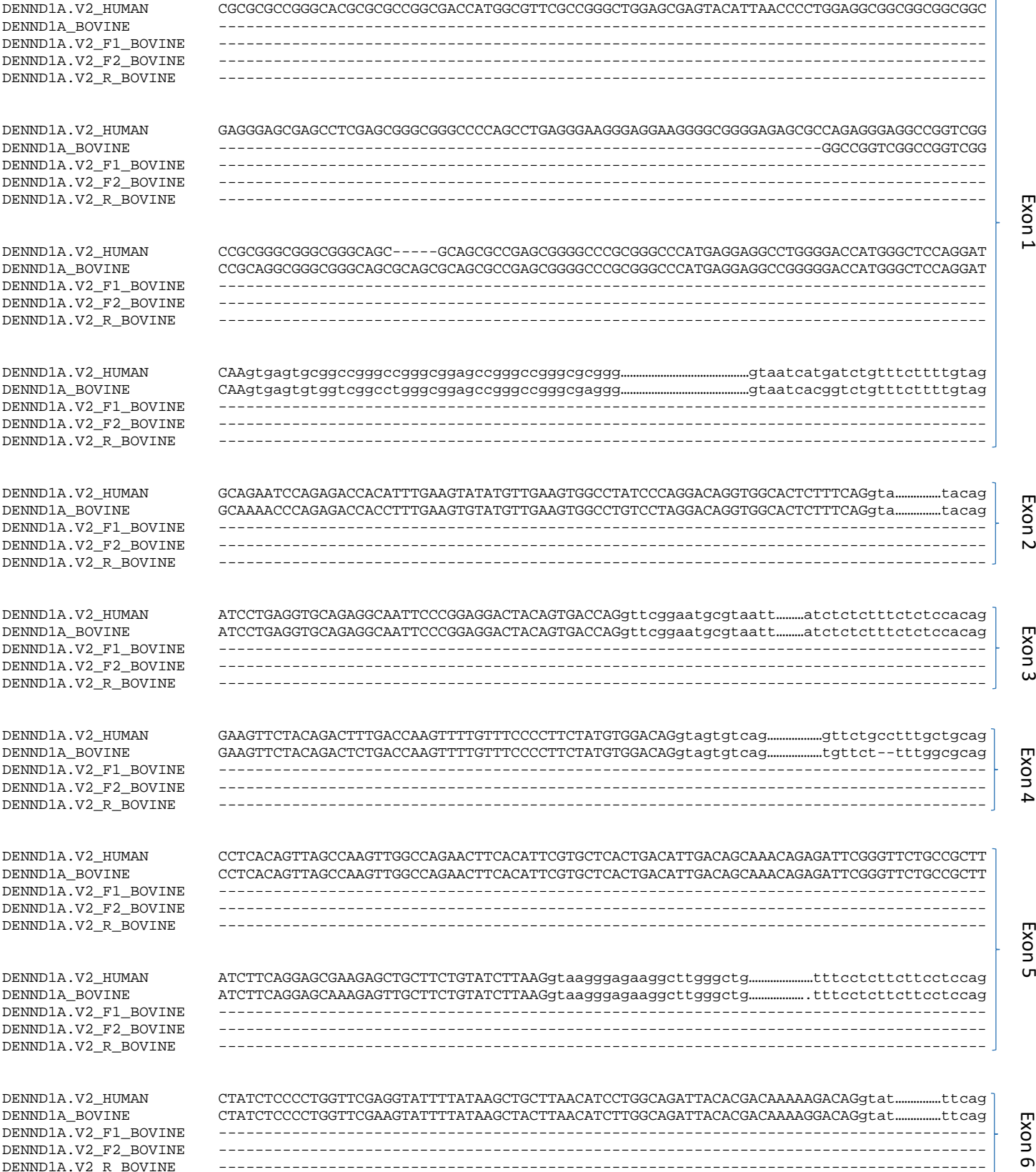


Fig S4. Alignment of human *DENND1A.V2*; bovine *DENND1A*; and predicted bovine *DENND1A.V2* primer sequences. Alignment was generated with CLUSTAL multiple sequence alignment by Kalign (2.0) based on sequences available at Ensembl Asia with transcript ID: human *DENND1A.V2* (ENST00000373620.7) and bovine *DENND1A* (ENSBTAG00000003610). Uppercase letters represent the exons, whereas lowercase letters represent the introns and only the sequence encompassing the exons is shown. **Highlighted** areas represent the primer sequences. represent areas of intronic sequence that are not illustrated in order to reduce the size of this file.



