Supporting Information

Nishihara et al. 10.1073/pnas.0809297106

SI Text

Dating the Separation Time Between Africa and Laurasia. Regarding the relationship between Laurasia (Europe) and Africa, it is well established that Laurasia and Africa began to rift in the Triassic (≈200 Ma) in the Alpine region (central to eastern Europe) and were separated in that region by the Jurassic (≈150 Ma), although they were still connected in the west near the Gibraltar Strait (1). A land bridge on the northwestern end of Africa to Europe must have been present from the Jurassic to the Cretaceous. To deduce the exact timing of their separation, we used the revised geomagnetic time scale to fix the position of Africa that represents the land connection with Europe. As described above, continental fragmentation occurred from 146 Ma to 90 Ma with a gradual decrease of the landmass area (brown regions in Fig. 3). Even under such conditions, the geographic position of the west African promontory (Morocco) was close to the Iberian peninsula at 120 Ma, suggesting the possibility of a connection between Africa and Laurasia. The critical evidence, however, lies beneath the western Mediterranean Sea. A large-scale unconformity must have been present between the Early Cretaceous shallow marine sediments and underlying basement rocks, presumably the middle Paleozoic Hercynides, but the data are not yet available. Therefore, although the estimated time of final separation ranges from 148 Ma (2) to 110 Ma (3) (and possibly 120 Ma), the resolution of this issue awaits future drilling data.

1. Dewey JF, Pitman WC, Ryan WBF, Bonnin J (1973) Plate tectonics and the evolution of Alpine system. *Geol Soc Am Bull* 84:3137–3180.
2. Stanhope MJ, et al. (1998) Molecular evidence for multiple origins of Insectivora and for a new order of endemic African insectivore mammals. *Proc Natl Acad Sci USA* 95:9967–9972.
3. Jacobs LL, et al. (2009) Cretaceous paleogeography, paleoclimatology, and amniote biogeography of the low and mid-latitude South Atlantic ocean. *Bull Geol Soc France*, in press.

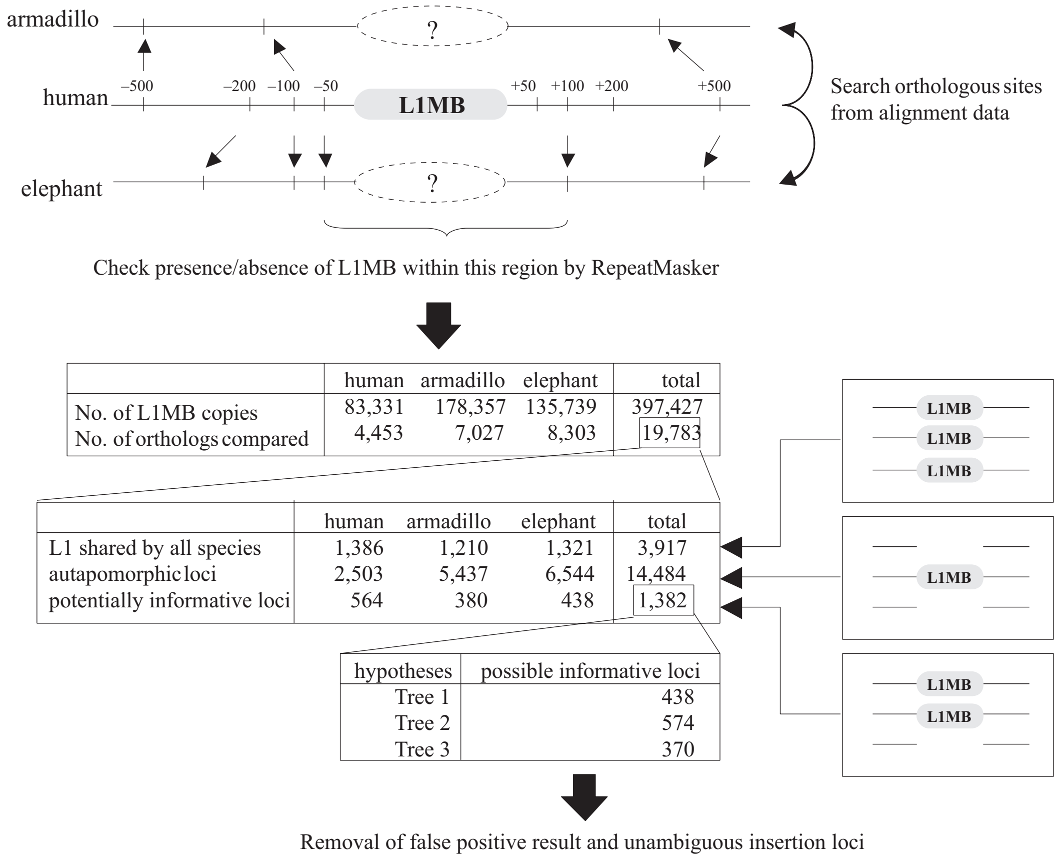

Fig. S1. Strategy used in this study. We used sequence at 50, 100, 200, and 500 nt upstream and 50, 100, 200, and 500 nt downstream of L1MB elements in the human genome to search for orthologous sequences in the armadillo (*D. novemcinctus*) and African elephant (*L. africana*) genomes and then determined the presence or absence of a L1MB element within the orthologous regions. Among 19,783 loci compared, 1,382 loci were potentially phylogenetically informative. Further analysis of these loci removed all false positive hits resulting in the final set of 68 loci (Table 2).

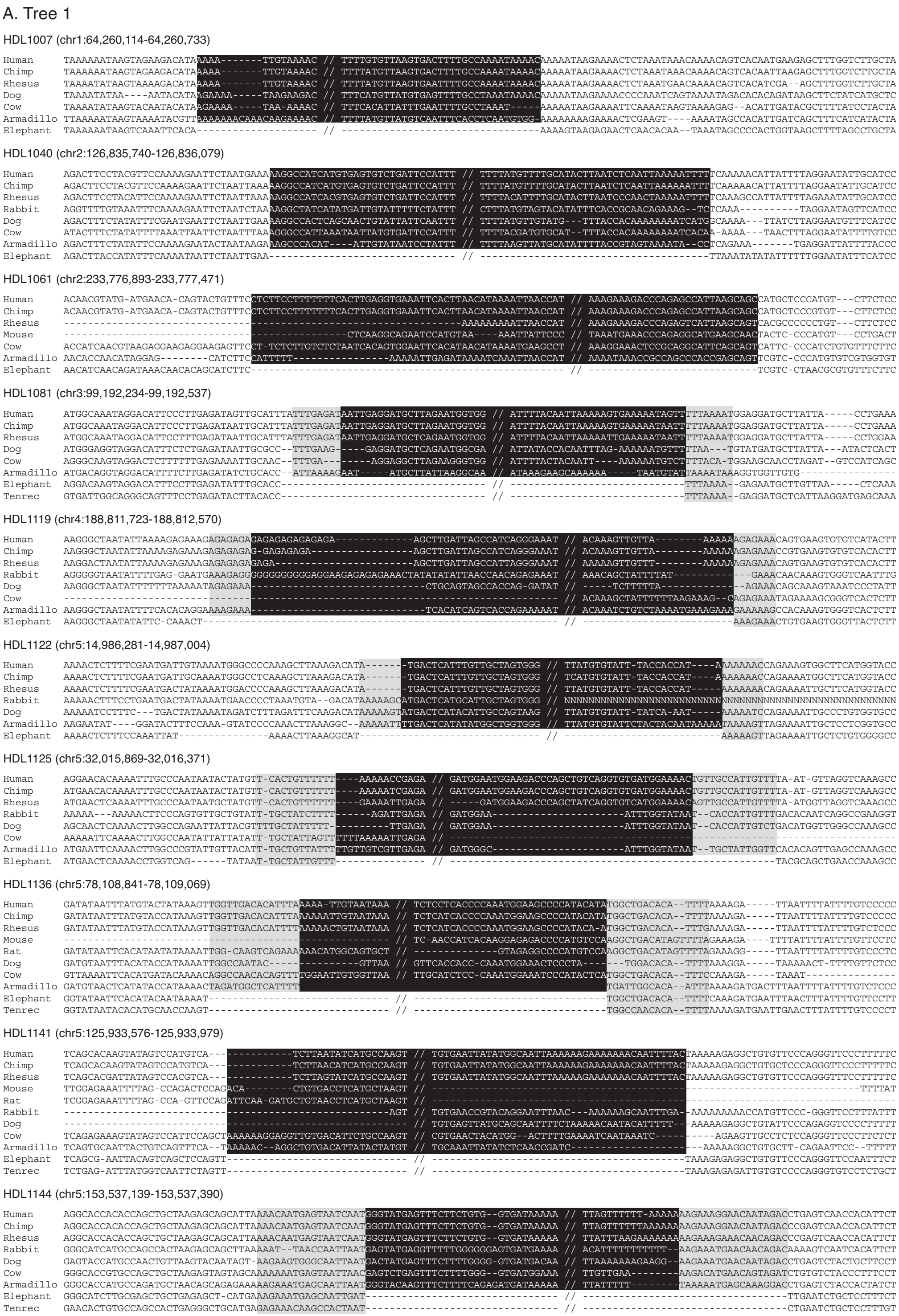

Fig. S2. Alignments for the 68 loci that support tree 1 (22 loci), tree 2 (25 loci), and tree 3 (21 loci). The genomic position of each locus in the human genome (hg18; NCBI Build36) is shown. Black and gray boxes denote the L1 and the TSD sequences, respectively. Each TSD was generated during L1 integration, an indication of bona fide retrotransposition. The central region of each inserted L1 sequence has been omitted.

