGGCTGCCACTGCTGCAC-A-TGC

DENND1A.X1\_BOVINE AGGGGGCAAGGGGGTTTCTAGAGGCCCTATAACCCAGGGAGCCTTGTATCATCTGAGGGACTGGGAGATCACCCACCCG  
DENND1A.X2\_BOVINE AGGGGGCAAGGGGGTTTCTAGAGGCCCTATAACCCAGGGAGCCTTGTATCATCTGAGGGACTGGGAGATCACCCACCCG  
DENND1A.X3\_BOVINE AGGGGGCAAGGGGGTTTCTAGAGGCCCTATAACCCAGGGAGCCTTGTATCATCTGAGGGACTGGGAGATCACCCACCCG  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----  
DENND1A.V1\_HUMAN TCAGT-----GAGGCTTGGC-----GGCCATCCTGG-----CACATGGCTCTT-----  
DENND1A.X1\_BOVINE TGAGTGAGCGAGGCCCGACCTGAGGTTTGTCTCAACAGCATGGGGTGTGAAGGGCTGCTGGCCCCACACGAGCACCTTCGTCA  
DENND1A.X2\_BOVINE TGAGTGAGCGAGGCCCGACCTGAGGTTTGTCTCAACAGCATGGGGTGTGAAGGGCTGCTGGCCCCACACGAGCACCTTCGTCA  
DENND1A.X3\_BOVINE TGAGTGAGCGAGGCCCGACCTGAGGTTTGTCTCAACAGCATGGGGTGTGAAGGGCTGCTGGCCCCACACGAGCACCTTCGTCA  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----  
DENND1A.V1\_HUMAN -----CCTGGGTCAACCGTGACCTGTCTGGCTCAGGAATGGGCTCTGGCTGCTGG-----GGGAGCCGTGTCACTCCTGG  
DENND1A.X1\_BOVINE GTCCCGGCCCTGGGGCAAGTCTCTCTTTTCAAGTCT-CGCAATGTCTCTGGCCACCAGGAGCAGGGCGCTGTGTACGCCTGG  
DENND1A.X2\_BOVINE GTCCCGGCCCTGGGGCAAGTCTCTCTTTTCAAGTCT-CGCAATGTCTCTGGCCACCAGGAGCAGGGCGCTGTGTACGCCTGG  
DENND1A.X3\_BOVINE GTCCCGGCCCTGGGGCAAGTCTCTCTTTTCAAGTCT-CGCAATGTCTCTGGCCACCAGGAGCAGGGCGCTGTGTACGCCTGG  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----  
DENND1A.V1\_HUMAN GCCATGGGGGCACCTCCTGGGCACCTTAGGTGTTTTCAGCATAGATTCCAGTTTCGCACCCTGGGCAGACCCCGAGGCCCATCCG  
DENND1A.X1\_BOVINE GCCACACGGGTGCCTCTAGGACACTCAGGTGTTTTCAGCAGAGATTGCAGATC--CATCCTGGGCAGACCCCGAGCCCTGTCTCT  
DENND1A.X2\_BOVINE GCCACACGGGTGCCTCTAGGACACTCAGGTGTTTTCAGCAGAGATTGCAGATC--CATCCTGGGCAGACCCCGAGCCCTGTCTCT  
DENND1A.X3\_BOVINE GCCACACGGGTGCCTCTAGGACACTCAGGTGTTTTCAGCAGAGATTGCAGATC--CATCCTGGGCAGACCCCGAGCCCTGTCTCT  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----  
DENND1A.V1\_HUMAN GGATA-GGGCAG-----AGGAGGTGCTG-GCGGCCCCAGGGAAGGAGGGTGTGTATCCCAAGGC-CCCCTGGCTGTGC  
DENND1A.X1\_BOVINE GACGGGGGGCAGAGTCTTAAGGCAAGAGGTGCTCGGTGGCCTCAGGGAAGCCGAG--CCCACCCCATGGTCTCCCTGGCTGGGG  
DENND1A.X2\_BOVINE GACGGGGGGCAGAGTCTTAAGGCAAGAGGTGCTCGGTGGCCTCAGGGAAGCCGAG--CCCACCCCATGGTCTCCCTGGCTGGGG  
DENND1A.X3\_BOVINE GACGGGGGGCAGAGTCTTAAGGCAAGAGGTGCTCGGTGGCCTCAGGGAAGCCGAG--CCCACCCCATGGTCTCCCTGGCTGGGG  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----  
DENND1A.V1\_HUMAN TGAGGGGCTGGGGTGAGCGCTCCATGTTTCAATGAGCACTGCTGCCTTCTCACTTGTGGGACTT--TTTGCAAACCAAGGATG  
DENND1A.X1\_BOVINE -----CCAGTGGCAAGAGACCATGTTTCAAGAGCACTGCTGTCTCTTCCCTTGTGGACTGAGTCTGCAAATCCAAGGATG  
DENND1A.X2\_BOVINE -----CCAGTGGCAAGAGACCATGTTTCAAGAGCACTGCTGTCTCTTCCCTTGTGGACTGAGTCTGCAAATCCAAGGATG  
DENND1A.X3\_BOVINE -----CCAGTGGCAAGAGACCATGTTTCAAGAGCACTGCTGTCTCTTCCCTTGTGGACTGAGTCTGCAAATCCAAGGATG  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----

DENND1A\_BOVINE -----  
DENND1A.V1\_HUMAN AACTTTGT--GTGCATTCAATAAAATCATCTTGGGGAAGAGG  
DENND1A.X1\_BOVINE AATTTTGTGTGTGCGTTCAATAAAATCTTCTTGGAGAGAAA-  
DENND1A.X2\_BOVINE AATTTTGTGTGTGCGTTCAATAAAATCTTCTTGGAGAGAAA-  
DENND1A.X3\_BOVINE AATTTTGTGTGTGCGTTCAATAAAATCTTCTTGGAGAGAAA-  
DENND1A.X4\_BOVINE -----  
DENND1A.X1-4\_F -----  
DENND1A.X1-4\_R -----