DENND1A.V2_HUMAN GAAAATCAGTGGAAATGAGCTTCTTGAAACTCTGCACAACTTCCCATCCCTGACCCAGGAGTGTCTGTCCATCTCAGCGTGgta
DENND1A_BOVINE GAGAGTCAGTGGAAATGAGCTTCTTGAAACTCTGTACAACTTCCCTATCCCTGACCCAGGAGTGTCTGTTCATCTCAGTGTGgta
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 7

DENND1A.V2_HUMAN agtgggg-cggagtattagccatcactgaaaacg.....atthtagcagaataaatcacttttgcttttctttctag
DENND1A_BOVINE agtgggggtagaatattagcaatcactgagaaac.....actttttcaggaataaat-atthtttatcttcttttacag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN CATCTTTATTTTACTGTGCTGTATACCAGAGAACTTCCCAGCATACTGAGAAAgtaagtactt.....tcttctttctctag
DENND1A_BOVINE CATCTTTATTTTACTGTGCTGTATACCAGAGAACTTCCCAGCATACTGAGAAAgtaagtactt.....tcttctttctctag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 8

DENND1A.V2_HUMAN AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTTAACAACATGTTGCATCTGTACGCCAGTATGCTGTACGAACGCCGATA
DENND1A_BOVINE AGAAATCTGACAGAATATTTTGTGGCTGTGGATGTTAACAACATGTTACATCTGTATGCCAGTATGCTTACGAACGCCGATA
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 9

DENND1A.V2_HUMAN CTCATCATTTGCAGCAAACCTCAGCACTgtgagtagacagtc.....tcattgatctctgctttgctctgttccag
DENND1A_BOVINE CTCATCATTTGCAGCAAACCTCAGCACTgtgagtagacagtc.....tagctctgaatctttaaactctctgtgac
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN CTGACTGCCTGCATCCACGGGTCTGCGGCGATGCTCTACCCCATGTACTGGCAGCACGTGTACATCCCCTGCTGCCGCCGAT
DENND1A_BOVINE TTGACTGCCTGCATCCACGGGTCTGCTCGGATGCTCTACCCCATGTTCTGGCAGCACGTGTACATCCCCTGCTGCCGCCGAT
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 10

DENND1A.V2_HUMAN CTGCTGGACTACTGCTGgtaagtggtg--gcctg.....acatataagcagctgtgtgtctctgtttctcttcacag
DENND1A_BOVINE CTGCTGGACTACTGCTGgtaagggcactgccaccctg.....acatataagcagctgtgtgtctctgtttctcttcacag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAAATGGAGgtaagttggc.....ttttt--tctccttgac
DENND1A_BOVINE TGCTCCCATGCCCTACCTCATAGGAATCCATTTAAGTTTAAATGGAGgtaagttgac.....tttttcttttacttgac
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 11

DENND1A.V2_HUMAN AAAGTCAGAAACATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCCTGGAAACCCCTTTCATGACCTCCAG
DENND1A_BOVINE AAAGTCAGAAACATGGCCCTGGATGATGTCGTGATCCTGAATGTGGACACCAACACCCCTGGAAACCCCTTTCATGACCTCCAG
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 12