A. Tree 1 (continued)

HDL1171 (chr7:30,523,722-30,524,319)

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Human      CAATTTGCCTTAGGAAGCCACAAAATTGTAGTGGCAAGATG--AATTCTCTAACCCAGC // TATGTTATGTGAATTTCACCTTTAA-------AAAAAAATGAGAAACCT-AG---------------------
Chimp      CAATTTGCCTTAAGAAGCCACAAAATTGTAGTGGCAAGATG--AATTCTCTAACCCAGC // TATGTTATGTGAATTTCAGCTTTAA-------AAAAAAATGAAAACCT-AG---------------------
Mouse      TTATTTGCTTTGCTCTCCTTCACAGTGGTAGAGGCAAAACC---TTCCTGTGATTTAGC // CATGCCATATAAATTTCATCTCAAT------------AAAGACAAGCATCAGAAACC-----TTCCTTAGTATTT
Rat        CTATTTGCTTTGCCACACTTCACAGTGGTAGAGGCAGAGCC---TTCCTGTGGTTTAGC // CATGCCATGTAAATTTCATTTCAAT------------AAAGATAG----CAGAAACC-----TTCCTTAGTATTT
Rabbit     TTACTTGCCTTAGGGTCCCACAAAATTATAGCTGCAAAGTTTTATTTCTGTGACCCAGC // -----------------------------------------------------------------------
Dog        TCATATGCTTTAG------------------------AATTTTACTTCTGTGATCCAAC // TAGATTATGTGGATTTTACCTTAGT-----AAAAAAGAAAAACAAACAAACAAACCATTTATTTTCCAAGATTTC
Cow        TGATTTGCCTTAGGGTGCCACAGAATTGGAGTGGCGAAATTTTGTTTCCATGACCCCAC // TATGTTATGTGAATTTCACCTCAATAGAAAAAAGCAGAAAAACAAACAAAAAAACC-TTTATTTCCAAGGGTTTC
Armadillo  TGATTTACCTTGG-ATGCCACAAAATTGTAGCAGCAAATTTTT-TTTCCAAAGCCTAGC // TATGTTACATGAATTTCACCTAAAT--TAAAAAAAAAACACACAA-CATACAACAC-TTTATTTCCAAGGGCTTC
Elephant   TGGTTTGCCCCAAGGTGTCACTATATTGTAGTGG------------------------- // -------------------------------------------------------CAAAAC-TTTGTTTCTAAGGACTTC
Tenrec     TGTTTTTCCTGAAGGTGCTACAGGGTTGTCGTGG------------------------- // -------------------------------------------------------CAAAAC-TTGCTCCCTAATGGGGCC
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HDL1200 (chr8:72,015,724-72,016,185)

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Human      TAAGAACTATAGGTGCCATACAAACTTTTTTATTAT-------------TATTT-TAGTGAAGTGAAGTCCACATAACATAAA // GGTATATATGCTAAATTTATTA-TTTTCTTATTT-CAAAATGTTGCTCAAG
Chimp      TAAGAACTATAGGTGCCATACAAACTTTTTTATTAT-------------TATTT-TAGTGAAGTGAAGTCCACATAACATAAA // GGTATATATGCTAAATTTATTA-TTTTCTTATTT-CAAAATGTTGCTCAAG
Rhesus     TAAGAACTATAGATGCCATACAAACTTTGTTGTTAT-------------TATTT-TATGGAAGTGAAGTCCACATAACATAAA // AGTATATATGCTAACTTTATTA-TTTTCTTATTT-CAAAATGTTGCTCAAG
Mouse      ------------------------------------------------------------------------------------ // TGTAATTATGCCAGA-CTATTA-TTTT--TACTT-CAAAATGTTCTTGAAG
Rabbit     TAGGAACCATAGATGC----CAAAATACACTGTTAT-------------TATTT-TACTGAAGTGAACTCAATGTAACAAGAA // TTTATTATTT-CAACTTTGTTATTTTCTGTTTT-CAAAAT-TTGTCCCAG
Dog        TAGGAGCAATGGGTTTCAGACAAGCTTAGTGATTAT------------TTTTTTGTATTGAAGTAAAATCCACACAACATAAA // -----------CAGCGCTATTA-TTTTTAACCT-CAGAATGTTGCCTAAG
Armadillo  TAAAAGCTATAGGAGACAGATAAGATTTATTATTATTTTCATCATATTATATTTTTATTGTTG-GAAATTCAATTAACATAAA // GAACTTCCAGCTTTATT-ATTACTATAATTATTT-CAAAATGTCTTCCAAG
Elephant   TAGGAGCTACAGGTGCCAGGCA-------------------------------------------------------------- // --------AGCTTTGTTTATTTATTTATTTATTTCAAAATGTTGCCCATG
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HDL1208 (chr8:101,304,116-101,304,783)

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Human      TGAGAGAACATGATTACTGACATTTCTGACC-TTTTGCATTATAGTTTTTCTAAAA // GGTAATTCTATGTTTAACTTTTTGAAGATTGTATTATATTTGTTATATG-TACTCAGGAAGGTTCATTTAAAGTAATT
Chimp      TGAGAGAACATGATTACTGACATTTCTGACC-TTTTGCATTATAGTTTTTCTAAAA // GGTAATTCTATGTTTAACTTTCTGAAGATTGTATTATATTTGTTATATG-TACTCAAGAAGGTTCATTTAAAGTAATT
Rhesus     TGAGAGACCATGATTACTGACATTTCTGACCTTTTTGCATTATGGTTTTTCTAAAA // GGTAATACTATGTTTAACTTTTTGAAGACTGTATTATATTTGTTATATG-TACTTAAGAAGGTTCATTTAAAGTAACT
Rabbit     TCTGAGGCCGGGGCTACTCCGATTGCTGGGCCTTGTGCTCCGGGCCCTTTTAGAAA // GGTAATTCTGTCTTTAAATGTTTGAGGATTGGATGATAGTTTTCA-GTG-TATTCAAGCAGGCTCTTCTAT-GTCAAT
Dog        TGAGGAGCTGTGATTACTCCTATTTCTGAACCTTCTGCACTATATATTTTTTAAAA // GGGAATTCTGTGTTTAGCTTTTTGAGGATTGTGTTACACTTTTTACATG-TACTCATGAAAGGTCTATTATACAGATT
Cow        CAAGAGACTGGGATCATTCATATTTCTGAACCTTCTACATTTTTTACACTTTAAAA // GGTAATTC--TGTTTAGTTTTTTGAGAATTGTATTGTAATTTTTAGGTG-TACTCAAGAAGGTGCTTTTACACAGATT
Armadillo  TGAGAAAGCATGATTATTCACATTTTTGAACCTTCTGCATTAGACTTTTAAAAAAA // NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNTCCTTTTATAGCAATT
Elephant   TAAAAGACCACGAATATTCACAT--CTGAAACTTC--------------------- // ----------------------------TATATTGTGCTTTTTATATGTTACACAAGCTGGCTCTTTTAGACCAATT
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HDL1233 (chr9:100,132,789-100,133,473)

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Human      ACTGTTTCTTTACCTGGAATGTC-CTTATGTATCTTTTCCTGTCTTTTTCTTTT // GTTTAACGTTTTCAGGAAAGGATGAACTATTTTGCACAGCTTCTGTTTTCT----TTATCCAAATCCTATTTGTTCTTTG
Chimp      ACTGTTTCTTTACCTGGAATGTC-CTTATGTATCTTTTCCTGTCTTTTTCTTTT // GTTTAACGTTTTCAGGAAAGGATGAACTATTTTGCACAGCTTCTGTTTTCT----TTATCCAAATCCTATTTGTTCTTTG
Rhesus     ACGGTTTCTTTACCTGGAATGTC-CTTATGTATCTTTTCCTGTCTTTTTCTTTT // NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNTGTTTTCT----TTATCCAAATCCTATTTGTTCTTTG
Mouse      ------------------------------------------------------ // GATCA--CTCTTGAGGGCAGGCCTTGACGTTTT-----GCTCTTGTTTTCT----TTACCAAGATTCTGCTTGTGCTTTC
Rat        ------------------------------------------------------ // GATTAATTTCTCGAGGGCGAGCCTTGATGTTTT-----GCTCCGGTTTTGT----TTACCAAA---CTGCTTGTGCTTTC
Rabbit     ATTGTTTCTATACCTGGAGAGAC-------------------------TTTTTA // -------TTTTGAGAAAAGGCTGAGCTGTCTG-CACAGCTCGTGTTTTCT----TTGTCCAAATCCCTCTTGTCCTTT-
Dog        GAATGCTCTTCACCTGGTGTAGCCCCTGTCTACCTTTACTTATCTTTTTAAAAA // AGTTTAATTTTTGAGGAAATGCCAGACT-TTCA-TACAGCTCCCATTTGCCTTAACTATCCAAATCCTACTTGTTCTTTC
Cow        GAATTCCCTCAACCTTGT------CCTGTC--TTTAAAAAAAAAAAAAAAAAAA // --TTAACTTTTTGAGGAACTGCCAGACTATTCA-CACAGCTTCTGTTTTCT----CTGTCTAAATCCTAC-TGTTCTTTC
Armadillo  ACTGTTTCTTCACCTGGAATGAC-CTTATG--CCCCTTTCTGTCT-TTTATTTT // TGTGAATGTTTAGAGGAACCGCCAGA-----------------------CT----TTATCCAAATCCCACCTGCGATTTC
Elephant   ACTGTTTCTTCACCTGGAATGTT-CTCGTA------------------------ // -------------------------------------------TGGTTTCT----TTATCTAAATCATAATTGTTATTTC
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HDL1256 (chr10:77,039,821-77,040,021)

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Human      GTGAACATACTTAATTTTTTAAAAAAGAAATACAGCTTTATCACTT------AAAAAATTGTGATAGGATACAT // AACTGTCACC-ACTATTTAGTTCCAGCTTTATCAC--TTTTAAGTATAGAAAAT-ATTTT
Chimp      GTGAACATACTTAAATTTTA-AAAAAGAAATACAGCTTTATCACTT------AAAAAATTGTGATAGGATACAT // AACTGTCACC-ACTATTTAGTTCCAGCTTTATCAC--TTTTAAGTATAGAAAAT-ATTTT
Rhesus     GTGAACATACTTAATTTTTG--TAAAGGAATACAGCTTTATCACCT------AAAAAATTGTGATAAAATACAC // AACCGTCACC-ACTATTTAGTTCCAGCTTTATGAC-TTTTTAAGTATAGAAAAT-ATTTT
Rat        ------------------------------------------------------------TGTGGTAAGATACAC // AGGTAATGGCCTCTGGTCAGTTCCAGCTTTATTAG--TTCTAAGAGTACAGAAT-GTTTT
Dog        GTGAACATACTTAGTCTTTT--AAAAGAAATACAGCTTTATCTCTTTA------TGTTATTTCTATTTTGCCAC // CATCATCACC-ACTATGTAG------TTGCGTCACCCTATGTAGGATAGGAAATATTTTT
Cow        GTGTGCCTGCTTAGTGTTTT--AAAAGAAATATAGCTGTAATGCTTTAAAAAAAAAAATGGTGGTAAGATACAC // AACCGTCACC-ATTATCTAG------CTTTACCAC----TTAAGTATAAAAAATTATTTT
Armadillo  GTGAGTATATTTCCTGTTTT--AAAAGAAAAATAGCTTTGTCGCTT-------TATTCTTGTGGTAAAATGCAC // AACCATCACC-ATCATCTAGTTCCAGCTTTATCAC--TTTCAAGTATGGAAAAT-ATTTT
Elephant   GTATGTGTACTTAACGTTTT---AGGGAAATA------------------------------------------- // ----------------------CAGATTTATTAC--TTTTAAGTATTGAAAAT-ATTTT
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HDL1262 (chr10:85,095,087-85,095,343)

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Human      TTGTTAAAATAATACTTTACCT--AAAATACATATACCACTA---TCTAGTTTCAGAACT // AATTTTATATTATTTATATTTTATCACAATAAACA-CACACACACATATACACAAA--TTTCAA--GTCTTTCT
Chimp      TTGTTAAAATAATACTTTACCT--AAAATACATATACCACTA---TCTAGTTTCAGAACT // AATTTTATATTAGTTATATTTTATCACAATAAACA-CACACACACATATACACAAA--TTTCAA--GTCTTCCT
Rhesus     CTGTTAAAATAAAACTTTACCT--AAAATACATATATCACTA---TCTAGTTTCAGAACT // AATTTTATGTT-TTTATATTTTATTACAATAAAAA-CACACAAACTTATACACAAA--TTTCAA--GTCTTCCT
Rat        --------------------CC--AAAATGCATACACCATTAGTATACCACCCCAGCACT // AGTTTTAATCTTTTCATAT------AAAACAGATG-TTCATAATTTTAGAAAAAAA-----------TTTCCC
Rabbit     -----AACAGAAAACTTTACCT--AAAACG---AAAGAATTATCTTCTAGTTTCAGGGCT // AAAAGTGAGCACTTTATGTT-----ACCACAAGGA-AACAAGCACATATACACAAA--TTTAAATAGTCTTCCA
Dog        TTTTCAAGACAAACCTCTGCCT--CAGATACATACATCAATA---CCTAGTTCCAGAACA // ------------------------------------------GCACACACATA------TTTAAA--GTCTTCTA
Cow        TCTTTCAAACAAACTTTTGCCT--AAAACACATTCATTGTTA---CCTAGTTCCAGAACT // AATTATCTGTTATTTGTAC---------------------------------------------------------
Armadillo  TTTC-AAGACAAACCTTTGCCTGAAAAACACAGACAACATTA---TCTACTTCCAGAACT // AATGTTAGGCATTGTGTATTTTATGACAATGAAAAACTCACAGAAA----CTCAAA--TGTAAACAGTCTTCCA
Elephant   TTTTGAAGATAAAACTTTGCC--------------------------------------- // -----------------------------TAAAA--CATGCATGCA----CACAAA--TTTAAATAGCCTCCCA
Tenrec     TTTTGAAGACAAACCATTGTC--------------------------------------- // -----------------------------TAAGG--AACACATACA----AAGAAATGTTTCACTTCCTTCCTC
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HDL1276 (chr10:123,767,839-123,768,340)

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Human      CAAACAATGTCTTATGCAGAA-ACCCCATATATGAAACATTTACA----CTTGTAAAACTT // CATTTTGTTTATCCATTCGTCTGTTGAAACATACACACTTC-TGCTCTG-TTCCAACCAGAAGCGGGGCACTG
Chimp      CAAACAATGTCTTACGCAGAA-ACCCCATATATGAAACATTTACA----CTTGTAAAACTT // CATTTTGTTTATCCATTCGTCTGTTGAAACATACACACTTC-TGCTCTG-TTCCAACCAGAAGCGGGGCACTG
Rhesus     CAAGCAATGTCTTATGCAGAA-ACCCCATATATGAAACATATACA----CTTGTAAAAATT // CATCTTGTTTATCCATTCATCTGGTGAAACATACACACTTC-TGCTCTG-TTCCATCCAGAAGCGGGGTACTG
Mouse      CAAACTATGTATTACACAGAA-TCGTAAGATGTGAAACACA---A----CTTTTAAAAAAA // AGGTGTGGTTATCTGGTCATCTGCCCACTCCCACACAATTC-TGCTCTA-TTTAAATGCAAAGTAGGGTACTG
Rat        CCCCCAAACCATTACACAGAA-CCCTAAGATGTGAAACATG---A----CTTT-AAAAAAA // AGGTGTGATTATCTGCTCATCTGCCCACACCTATACAATTC-TGCTCTA-TTTAAATGCAAAGTAGGGTACTG
Rabbit     ------------------------------------------------------------- // CATTGTGTTTAACTGTTCATCCATTGAAACCTACACATCGC-TGCTCTG-ACCCA----GAAGTAGGGCGCTG
Dog        CAAACAATAGTTTGTACAGAA-CTCCAAGATGTGAAACATAAACA----CTTTAACATAGG // CAATTCGAATATCCGTTCACCTGTTGGAACATATACACCTC-GGCTCTG-TCCAAACCGAAAGTGGGGGCACC
Cow        CAAGCAATATCTTATGCAGAA-TCTCAAGATATGAAACACATTCA----CGTTTAAAAATT // CAACTCACTTATCCATT-GCCTGCTGAAACATACACACTTC-GGCTCTG-TTTGAACCAGAAGTGGGGCCCTG
Armadillo  CAAACAGTATCTTATGTAGAA-CCCTAAGATGTAAAATATATATAGTTTTTTTTAAAAAAT // CAATTTGTATAGCCATTCATCCGTTGAAATACACACA---C-TGCTCTG-TTTGAAACAGAAGTGGGGTATGG
Elephant   CAAACAATATCACATGGAGAACCCCCAAGATG----------------------------- // ----------------------TAAAACATACACACATCTTTCTCTGCTTTGAAGCAGAAGTGAGGTATGG
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HDL1287 (chr11:35,970,466-35,971,040)

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Human      TGTTG----------------ACAGTGACTTATGGAAACACATTGGTATGTCCACACACAAATTT // GTGTGTGAGTTTTATCTCTTAGTCATGCTGTTAAA-GATCACATTTACATTGCAAACAAGAACAT-TTA
Chimp      TGTTG----------------ACAGTGACTTATGGAAACACATTGGTATGTCCACACACAAATTT // GTGTGTGAGTTTTATCTCTTAGTCATGCTGTTAAA-GATCACATTTACATTGCAAACAAGAACAT-TTA
Rhesus     TGTTG----------------ACAGTGACTTATGGAAACACATTGGTATGTCCACATACAAATTT // GTGTGTGAGTTTTATCTCTTAGTCATGCCGTTAAA-GATCACATTTACATTGCAAACAAGAACAC-TTA
Mouse      T-CCG----------------ACAGTGCCCCATAGGTACACATTTATACATTCACACAAAAACTC // GTGTATGAATTTTATCTC--AGTAAATCTGTCTAAAAGTCACATTTAAATTGCAGATTAGAATAT-TAT
Rat        ----------------------------------------------------------------- // -----------------------------------AGTCACATTTAAATTGCAGATTAGAATAT-TAT
Rabbit     TGTTG----------------ACAGTGGCTTCTGGAAGCATATTGA-AAGCTCTTGTAAAAATCT // GTGTGTGGGTTTTATCTC--AATAACGCTATTGAA-TATCCCATTTACATTGCAAACTAGACCAT-TTT
Dog        TGTTG----------------ACAGTGACCCAGAGAA------------------ATACAAACATTT // GTATGTGAATTATATGTC--AATCAAGCTGTTAAA-AATCACATTTACGTTGCAAGCTAGATCAT-TTA
Cow        TGTTG----------------ATAACTACCCATAGAAACGTATTTATATGTCTACACAAGCATTT // GCAAGTGAATTATGCCTC--GATCAAAC--TTCAA-AATCACATTTACTTCTCAAACTAGAACAT-TTG
Armadillo  CTTTG----------------ACAGTGACTCATGGACACAAATTTATGTGTCCACCCAAAACCTT // GTATAGG------------AATAAAACTGTTAAA-AAT-ACAT-------GCACATTAAAACATGTAA
Elephant   TGTTGACCAAAAAAAAAAAAAACAGTGACCCATAA------------------------------ // ------------------------------------AAGCACATTTATGTTGCAAACTTGAACAT-GTA
Tenrec     TCCTG----------------ACCATGACCCATAG------------------------------ // ------------------------------------AAAGACATGTACA--ACACGTCACAACAT-GTG
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HDL1337 (chr14:90,227,725-90,228,475)