DENND1A.V2_HUMAN AGCCTCCCAAACGACGTGgtaggtaatgagcttgcgagatctcac.....ctgtgttttcttctctccatcaccag
DENND1A_BOVINE AGCCTCCCAAATGATGTGgtaggtaatgagctctcgagt-tctgac.....ctgtat---ctcctttctgtcatcag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN ATCTCTTCCCTGAAGAACAGGCTGAAAAAGGTCTCCACAACCACTGGGGATGGTGTGGCCAGAGCGTTCCTCAAGGCCAGGCT
DENND1A_BOVINE ATCTCTTCCCTGAAGAGCCGGCTGAAAGAAGGTCTCCACGACAACCTGGTGTGGTGTGGCCAGAGCGTTCCTCAAGGCCAGGCT
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 13

DENND1A.V2_HUMAN GCTTCTTCGGTAGCTACCGAAACGCTCTGAAAATCGAGCCGgtgagtagc-c.....ccc-----tctgcacttcccag
DENND1A_BOVINE GCTTCTTCGGCAGCTACCGAAACGCTCTGAAAATCGAGCCGgtgagtagctt.....tccatcttatctctgtctcccag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN GAGGAGCCGATCACTTTCTGTGAGGAAGCCTTCGTGTCCCACTACCGCTCCGGAGCCATGAGGCAGTTCCTGCAGAACGCCACA
DENND1A_BOVINE GAGGAGCCAATCACCTTCTGCGAGGAAGCCTTCGTGTCCCACTATCGCTCAGGAGCCATGAGGCAGTTCCTGCAGAATGCCACC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 14

DENND1A.V2_HUMAN CAGCTGCAGCTCTTCAAGCAGgtgcctc-cctccctggctgtggcctgggtctgg.....tttgttccttctttctatag
DENND1A_BOVINE CAGCTGCAGCTCTTTAAACAGgtgcccagcctcccttggcctggctgtgcgtctgg.....tttgttccttctttgtatag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN TTTATTGATGGTCGATTAGATCTTCTCAATTCGCGGAAGTTTCAGTGATGTTTTTGAAGAGGAAATCAACATGGGCGAGTAC
DENND1A_BOVINE TTTATCGATGGTAGATTAGACCTTCTCAATTCGCGGAGGGCTTCAGTGATGTTTTTGAAGAGGAGATCAACATGAGCGAGTAT
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 15

DENND1A.V2_HUMAN GCTGgtgagaagcaac.....gtgacagcttctctgaattctctttccccag
DENND1A_BOVINE GCTGgtaag-ggcagt.....ataccagcttctctgcctcctctttccccag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN GCAGTGACAACTGTACCATCAGTGGCTCTCCACTGTCCGGgtaagcatgcaccaat.....acatttttattatag
DENND1A_BOVINE GGAGTGATAAGCTATACCACCAGTGGCTCTCCACAGTCCGGgtaag--tgccaccccc.....acatttttattatag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 16

DENND1A.V2_HUMAN AAAGGAAGTGGAGCAATTCTGAATACTGTAAGACCAAAGCAAATCCGGCCATGAAGACTGTCTACAAGTTCgtaa.....tgcag
DENND1A_BOVINE AAAGGAAGTGGAGCAATTTGAATACTGTAAGAACCAAAGCAAACCCGGCCATGAAGACTGTCTATAAGTTCgtaa.....tgcag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 17

DENND1A.V2_HUMAN GCAAAAGATCATGCAAAAATGGGAATAAAAAGAGGTGAAAAACCGCTTGAAGCAAAAAGgtacttgaagtt.....tctcctacag
DENND1A_BOVINE GCAAAAGATCATGCAAAAATGGGAATAAAAAGAGGTGAAAAACCGCTTGAAGCAAAAAGgtacttgaagtt.....tctcctacag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 18

DENND1A.V2_HUMAN GACATTGCCGAGAATGGCTGCGCCCCACCCAGAGAGCAGCTGCCAAAGACTGCACCGTCCCCACTGGTGGAGGCCAAGGAC
DENND1A_BOVINE GACATCACTGAGAATGGCTGTGCCCCACCACAGAAGAGCAGCTGCCAAAGACTGTGCCGTCCCCACTGGTAGAGGCCAAGGAC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 19