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Human      AAGACCTGGATGTTTA--TGTACAAATTTGGTCATTAAATGCCCTTTTTGTGTG // TTTTTAATTATTTGGAGTATATACCTAA-GAGTGGAACT-GTTGAAAATATACTTTCAAATCCTTCTCTGCTATGATCTC
Chimp      AAGACCTGGATGTTTA--TGTACAAATTTGGTCATTAAATGCCCTTTTTGTGTG // TTTTTAATTATTTGGAGTATATACCTAA-GAGTGGAACT-GTTGAAAATATACTTTCAAATCCTTCTCTGCTATGATCTC
Rhesus     AAGACCTGGATGTTTA--TGTACAAATTTGGTCATGAAATGCCCTTTTTGTGTG // TTTTTAA-TATTTGGAGTATATACCTAA-GAGTGGAACT-CTTGAAAACATACTTTAAAATCCTTCTCTGCTATGATCTC
Rabbit     CCGTCCTGGGTGTTCA--TGGACACACTC-ATCGTTAAGTGCAGTGTGTGTGTT // CTTTCAGCAATTTGGGGTATATATCTAA-GAGTAGAAGT-TCTGGAAATGTATTTCCAAATCCTTTTCTGCTACAGCCTT
Cow        AAGAACTTGAACTTCTT-TGTACAAAGCTGGTCATTAAATGCACTTTTTTTTGC // CTTTCAATTATTTGGAGTATTTATCTAG-GAATGGGGCT-GCTGGAAATGTACTTTTAAATCC-TCTCTGCTATAGTTTC
Armadillo  AAGGCCTGGATGATCAGGTATACAAATTTGGGTATTCAATGCAACTTTTTTTTT // TTTTCAATTATTTGCAGTATATA-CTAAAGAGTGGTAATTGCTTTAAATGTACTTTTAAACCCTTCTCTGCTATGGTCTC
Elephant   AAGGCCTGGGTATTTG--GGTACAAAATTGGTAA-------------------- // ----------------------------------------TTAAATGTACTTTGAAATCCTTCTCTGCTGTGCTCTC
Tenrec     GAGGCCTGAGCGTTTG--TGGACACATCTGGTCG-------------------- // ----------------------------------------TCCAGTGTGCTTGGCGATCCTTCTCGGCTGTGCTTC
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Fig. S2. Continued.

A. Tree 1 (continued)

HDL1360 (chr16:66,678,918-66,679,430)

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Human      AAAATATTTTAAGCAGGTAATTTTTTTTTAAAG--TTTTTTTAATATTAAGGCAAAATACATA--TGAAAAAAC // TTTTGAAATTCTGTTGAGGA---TGTGTTATATATTCACAGCTAAGTTTTCAGAATTACTT
Chimp      AAAATATTTTAAGCAGGTAA-TTTTTTTTAAAG--TTTTTTTAATATTAAGGCAAAATACATA--TGAAAAAAC // TTTTGAAATTCTGTTGAGGA---TGTGTTATATATTCACAGCTAAGTTTTCAGAATTACTT
Rhesus     AAAATATTTTGAGC-GGTAA-TTTTTTAAAAGTTTTTTTTTAATATTAAGGCAAAATACGTA--TGAAAAAAC // NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Rabbit     AAAATATTCT-AGCAGGTGA-TTTTTTTTTAGTTTTTTTTTT-CATTAAGGTGAAA--CGTG---AATAAAAT // TTTTTAAATTCTGTTAGAGA-----TGTTATACATTCACAGCTAAGTTTTCAGAGTTACTT
Dog        ------------------------------CTTTTTTTTTT---TTAAAGTCAATT------------------ // TTTAAAAGTTCTATTGAGAAGGTTATGTTATATATTCAAAA-------------TTATTT
Cow        AAAGTAGTCT-AGTAGCTAT-TTTTTTTAA-GTCTTAAAAAC---TTAAGGTAAAATAC-----ACATGACAC // TTTTTAAATTCTTTTGAAAATGATGTGTTAAATGTTCAAAATTAAGGTTTCAAAGTTATTT
Armadillo  AAAATATTCC-AGCAGCTA------CTTAA-TTTTTTTTTTA--ATTGAGGTGAAATTCGCAGAACATAAAAC // TTTTTAAATATTATTGAGAAGGATGTGTTAAATAGTCAAAGTTAAGATTTCAAAATTATTT
Elephant   AGAATATTGT-AGCATCTGA-----------TTTTTGAATAC--ATTGAGA-AAAATGTAT------------ // -------------------------TATTATATATTCAAAGTTAAGGTTTCAAAATTATTT
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HDL1372 (chr17:25,718,455-25,718,910)

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Human      TCATTATTACCCTCTTCC-CTCTCAGGGGATGCCAA-------------TATTTTTTTT-ATTTGAGGCAAAA // GAAACCCTGTACCCATTAAGCAGCCATTCCCCCATTCCCCCCTGCACCAGTATATTT-T--
Chimp      TCATTATTACCCTCTTCC-CTCTCAGGGGATGCCAA-------------TATTTTTTTT-ATTTGAGGCAAAA // GAAACCCTGTACCCATTAAGCAGCCATTCCCCCATTCCCCCCTGCACCAGTATATTT-T--
Rhesus     TCATTATCACCCTCTTCC-CTCTCAGGGGATGCCAA-------------TATTTTTTTTTAATTGAGCCAAAA // GAAACCCTGCACCCATTAAGCAGCCATTCCCCCAGTCCCCCCTGCACCAGCATATTT-T--
Rabbit     CTTTTATCATGCTCTCCC-CTCTCTGAGAATGAAAAGAATGAAGGGAGCCAGTTTTGTTTGTTCATAGCAAAA // GAAAGACTGTGCCCATTAGGTAGCCGATCCAC--ATCCCCGTACTCCAGT----------
Dog        CCTTTATTACCCTCTCCC-CTCTTAAGGGATGCAGAGTGCTAGTATCTTTTTAAAATTTTAACTGAGGCACAA // GAAACCCTGTCCCTGGCAAGCAG--------CCATT-CCCCTTGCATTTGTGTTTTG-TAA
Cow        TCTTTATTACTCTCCCCCACTCTTATGGAAGGCAGAGTGCTAGTTTTTTTTTTAAATT------GAGATAAAA // GAATCCCTGTGCCCATCAAGTA-----CCTCCCATTCCCCCTTGCACTTGTATTTT--CAA
Armadillo  TCTTTATTACCCTTCCCC-TTCTCAGGGAATGCAGGGCACCAGCTTATTTATTAAA---------GGTAAAA // GAAACCTCGTATCCACTAAGCGGTCACTTCCCCTTT-GCCCCTGCATCAGCATTTT--TAA
Elephant   TCTTTATTACCATCTCCT-CCCTCAAAGGATGCAGG------------------------------------- // -------------------------------------------ACGCCAGTATTTTT-TGA
Tenrec     TTTTTATTATCATTTCCC-CTCTCGGAGGCTGTAGA------------------------------------- // -------------------------------------------GCACCAGTGTTTTCGTAA
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HDL1373 (chr17:52,639,033-52,639,686)

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Human      ACATAATAGCAACCTGATAGCTGCTCTTAAGCAAAGAGCTCTCTTTTTAAATTATTGTAGTAAAATACACATAACATAAAA // TTGCTGAGACCCCTCTTTTTAATTTATAACTTTTAGT-TCCCAGGAAAATTCA
Chimp      ACATAATAGCAACCTGATAGCTGCTCTTAAGCAAAGAGCTCTCTTTTTAAATTATTATAGTAAAATACACATAACATAAAA // TTGCTGAGACCCCTCTTTTTAATTTATAACTTTTAGT-TCCCAGGAAAATTCA
Rhesus     ATATGATAGCAACATGACAGCTGCTCTTAAGCAAAGACCTCTCTTTTTAAATTATTATAGTAAAGCACACATAACATAAAA // TTGCTGAGACCCCTCTTTTTAATTTAAACCTTTTAGT-TCCCAGGAAAATTCA
Mouse      --------------------------------------------------------------------------------- // TTG---AGGTACCTTTATATAATTCAAATGTTCTAGC-CCTTAGAAGAATTAA
Dog        CCCTGA-----------------TTCTTTAGCCAAGACCCCT-TTTTTTATTATGGT---AAAATACATATAACATAGAA // TTGCTGACATCCCTCCTTTTTACTTAAACTTTTAGT-TTCCAGAAAGATC--
Cow        TCCTGA-----------------CTCCATAGTGAATATTTGTCTTTCTATATTGTGGT---AAAATGC-----ACATAAAA // CTACTGAGAC--TTCTTTTTAACTTAAAC-TTGTAGC-TCCCAGGAAAATCCA
Armadillo  CCCTAA-----------------CTCCATACCAAAAACTCTCCTCCCTTTTAAATGGTGATAAAATACACATAACATA--- // TTTCTGACACCCCTCTTTTTGACTTAAACTTTGCAGC-TCCCAGGAAA--TAA
Elephant   CCCCGA-----------------CTCCACAGCAAAGACCCATCATTTT--------------------------------- // --------------------GACTTGAACTTTTCAGC-TCCCGGGACTATTCC
Tenrec     CTCTGA-----------------CTCCACAGCCAAGACCCCT--TGTT--------------------------------- // --------------------GAGCTGAACTAGGCAGCGTCCAAAGATTAGCCA
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Fig. S2. Continued.

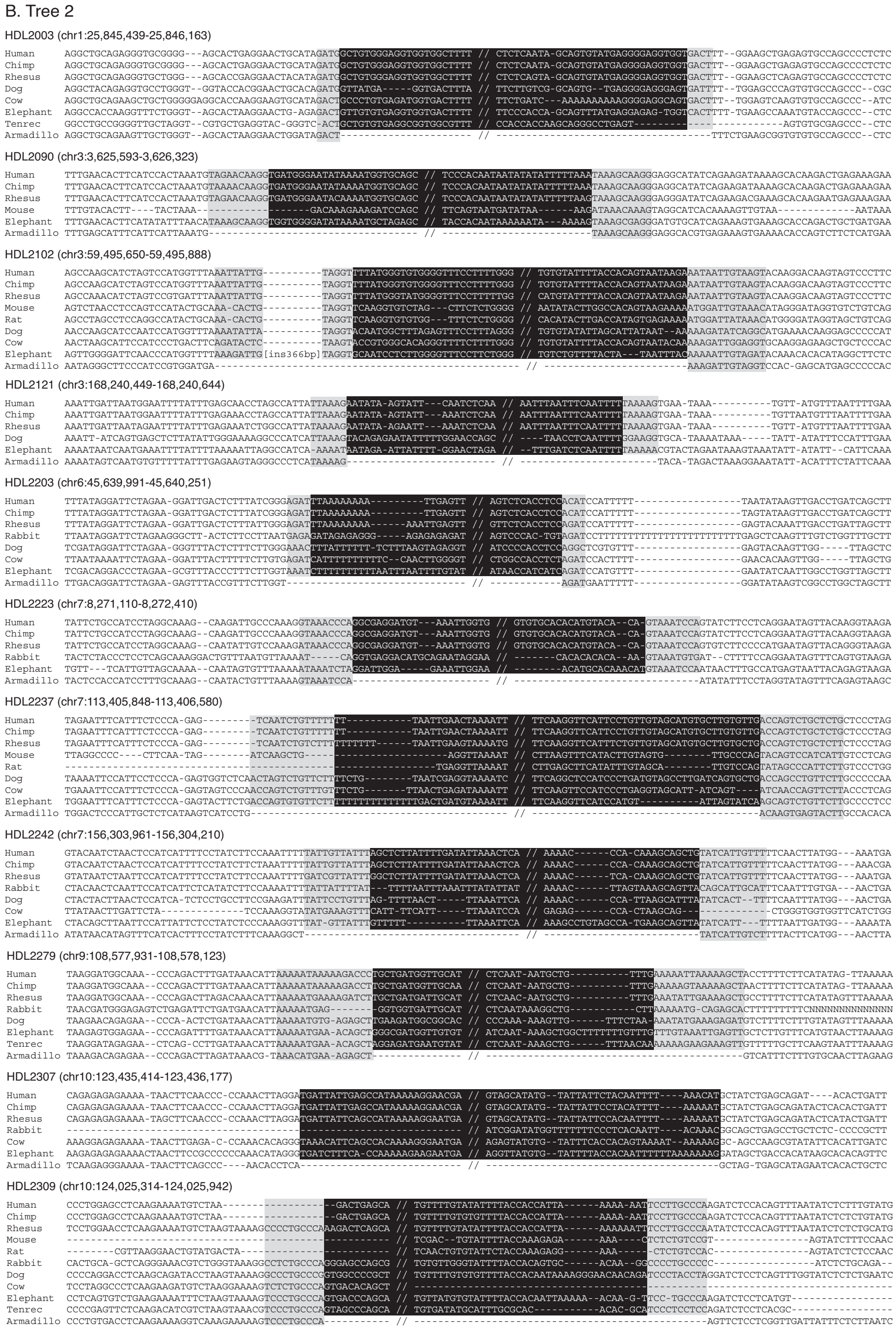

Fig. S2. Continued.

B. Tree 2 (continued)

HDL2333 (chr11:72,587,797-72,588,727)

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Human     ATACCCAGCACA-AGGTTGTCGGTGAATGTATAACTGA--ATTTATTTCTTTTGCAAATCATTTTTT // TTTCAATTATTTTGGGTGAATATTAATGCATGATTGGATTTTTAAAGAAGGTGGTATTTCCTCAC
Chimp     ATACCCAGCACA-AGGTTGTCGGTGAATGTATAACTGA--ATTTATTTCTTTTGCAAATCATTTTTT // TTTCAATTATTTTGGTGAATATTAATGCATGATTTGATTTTTAAAGAAGGTGGTATTTCCTCAC
Rhesus    ATACCCAGCACA-AGGTTGTCGGTGAATGTATAATTGA--ATTTGTTTCTTTTGCAAATCATTTTTT // TTTCAATTATTTTGGGCTAATATTAATGCATGATTGGATTTTTAAAGAAGGTGGTATTTCCTCAC
Mouse     GAATAAAGCATA-AGGTTGTCTGCTGTGTG---ATTTGG--TTTTTCTTCTTT--CTTTTCTTTCTTT // ACTC-TTTAGATGGCTAGTAATGCATGATCGAATTTTTTCAAATGGAGTTATTGCTT--CAGAAT
Dog       ACACTTGGCACA-AGGCTGTCTGTTGAATA---CATTGGGTATCGTTTTTTC-TGCGGATGCACTTTT // TTTCAATTCATTTGGGTGTATACCTATGCGTGACTGGATTTGTAAGGAAGGTAATATTTCTTCAC
Cow       ATACTTGGCAC--AGGCTGGCTGTTGAATG---CATTGG--ATTTTTTCTTT-TGCAGATGCTTTGTT // TTTTAGTTCTTCTGTGTACA--GCTATGCATGATTGGACTTTAAAGAAGGTGATATATCTTCCC
Elephant  ATACTAGCACG-AAGCTGTCTGCTGAATGCATGATTAA--TTCTGTTTATTTTGCAAATACAGTTTT // TTTTAATTCTTGGGGTATATACTTATGCATGACTGGATTTTTAAAGAAGGTGGTATTTCTTCAC
Armadillo ATTCCCAGTGCACGGGCTGTCTGCTGAACTCATGACTGG--ATTT---------------------- // --------------------------------------TTAAAGAAGGTTGTATTTCTTCAC
```

HDL2340 (chr11:104,677,379-104,677,972)

```
Human     TCCTGTTATGTTCCCTAGTTTTAAGCTGT--TAATGT-ATTTAT-------TTTT // AATAATCCCGCCATGGATA--CATGTACAAAGCTATATTCAAAAAAGCTGTTATCATTTTAATGACCCCTTTCATCTT
Chimp     TCCTGTTATCTTCCCTAGTTTTAAGCTGT--TAATGT-ATTTAT-------TTTT // AATAATCCCGCCATGGATA--CATGTACAAAGCTATATTCAAAAAGCTGTTATCATTTTAATGACCCCTTTCATCTT
Rhesus    TCCTGCCATCTTCCCTAGTTTTAAGCTGC--TAATGT-ATGTA-------TTTT // AATAATCACACCATGGATATTCATATACAAAGTTATATTCAGACAAGCTGTTATCATTTTAATGCTCCCTTTCATCTT
Mouse     ------CAGCTCCTTTAGTTGTAAGCTGTGGAAATGTCCAATTT------CCTATT // ---------------------------------------------------------------------------------
Rabbit    ---------TTCCCTTAGTTGTAAACTGTTACTATTTTTTTTAT-------TTATT // AATGATGATGCCAC-------CATG-----AGTATTGTTTGAATAAGCTGTTAAAATATGAA-AACCCCTTTCACCTT
Dog       TCCTGCCATATCACTTAGTTCTAAGCTAA--GATTTTAATTTAT-------TTTT // ACTAATGCTGCTCTGAACA--TTGGTCTACGAGTTTATTT-AATAAGATGCTACAATTTAAACACCCCTCCTCACCTT
Cow       TCCTTCCATCTCCTTTAGTTTCAAACT-------TTTTAT-------ATTTT // -----------------AAA--CTGTATA---------------ACTTTACAATTTTAAGGCTTTGCTTCACCTT
Elephant  CCCTGCCGCTTCCCTTAGTTCCAAGCTCT--TAATAT-TTTTGTTGACTATTATT // AATAGTGCTGTTATGAACATCAGTGTATAAGTTTCTGTTTGAA-AAACTGTTAAGTTTTTAATGTCCCTTTTTGCCTT
Tenrec    CCCTGCCAAAACCCTTAGCTTTAAGCTCT--TGAAT-TTTTGG---TCATTATT // ---------------------------------------------------------------------------------
Armadillo GCCTGACGGTTCCCTTAGTTTAGAGCTTT--TAA--------------------- // ---------------------------------------------------GATGCTGGTGCCTCTTT-CACCTC
```

HDL2345 (chr11:112,966,097-112,966,318)