DENND1A.V2_HUMAN CCAAGCTCCGAGAAGACCGGCGCCAATCACAGTCCACTTTGGACAGgtgtgtaccctggcc.....cctgtacctcctctag
DENND1A_BOVINE CCAAGTTCGAGAGGACCGGCGCCAATCACAGTCCACTTTGGACAGgtatgtaccctggcc.....ccc-atgcccattctag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN GTGCGCCACCTCGTCCACATGTTGTTAAGAGACCAAAGAGCAACATCGCAGTGAAGGCCGAGGACGCTCTGTGCCAGCCCT
DENND1A_BOVINE GTGCGCCCTCCCGTCCACACGTGTTAAAAGACCGAAGAGCAACATCACAGTGAAGCCGAAGGACGTCCTGTCTGAGCCCT
DENND1A.V2_F1_BOVINE -----ACCGAAGAGCAACATCACAG-----
DENND1A.V2_F2_BOVINE -----AGCAACATCACAGTGAAGC-----
DENND1A.V2_R_BOVINE -----

Exon 20

DENND1A.V2_HUMAN GAGCAgtgagatattgtgcctctcccctctgtctgtaagaac.....ccagaatattcttgattaca-cag
DENND1A_BOVINE GACCAGtgagtaacccctcctcccctcctctgcaggagc.....ccagaatattcttgattgtaccag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN AAACACCATTGCAACACCAGCTACACTCCACATCTACAGAAAAGCATTACCCATTTTGGCGCCAAGTTCGGACGAGAGGCTG
DENND1A_BOVINE aaaca-----caccaacacttgccagctctaccgaaaagcattgcccatttggcgccaagtcggacgagagctg
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 21

DENND1A.V2_HUMAN	GACCTCTTCATCACATTGACTTACGCCGTTGCTTTTCCAGACTGGGCAGAGGGGCTGACTTCG-CAGTGTGTGCCAAAGAGCCG
DENND1A_BOVINE	Gacctccccaccacacgtgtttatgctgttgctttccagccccgtgataggagattgctgctcagtgatg-caaagagcca
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----GATAGGAGATTGCTGCGTCA-----
DENND1A.V2_HUMAN	GTGTCTGATAATCCATTTCCTGCTTATCACCTGAACTGTGTCAGTATCACTTTTAGTTTTGTGGTTGGTTGGTTTGTGTGT
DENND1A_BOVINE	gggtctggcaccceccatcattctgggtggttaccagagctgggtcgggtaccactttg-----tgcgggttttgttttgtttt
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	TGTTTAATATGCCCTGTTTCTACTTCTGTTGGA-AAATATTTGGGGTTGAAATAAACAGTGGGAGCATGGG-AGCCAGTTTG
DENND1A_BOVINE	attgcattatgcttgttatggatttctttgggggaaacatttgaggtgaaatgaaccgggtgggagcagggttggctagttta
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	GTGG-TTGCCAACTACCAGTGATAGAAAACAAATGACAGGTTTTCTGTGAGCGTACGTACAGTGGCTCG-----GGCC
DENND1A_BOVINE	Gtgggctggcacactggcagttatagaagacaaatgacaggttctctgtgatcacgcataaacagtgctccaccgtacagtggcc
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	CACAAGGAGACAGAGGGGTACGTTTCAGGACATCATTCCAAGGTTTTCTGTTACGTTTTGTTAAC-----GAGGAAG
DENND1A_BOVINE	caccaggagatagggaggtacattttagaacatcattccaagagtttctgttcacttctttttttttttatggggtgaggggaa
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	GGGAAGTTGTTCTCCATAATACCAGTGGTATTTCTAGTGCAACCCGGGTGTTTTTCTACGCCTCTTCCCATGCTGCTTCCCCA
DENND1A_BOVINE	gcagggtgtattcctataaacgccagtgacatttctggtgtaaccgggtgtttccctgctctcttcccattgctgccttctcc
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	C-----CCCCCACTGTGCTCCGCCCTTCCAATGCCATGTCAACAGCACTTGGATGTGTTTTTCTCAACTGTCATCAGCT
DENND1A_BOVINE	ctgccccccaccctgtgtgctccacttccaaatgccatgtcacaacagcacttggatgtgttttctcaactgtcatcagct
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	CCAGCTGGCAGGACCAACTTCTTGAACACAGGAAGCATCCAGCGGAAAAATTTTAATAAAACAGACTCCTCATAAAAATATT
DENND1A_BOVINE	ccagctggcaagaccaacttcttgaaacacaggaagcatccagcggaaaaatattttaataaaacagactcctcataaaaatggt
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	GTTCGGGGGAGGGGGAAGAAACCGGCTC-CACCAATCTGTCGGCATTGTATTGGGAGATGTGAGAAGCCAGGCTGGCAG-CAGG
DENND1A_BOVINE	gttttgggg---ggaagaaccgccctccccagctctgtcagcattgtgtcgggagacacgagaagacaagccggcgggag
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	GGCCCGATCCTAATGGGCCTTTGTCAGGTGGTGGTTCCGTTGGGCACACGGACTTGGTGCCTGGCCCTTAATCTGGCCTGG
DENND1A_BOVINE	agccacatcctaattgggctttgttgcg-ggtggttcagtgctgggcacgaggactcggcctggcccttaactctggcctgg
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	GTTTTCTGAATCACAGATCTTCATCTCCACTGGGAATATCAAAGTGCTTGGGAACTTAGAAGACTGG-GGCAGCAGAAGGGG
DENND1A_BOVINE	attctcttgaatcaca-atctttgtctccgctgggaatatcagagtgcatcagaacttggaggatttttgggtggcagaaggag
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	ATGCAGGATCTTTGAAGTGGAGAGGAGAGATTTCCTCCTGACTTCTTGCCCCAACTCTCACTTCCAATT-GCACATTAAT
DENND1A_BOVINE	acacaggatctttgaagtggag-ggcgggattcggctcctcctgacttcttgccccaaacttctcacttccaaaaagcacatataat
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----