```
Human     GGCAGT--CAATGTGGTAGGAATACAAG-CCCCCACACGTATATCAGTGCTTCATTCCTTT // TATGAATAATGCTACTATGAATATT------TACATTTTGGTGTGCAGAGGAGTGCATACGACAGAGGCAATA
Chimp     GGCAGT--CAATGTGGTAGGAATACAAGACCCCCACACGTATATCAGTGCTTCATTCCTTT // TATGAATAATGCTGCTATGAATATT------TACATTTTGGCATGCAGAGGAGTGCATACAACAGAGGCAATA
Rhesus    GGCAAT--CAGTGTGGTAAGAATACAAGACCCCCACACGTATATCGGTGCTTCATTTCTTT // TACGAATAATGCTGCTATGAATATT------TACATTTTGGTGTGCAGAGGAGTGCATATGACAGAGACAATA
Mouse     --------------------------------------------------------------- // TGGCTAGCACTGCTGTA--AACATT------GAAGTTTCAGTGTGCTCAGAAGACCATTT--CAGAGACCACA
Dog       GGCACCCACAGGAGGGACAGAACACAAGACTCCCACA-GTGAATCAATATTTCATTCCTTT // TGTGCATAACATCACTATGAACATT------CAAGTTTTGGAGTGTCTAG--------------AGACCATA
Cow       GGCTCTCACAGTAGGGATGAAATGCAATATCCCCACATATGAATCAATATTTCATTCCTTT // TACGAATAACACTGCTATGAACAGT------CACATTTGGGTATGCATAGGC-------------ATACTATG
Elephant  GGAACTCACAACATGGTGGGAATACAAGACCCCCACACATGAATCAGTACTTCATTCCTGT // TATAAATAATACTGCTAGGAACATTCATATACAAGTATTGGTGTGCAGAGGAGTGCATATGACAGAACATAGA
Armadillo GG-GCTCACAAAGTGGTGGGAATACAAGACCCCCATAT------------------------ // -----------------------------------------------AGGGGTGCATATGACAAAGACAATA
```

HDL2368 (chr12:90,848,301-90,849,015)

```
Human     ----ATAAAATAC-TCAAAAATGCTTCAAAAC-TGACTCTCATACATGATTGACAAGAATGTAAGACTGCTCCA // TTTTCTACA-----------------ATAAAAAATTATACAAAATTCAATTAATAGGC
Chimp     ----ATAAAATAC-TCAAAAATGCTTCAAAAC-TGACTCTCATACATGATTGACAAGAATGTAAGACTGCTCCA // TTTTCTACA-----------------ATAAAAAATTATACAAAATTCAATTAATAGGC
Rhesus    ----ATAAAATAC-TCAAAAATGCTTCAAAAC-TGACTCTCATACATGATTGACAAGAATGTAAGACTGTTCCA // TTTTCTACC-----------------ATAAAAAATTATACAAAATTCAATTAATAGTC
Mouse     ----TATGGTGTTCTTAGGATTTGCCCAAACC-C-ATCCTTCCTCGTAACTCGTTAGAATGTAAAATTGTTGAA // TTT--------------------------------------------ATACAATGAATGGAT
Rat       ---------TGTTCTTAGGATTTGCCCAAACC-T-ATCCTTGCTTATTCCTGGTTAGAATGTAAAATCGTTGAA // TTT--------------------------------------------AGACAATGAGTGGAT
Rabbit    ------------------------------------------------------------------------- // TTTACTACA-----------------GCAAAATATTCTCCAGA--------------
Dog       ----ACAAAACACTCCTAAAATTCATCAGAAC-TCATTCTCATATGTTTCCAGTGGGAATGCAAAACTGTTGAG // TTTACCACATTAAAAAAAAAAACAACAACAAAAACAATCTCCAAAACTCAATCAATAGGC
Cow       AAAAAAAAAAAACATTTAAAATTCTCCAATTC-TCATCTTCATACATTACTGATGGGATTGTAAAGTCATTCAC // TTTACCACA-------------CACACAAAAATAATTCTCCAAAACCCAGTTAACAGGG
Elephant  ----CCGGAATAC---TCTAATTCTCCAAAACTTCAGCCTCATGCGTG-ATGGTAGGAATGTAAATTCATACAG // TTTACCACA-------ACTAAAAAAAAAAAAAAAGATCT-CAAA-TTGAAATAATAGGT
Tenrec    ----CTAGGATGCTCTTCTAATTTTCCAAAA-TTCAGCATCATCTATACCTGATGGGAATTTAAAATGGTGCGG // TTTACCACA--------------ATTTTTTTAAAGTTTGCCAAG-TTAAATGTGTGGGT
Armadillo ----ACAAATCACTCTTAAAATGTTTCACAAC------------------------------------------ // ----------------------------------------------CCAATTCATAAGT
```

HDL2370 (chr12:103,495,102-103,495,312)

```
Human     GCACCGGTATGATTC-GTGTATCTGAGGGCTGCAGCCCTTCATTTTTTTTTTTTTTTTTTT // GTTG----TGTTCATGCAGCCCA------------------AACTTGAGAGCTCTTTTGGAACACTCCAGG
Chimp     GCACTGGTATGATTC-GTGTATCTGAGGGCTGCAGCCCTTCATTTTTTTTTTTTTTTTTTT // GTTG----TGTTCATGCAGCCCA------------------AACCTGAGAGCTCCTTTTGGAACACTCTAGG
Rhesus    GCGCCAGTATGATTT-GTGAATCTGAGGGCTGCAGCCTTTCTTTTTTTTTTTTTTT------ // ATTG----TGTTCATGCAGCCCA------------------AACTTGAGAGCTCCTTTCGTAACACTCCAGG
Mouse     ------------------------------------------------------------- // ----------------TGCTCA------------------ATCTGGAGGGC-GCCTTTGGAACATTCTAGA
Rat       ---------TGATGTGG----------GT---GGGCATAGCCCACACCACTTTTTAAATAT // GTCAG---CTAGCCTGATGTCCACAGCAGAAGCAGCAGCAACACACAGAGGCC-CTGCCTTGAACAATGCAGA
Dog       GCATCAGTGTGATTAGGTGT-------GCCTGGGGC-T-GCACCCTAAACTTTTTTTGTTG // ACTGT---TGTGCATGCAGCCCA------------------ACCCAGGGGTCCC-------------ATAGG
Cow       GCATCAGTATGATTAGGTGT-------GTCTGCAGCCT-GTC------TCTTTTTTTTTTT // ATTGT---CAGGCACACAGCCCA------------------GTCCAGGGGGCTCCTTTTGGAACTGTCTAGG
Elephant  GTATCAGTGTGATTAGGTGTGTCTGG-GGCAGCAGCCTAGTC-TTTTGTTTGTTTTATTT // GTTGTTTCCACTTTTGCAGCCCA------------------ATATTGAGGGCTCTTTTGGAGCACCCTACA
Armadillo GCATTAGTGTGATTAGGTGTGTCTGGGGGC------------------------------ // --------------TGTAGTCCC------------------CTCTCGAAGGTTCTTTTGGAGCCGTCTAGG
```

HDL2380 (chr12:124,285,891-124,287,107)