DENND1A.V2_HUMAN AAT-----CCAGCACT-----TTGGGAGGCCAAGGCGAGCG
DENND1A_BOVINE aattaactg.....ctggcactgcccagcactgctggcact.....attgaacagatgggaaactgaggctcgga
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN GA-----TCACCTGAGGTCAGGGTTCGAGA-----CCAGCCTGGGCAACA
DENND1A_BOVINE gagaggctttccataacttgccaaggtctggggctggaaaatggagagat.....atcttccctccggcttggtagata
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN TGGCGAAACCCGTCTCTACT-----AAAAATACAAAATTAGCCGAGTGTGGTGGCGCACCCCTGTAATCCAGCTA
DENND1A_BOVINE tggggcaatttcgcatccaacctaaggcttagaagagtcgatagcaagctgtaaaggcagcactgctcagtactgccgccc
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN CTCGGGA-----GGCTGAGGCATGAGAATCACTT-----G
DENND1A_BOVINE ctccaggaccacacacag.....actgtcctcaggatgagggatgggtgtttctcagcatctaca.....aaggcacaacg
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN AACCCAGGAGGCGGAGG-----CTGCCGTGAGCTGAGAT
DENND1A_BOVINE aaccaggagatggagatgagggcagtgagccagtaagtgcccgtgcccggctccccaggccaccaccgccccaccgacct
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN CACACCACCACACTCCAGCC-----TGTGCAACAGAGTGAGACTCTGTCT
DENND1A_BOVINE cacaccacctggtccctgccaaccccactgcccacctcaa.....tattcgtccttgaacaccaggggagactctgaac
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN CAAAAATAAAATAACCAGCTTTGTGGACAG-----CAAGATGGGGCTGATT-----
DENND1A_BOVINE aggggtggagaggtgcaaaatctgtggacaggtgagcgtag.....ggaatgcattcaagatggatttgagcgtcaccaaa
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----AAGAGTAAGACTGTCTCCTGGAGTAGCTG-----AGCATCCTGGG
DENND1A_BOVINE g.....agaggactggaaggagaggctctgaactggagtcctctcatcacct.....agctgaggaaaggatcatgtg
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN ACTCATCAGGGCCAGAAA-----CACTAGCCAGCCACTCTCTGGCCAGTCC---
DENND1A_BOVINE Cctgggtgggtgtccagaagaggataaaaatgggcgctgcgaggcctcgtctccccagcacgctggcttctgctcagtcacct
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----ACCCCTGAAGTTCATTCTCCTTCCC-----AGCTGATG
DENND1A_BOVINE agcagac.....gccagggcacattcctgcccgtcagacctcctgcctctctctga.....ccagggacagctgctg
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN TCCATCCCCT-----CCATCATTCCATCTGTCCATTTCGTCATTTCATT---
DENND1A_BOVINE Tctctcacttaccctccag.....athtagacacctgccttccagctctttttctatgcatttttccattagcaaatgag
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -CAGCAAGTATCTTTGAAAA-----CCATCATTCCATCTGTCCATTTCGTCATTTCATT
DENND1A_BOVINE acagaagggttttataaacatagtttaatg.....athtagacacctgccttccagctctttttctatgcatttttccat
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN T-----CAGCAAGTATCTTTGAAAA-----CCTACTAGGCGCAAGCACGG-----
DENND1A_BOVINE tagcaaatgagacagaaggtttttataaacatagttaatg.....ggctcctctcctcacagggagaatgcactggactg
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----ACGATTTTTTTAAAGGAGGCCTTAAAAGGGAG-----TCCCCATGCTG
DENND1A_BOVINE ttact.....atctgtttgcatgggtgtttctaattgggagccttcaggggaagggaaactgccagaggggctctccccttgctc
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN ACTCTTG GTT GAC-----TTGCATTTCCCAAATGAAATTTTC-----TGTGTCAAATT
DENND1A_BOVINE ccccttgtcagcccccttact.....aaataaagattgcatcattggaataagaaatgtccagccatgtatcaactt
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----TTCTTTCTGAATCAAT-----
DENND1A_BOVINE ac.....gctggccacggttctttttaattaattgatgcctta.....tccagcctgctctgcctccccccagGCCACA
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE GCCATATCGGACACTCAAGGAGTCAGACAGTGCAGGGGACGAGGCCGAAAGCCCGGAGCAGCGAGCGGGGACCTGTGGGCC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE CACCCAGCTCCACACGACCGGGCCGCCAGCATCAACCTCCTGGAGGATGTCTTCAGCAACCTCGACATGGAAGTCCCGCTGCA
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE GCAGCTGGGCCAGGCCAAAAGCTTGAAGACCTTCGGACCCCCAAAGACCTGAGGGAGCAGCCGGGGACCTTTGACTATCAGgt
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----GATAGGTTTCTAGTCCCTTA-----AAACTGGCC
DENND1A_BOVINE atgggtgt.....gggagaaagagcacttttccaagtccctcagccagtgctc.....gcctgatgaaaatctgccc
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN GTTG-----GCAATTGGAAGA-----
DENND1A_BOVINE gctgcttcatgggc.....tcgtggcccagcaggtggcagagctggacaga.....tctccggcagAGGCTGGACCTG
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE GGCAGAAGTGACAGGAGCCGTGGGACACCAGGGGCCTTGAAGCTGCCACCCGCACAGCAGGCTCTGGAGCCTAGGCCAGGAT
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE GACATGGCCATCCCCAGCAAGCCGCCGCCCTGCCCGAGAAGCCCTCAGCCCTGCTCGGGAACCTCCCTGGCCTCACCTGC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE AGGCCCCAGAACCAGAATGGCCTCCTGAACCCAGCGACAAGGAGGAGGTGCCACACCCACCCCTGGGCAGCATCACTATCCCC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