```
Human     CAGCTGGCTGATTATCCACCTGTGGGCCCATGGAGGCTCTTGCTGCTGGATTTTTTTTT // CATCCGTTAATGGACACATGAGACCCATGGAGTCCTTTACAGAGGCAGTTGCATCATGTCTCTTGTCTGTATACG
Chimp     CAGCTGGCTGATTATCCACCTGTGGGCCCATGGAGGCTCTTGCTGCTGGGTTTTTTTTT // CATCCGTTAATGGACACATGAGACCTGTGGAGTCCTTTACAGAGGCAGTTGCATCATGTCTCTTGTCTGTATACA
Rhesus    CAGCTGACCCATTATCTACCCGTGGGTCCATGGAGGCTCTTGCTGCTGGATTTTTTTTT // CATCCGTTAATGGACACATGAGACCGGCGGAGTCCTTTACAGAGGCTGTTGCATCATGTCTCTTGTCTGT-TATG
Mouse     TGGCTTCTCTGCCTTCCACC------------GAGGC----------AGGTTCCGTTTA // CATCTACTGGCAGATGCTTGGGGCTCCTGATTTCTCCCAAAGAGGGAGCTGGGTCTTAACACCCCCCTGTGTGTG
Rat       CGGCTGCCCTGCCTTCTACC------------GAGGC----------AGGTTCTGTTTA // --------GGTGGATACTTGGGGCTCCTGAGTTCTCCCAAAGAGGGAGCTGTGTCTTACCGCCCACCTATGTATG
Dog       CACCCACCTCATTCTCCCCCAGTGAGCCAGT-GGGGTCCCTGCCCCCTCTTCCTTCTTT // TGT----GGGTGCACACCTTGGGCCAGCGGGACATTTGAAAGAGGTAGTAGGATCATGTCTGTCCCCTGCTCATG
Elephant  CACCCAACCCCGTCTCCACCTATGAGCTGGC--AGGCTCTT-----TTTTTTTTTTTTT // TGTCCACTGATGGACGTCTGGGACCAGTGGAGTCTTTCAGAGAGATAGTTGGATCGTGCCTCTCA-CTGCCTACG
Armadillo CACTCTACACATTCTCCAC-TCCGAG--------------------------------- // ----------------------CCTGCAGAGCCCTGG--AGAGGTGGTTGAATCATGTCTC---CCTGTTTGAG
```

HDL2387 (chr13:74,918,343-74,918,529)

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Human     TTTGCTGGAATTATGCTGCACTTTAAAAAATTTA------GGTAAAAT-TCTTATAGA // ATCACCTCTATCTAGTT-CCAGAACACTTTCA--TCACTGTGTTGTACTTTTAA-ATT-TATTTATGGAGTTTATT
Chimp     TTTGCTGGAATTATGCTGCACTTTAAAAAATTTA------GGTAAAAT-TCTTATAGA // ATCACCTCTATCTAGTT-CCAGAACATTTTCA--TCACTGTGTTGTACTTTTAA-ATT-TATTTATGGAGTTTATT
Rhesus    TTTGCTGGAATTATGCTGCACTTTAAAAAATTTA------GGTAAAAT-TCTTATAGA // ATCACATCTATTTAGTT-CCAGAACATTTTCA--TCACTGTGTTGTACTTTTAA-ATT-TATTTATGGGGTTTATT
Mouse     TTTGCTACAATTATGTTGTACATTAAAAAAAAAT------GGGTAAAT-TCATCTAAC // ATTATTGTTATCTTGCT-CCAAAGAGTCTTA---GCA-TGTTTTTTA---AAAA-AAT-AATTTACAAAGTTTATT
Rat       TTTGCTACAATTATGTTGTACTGTAAAAATAAA----GGGCGGTAAGT-TCATCTAAT // GTTA-TGTTATCTCACC-CCAAAGGGTTTTA---TCA-TGATTTAC----AAAA-AAT-AATTTACGAAATTTATT
Rabbit    TTTGCTGTGATTCTGCTGCACTTTTTTTTTTTTAAAGTTGGGGTACATCTCATATAAT // ATCCATTCTGCCTGGTT-CCAAAACATTTTAAATAAACTATATTGCACTTCCAA-ATT-TGTTTAATGAACTGGTT
Cow       CTTGCTGGGATTATGCTGTACTCTTTTTTAGTT-----GAGATAAAAT-TTGCAGAAA // NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Elephant  CTGACTAGGATTGTGCTGTGCTTTTTTTTTTTTTAATGGAGATAAAAT-TCACACCGC // ATCACCTCTGTGTAATT-CCAGAATGTTTTCA--TCACTGTGCTGTACTTCTAA-ATTGTATTTACTGGATTTATT
Tenrec    CTTACTAGGATAATGCTTGGCTCTTTTGCTTGTTGATGGAGATAACAT-TTA-GTAGC // AGCATATCTAAGTACTTCCCCAAACATCTACA--TCCCTGTACTGTACGTTAAA-ATTCTGTTTATTTAATTCATT
Armadillo CTTGCTGGGAT----------------------------------------------- // --------------------------------------TATGCTGTCCTTTATGCATTGTATTTGCTGAATTTATA
```

HDL2433 (chr15:67,641,407-67,641,637)

```
Human     AAAGGTATCTT-----CAAAAGAGGCTGATGTTCAGTGGGTAC------GGGC // GAATTTCATCG-----AAAAAAAAAAAAATAAAAAGGGTGAATCCCAATGAACCCGG---------GTCGTTTACATTT-CA
Chimp     AAAGGTACCTT-----CAAAAGAGGCTGATGTTCAGTGGGTAC------GGGC // GAATTTCATCG---------AAAAAAAATAAAAAGGGTGAATCCCAATGAACCTGG---------GTCGTTTACATTT-CA
Rhesus    NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN // GAATTTCATCG---------AAAAAAAATAAAAAGGGTGAATCCCAATGAACCCAG---------GTCGTTTACATTT-CA
Rabbit    AACAGGGTCTT-----AAAAAGA-GC----ATTCCATGGGCCTTTTGGAAGGC // GGATTTTACCTA---TAAATAAGAAAGAAAGAAGGGGTGACTCCTAGTGAACCGTG---------TTCGTTTGCATTTGAA
Dog       AACA-TACCCT-----AAAAGGAGGCTGATGT-TAGTGGCTAC------AGCC // GGATATCACCTCAGTTGGAAAAAAAAAAAAAAAAAAAAGAATCCCAGTGAGCCCAG---------GACATTTACATTT-GA
Elephant  AGTAACACCTTAAAAACACAAAAGAGGGATGCTTAATGGCTAG------GGGG // GAATTTTAACT----TAATTAAAAAGAGAAAAAGGGGCGAATCCCAATGAATCCAG---------GACGTTTACATTT-GA
Tenrec    AGTAATCCCTT-----CACAAT-TGC--AACTACAGAGTC-AT---------- // GACTTTTGCCT----CAATTAAAACAGGAGGAAAAGGTGAATCCCAGTGCACCTGG---------GACGTTGACACGT-GA
Armadillo AAAGATACCTT-----AACAAAAGG---------------------------- // ----------------------------------GTAAATCCCA-TGAACCCTG---------GGCATTTACATTG-GA
Opossum   GATCA-AAGAG-----GACAAAGGA---------------------------- // ----------------------------------GAGAAGGGCA-TG-GCCCAGATTTGGGGAGTCGTTTACAC---CA
```

HDL2443 (chr16:5,574,947-5,575,472)

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Human     C-AAAGGGAGGGATAGAAGTCTGGGTCTGCTGGGAATTTT-----TTGGAAGTCTTCTGT // TGTTCATCCAGTGATGGACATCTGGGGTGTTTCCTGCTTTGGGCTCT-CTTGGGATTTTTAAAC-TTGTAGACA
Chimp     C-AAAGGGAGGGATAGAAGTCTGAGTCTGCTGGGAATTTT-----TTAGAAGTCTTCTGT // TGTTCATCCAGTGATGGACATCTGGGGTGTTTCCTGCTTTGGGCTCT-CTTGGGATTTTTAAAC-TTGTAGACA
Rhesus    G-AAAAGGAGGGATAGAAGTCTGGGTCTGCTGGGAATTTT-----TGGGAAGTCTTTTGT // TGTTCATCCAGTGATGGACATTTGGAGTGTTTCCCGCTTTGGACTCT-CTTGGGATTTTTAAAC-TTGTAGACA
Rabbit    C-AAAAAAAGGGAAAGAAGTCCAAGTCTATTGGG-ATATT-----TTGTATCTCTCTTGT // ----------------------------------------------------------------------------
Dog       C--CAGAAAGGGTTAGAGGT-TGGGTTGGTTGGAATTTAT-----TTGGTCTT---TTAA // CATTCATCCCTTGATGGACATTTGGATTGTTTCTACCTTTTGGTTCTGTTTGGGGTTTTTAAACTTGGTAGTCA
Cow       G-GAAAAGAGAGA----CGTCTGGATCTGTTGGGATTTGTTGTTGTTGTTGTTCTTATTA // CATTCATTCCTTGATGGACGTCTGGGTTGTTTCCACCTTCTGGCTCTAGTTGGGGTTTTTAAACGTTGCAGACA
Elephant  G-GAAAGGAGGGT-AGAAGTCTAGGTCTGTTGAGTTTTTT-----TTTTTTTTTTTAATT // TGTTCATCCATTGATGGACTTTTGGTTGTTTCCACCTCTTGGCTCT-GTTGGGATTTTTGAACTTTGTAGAAA
Armadillo CCAAACGGGGGCTTAGAAG--------------------------------------- // --------------------------------------TCTGGGTCT-GTTGGGGTTCTGGACCTTGGGAGACA
```

Fig. S2. Continued.

B. Tree 2 (continued)

HDL2446 (chr16:12,795,481-12,795,831)

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Human     CCCCACTGTGAAGCTGCCAGAATGGTATGCAGCAGA-TAAGAGTGTCCTTCATTAGTGGCTGTTTAGGGGTTGGGGG // AGGAAAAAAAAAAAAATAGTGTCCTTCAGGACCCTGTCCCTCCCCCCACCCCCAAAAT
Chimp     CCCCACTGTGAAGCTGCCAGAATGGTATGCAGCAGA-TAAGAGCATCCTTCATTAGTGGCTGTTTAGGGGTTGGGGG // AGG-AAAAAAAAAAATAGTGTCCTTCAGGACCCTGTCCCTCCCCCCA-CCCCAAAAT
Rhesus    CCCTACTGTGAAGCTGCCAGAATGGTATGCAGCAGATTAAGAGTGTCCTTCATTAGTGGCTCTTTAGGGGTTGGGGG // NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNAAAT
Mouse     CCTCACCATAAAATACCCAGGCTGT-ATATGGCAGG-T-AGGATG-CCTTCCAGGATGGCTGTTGAGAGCCCAGGGG // AGTAATTTA-----AAAATGTTCTTCGGGGACTTTT----CTCCCC-------ACAG
Rat       CCTCGGCATAGCA-GTCCAGGCTGG-GTACGGCAGG-T-ACAGTACCCTTCTATAATGGCTGTTCAGGGCCTCGGGG // AGTAATTTT-----AAAATGTCCTTCGGGGACTTCT----CTCCCC-------ACAG
Rabbit    CCAGAACTTAACACAACAA--------------------ACAGCG-CCCTTCATTAGTGTTGCTTCAGGCTTGGGGG // AACTCTTTAAAGAGAGAGTCCCCTTCCAGACCCTGTGCCGCTACCC-------AAAC
Dog       CCCGACTGTAAAACTGCCAGAACTT-ATGTTCCATA-TAATAGTGCCATTCCTTAGTGGCTGCCCAGGGCTGGAGTG // AGCTATTTAAAGTAAATAGTGCCCTCT-GAGGCCCCCCTTCCCCTG-------AAAT
Cow       CCCAACAGGAAGACTGCCAGAACCTGATGCTGCAGT-TAACAGCATCTTTCATTAGTGGCGGCCTGGGCCTGGGGGG // TGT-TTTTAAAAAG-CAATGTCCTTCAGGACCCT-CTCCTCCCCCC-------AAAT
Elephant  CCCAACTATAAAACTGTCAGT----------------TAATAGTGTCCTTCATTAGGTGTTGCCTAGGGCTAGGAGG // TGT----TAAAAA--CAGTGTCCTTCAGGACCCTCTCCCTCACC---------AAAG
Tenrec    TCCAACTCTCAAACTGCCCGT----------------T--CAGTGTCCTTCATGAGGGGTTGCCTAGG--------- // TGT--GAAAAATCTCCGGGTCCTCT----TCCTCTTCCTCACC---------AAAT
Armadillo CCCAACTGTAAAACTGGCAGAACTAAATCCAGCAAT-TAATAGTGTCCTTC------------------------- // -------------------------GGGGCCCTGT-CCTGAA----------AAAT
```