Exon 21

Exon 22 bovine

DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	CGGCCCCAGGGCAGGAAGACCCAGAGCTGGGCATCGTGCCCCGCCTCTACTGCCCGCCAGCCAAGTCCAGGCCCCCGGG
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	ATCGCCCTTGCGGACTTCTTGGAACAACCTGCCGGCTGAGCGGAAAGGCGGGCTGCCCTCAGCTCAACCCCATTCCTTGGGCTC
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	CTCTCCAGTGCTGACCCCAAGACCCCACTGAACTGCTCCAGCCACTCAGCCTGGCCCCAGGGCTGCCGGCAGCAGCAGTGAT
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	GCCCTGTGGCCCTGCTGGATCCACTTAACACAACCTGGTCGGGCAGCTCCCTTCCACCAGGCCCTACAGCCCCAAATGTAGCC
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	ACCCCATTTACTCCCAATTTAGTTTTTCCCCCATGGGACCCCCACCCCATTTCCACAGCCATCACTCAACCCCTTTGTCCCA
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	CCTCTGCCAGCGACACTGCCACCATGCCCTGGTCTCTGCACCAGCTGGGCCTTTTGGGGCCCTCCTGCTTCCTGGGGCCA
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	GCCTTTGCCCCCAGCCTCCTGTGTCCAATTCTGGCTTCTGTGCCCCACATCGATCTCAGCCCAACCTGTCTGCCCTCTCCATG
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	CCCAACCTCTTTGGCCAAGTGCCCATGGGTACCCACTCCCTGCAGCCTCTGGGTCCCCAGCAGTCGCCCCCTCAAGGATCCGA
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	ACATTGCCCTTGCCCGCTCAAGTGCCAGGGCCGCCGAGGCCAAGCAAGGGCTGGCCCTGAGGCCTGGAGAACCCCACTCCTC
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	CCAGCCAGCCCCCCCAGGGCCTGGAGCCAGCACTGCAGCCCTCTGCTCCACGAGAGGCCAGAGACCCCTTTGAGGATTTGTTA
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	GGGAAA-----
DENND1A_BOVINE	CGGAAAACCAAGCAAGATGTGAGCTCGGCCCCAGCCCCGGCTCCGTGGAGCAGCTCAGGAAGCAATGGGAGACCTTCGAGTGA
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----
DENND1A.V2_HUMAN	-----
DENND1A_BOVINE	CTGCTGTTTCTACCCAGTTTCTACTGGTGGGAAGGGATGGGAACCCTCTCTGCCGCCCTCCTCCTTTCCACACTGCCCATCTC
DENND1A.V2_F1_BOVINE	-----
DENND1A.V2_F2_BOVINE	-----
DENND1A.V2_R_BOVINE	-----

Exon 21 (human)/22 (bovine)

DENND1A.V2_HUMAN -----CATTCCCTTTACTTTTCAGGTAACATTAC
DENND1A_BOVINE TGGAGAATGGCGCCAGTTCCAGCCTGGGAATCGACCCAGCTCCTGGGTGCCTGTCTGTCCCAGCCCTTCCCCTGCCCCCTAG
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN TTGGTT-----
DENND1A_BOVINE TTGGGTTTTGCACTAAAGAGGTGAGCTGGGCCAGCGATTGCCCCAGGCCACATCTTACCCACCTTCCCTCTGGAAACTGCCCAC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE CAGGAGCCCCGCGCTCCTCAGGATGTCTCTCTGAGCCCCGTCTCTTGCCCCAGCTGCAGCCAGCCCGCACACCCACCT
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----
DENND1A_BOVINE TGATGGGCACGAGTGTGGCGGTACACCAGCTCGTCTGCACGAGAGGCACGTGGTTGGAGTTTGAAGTAAGGAACCCCTCC
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN -----AATATTCAGTTACTAAA
DENND1A_BOVINE CCCACCCCTCCCAGCTGGAGGATCTACCTGGCGAGGCATTTCCAAACCCTGTCTAGCAATATGCACACTCTTTCTTTACTGAG
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----
DENND1A.V2_R_BOVINE -----

DENND1A.V2_HUMAN TCTCTTCAAGAA-----
DENND1A_BOVINE TCTTACCCCAACCCCTCCACCTCCGTTTTTCTGACTTGGTTGGGATCTGGGGGC-----
DENND1A.V2_F1_BOVINE -----
DENND1A.V2_F2_BOVINE -----