HDL2457 (chr16:76,038,675-76,038,860)

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Human     GTTTGGCTGTTGTT----AAATTTTGAAAAC--TCACACTGGTTTTATTTT----ATCGTGGTAAAATA // TTCATGATGTTGG--GCAACCATCCCCATCATAGAATGAGGTTTGCATTACACAGGTGGAAACCA
Chimp     GTTTGGCTGTTGTT----AAATTTTGAAAAC--TCACACTGGTTTTATTTT----ATCGTGGTAAAATA // TTCATGATGTTGG--GCAACCATCCCCATCATAGAATGAGGTTTACATCACACAGGTGGAAACCA
Rhesus    GTTTGGCAGTTGTT----AAATTTTGAAAAC--TCACACTGGTTTTATTGT----ATCATGGTAAAATA // TTCATGATGTTGG--GCAACCATCCCCACCATAGAATGAGGTTTACATCACACAGGTGGAAACCA
Mouse     GGGTAGAAGTTGTTACA-AAATTTGGGAGGCCTCCCAATTGATTTTATGCG----ATTGTGCTAAAATA // TTCACTAGGCCACATACAGCCATCACTGCCACGGAACGAGTTTTATATCACACAGGTGGGAAGCC
Rat       GGGTAGAAGTTGTTACA-AAATTTGGGAGGC--TCCAATTGATTTTATGTG----ATTGTCTTAAAACA // TTCAGGAGGCCACATACAGCCATCACTGCCACGGAATGAGTTTTATATCACACAGGTGGGAAGCG
Rabbit    GTACAGCAGCTAGTACT-AAAGTTTAGCAGC---------------TTTG----ATTGTGGAAAAATA // TTCTCAGTGCTGA--GCAGCCATCACGGCCATCAAAGGGGCTTTACATCATGCAGGAGGAAAGCC
Dog       GCATGGCCATTGTTACT-AAAGTATGGAGAC--TCAGATACTCTTTATTTTTTTTGTTCTAGTGAAATA // TCCCCAATATTGT--GCAACCATCACCACCATCAAATGGG-TTTACAGCA---GAGTTTAAACTG
Cow       GTGCAGCAGTTGTCATT-GAAATTTGGAGAC--CCAAATGCTTTTTATTTT--TGATTGTGGAAAAATG // TCCACAACGTGGT--TCAGCCGTCGCCAGCATCA-GAGGGGTTTACATCATGGAGGCCTAAGCTG
Elephant  GTGTAGCAGCTGTTACTAAAAGTTTGGGGAA--TC-CACTGGTTACTTTTT-TTTATT-TGGTAAAATA // TTCACAAGGCTGT--GCAACCATCACCGCCATCAAACAGGCTTCACGTTACAGAGCTCAAGACCA
Armadillo GTGTGGCTGTCAGTATT-AAAGGCTGGGGAC--TCACA-TGG-------------------------- // ------------------------------------GCTTTCCCTCACAGAGGTAGAAACCA
```

HDL2483 (chr17:58,028,031-58,028,513)

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Human     CCGTGGTGTAGATATTCCTCCTGTGTCTAATTTTGATGTACCACCTGTTTATTTTTGTTTTTTTTTAAACATCTTAATTATAAT // CATTTTGCTTAT--------------AACGGTTTGATAACCAGCTCACAA
Chimp     CCGTGGTGTAGATATTCCTCCTGTGTCTAATTTCGATGTACCACCTGTTTATTTTTGTTTTTTTT-AAACATCTTAATTATAAT // CATTTTGCTTAT--------------AACGGTTTGATAACCAGCTCACAA
Rhesus    CCGTAGTGGAGATATTCCTCCTGTGTCCAATTTTGATGTACCACCTGTTTATTTTT-------TTAAAACATCTTAATTATTAT // CATTTTGCTTATCTGTTTGTCCTACCAGTGGTTTGATAACCCGCTCACAA
Mouse     CTGTGGCATCAATATTTCTATTATGTCCAATATTAAGATACCAATTTTAAA-----------AATTAGAGAACTTTATCCTAAA // CACTCTGGTTAGTCTTATGTAC----AGT-ATCTAG---CCAGCTCACCG
Rat       TTGTGGCATAAATATTTCCATTATGTCCAATGTTAAGATACCAACTTAAAA-----------AATTAGCGAACTTTATTCTAAT // AATTCTTCTTAGTCTTACATAG----AGTTGTCTAGC--CCAGCTCACAG
Dog       CTGTGATAATAAATTTCTCAACATGTCTAATTTCACACTACTAACTTAAAA-----------AA-CATCCAGCTTTATTGAGAT // CCTTTTGTTTGTCCACTCATCCTACCAGTGGTGTAATAACCAGCTCATAA
Cow       CTGTGA-AATAAGACTCTGAACATGTCCAGTTT-----------TTTAAAA---------AAGGGGGGGCAGCTTTATTGAGAT // CCTTTTGTTTATCCATTTATCCTACCAGTGGCTTAAAAACTAGCTCACAA
Elephant  TCATGGTATAAGTACTCCCGCCATAGCCAATGTCGAGTTACTGACTTTTTT---------AAAAACAGCCATTGAGATAATAAT // TATTTTGCTTGTTCA-TTGTCCTATCAACCGTTTAATAACCAGCTTACAA
Tenrec    TTATGGTGTAAATACTCCCACCCTGAGTAATTTTGAGTTACCAAAATTTTT-----------TAGCAGCCACTGAGAT-ATTAT // CATTTTGCTTCTCCATTTGTGCTACCAACAGTTTAATGACCAGCTCACAG
Armadillo CCATGATATA------------ATGGCCAATTTCAAGC---------------------------------------------- // ----------------------TACCAAGAGCAGAATAACCAACTCATAA
```

HDL2499 (chr20:13,804,736-13,804,976)

```
Human     ACGGCAGCATTCCCCTCTAAATACATCTAGGAAGAAAAATGAAAA-GAGGAT // TAAAGTGGTCAATTTTGTGTTATTTACATATTTACATTTTACCTCAATTTAAAACAAGA---AAAAGTAAGAGTA--CCATT
Chimp     ACGGCAGCATTCCCCTCTAAATACATCTAGGAAGAAAAATGAAAA-GAGGAT // TAGAGTGGTCAATTTTGTGTTATTTACATATTTACATTTTACCTCAATTTAAAACAACAAGAAAAAGTAAGAGTA--CCATT
Mouse     GCAGCAGCATTCCCTTCAAAATACATCTAC------AGATGAAAACGAGGAC // TAAAGGAGTACA---TGT----------TATTTTAGTTTTACTTCA------AGTAAGA---AAGCAAAAGGAACTGTCACC
Rat       GCAGCAGCGTTCCCCTCTAAATACATCTAC------AGATGAAAAAGAGGAT // TAAAGTAGCACA---CGT----------TATTTTAGTTTTACTTCA------AGTAAGA---AAGCAGAAGAAAC--TCACC
Rabbit    GCAGCAGCATTCCCTTCTAAATACATCTAGGAAAAA--AGGAAAA-GAGGAT // GAAAATGGTTAATTTTGC----------TATTTGAATTTCACTTTA------ATTAAAA---CGAAAGCAGAAAC--TAATC
Dog       GCTGCAGCATTCCCCTCTAAATACATCTGCAAAACCAA-ACAAAAAGGGAAT // TAAAATGATTAATTTTATAG--------TA--------TCACCTCAATTTT-AATAAAAGG-AAAACCAAGGAAA--TAATC
Cow       GCTGCAGCATTCCCTTCTAAATACATCTACAAAAAAAACACACAC-ACACAT // TAAAATGGTTAATTTTATGT--------TATTTGAATTTCTCCTCATTTTT-AATAAAAGGAAAAATTAAGAATA--CAATC
Elephant  GCTGCAGCATTCCCCTCTAAATACATCTGGGGAAAAAAAAA-------GAGT // TAAAATGATTAATGTTATG--------TTACGTGAATTTCACC---------------------------------------
Tenrec    GCTGCAGCATTCCCCTCTAAATACATCTACAGGGGCAAA--AAAA-GAGAGT // TAAAATAATT-ATTTTATG--------ACATGCAAATTTTACCTCA------AATAAGA----AACCTAAAACATTTCAAAA
Armadillo ACTGCAGCATTCCCTTCTAAATACATCTGGGGGGAAA--------------- // ---------------------------------------------AATTAGATATATAA---AAACCTAAGGAAA--CTA-C
```

HDL2548 (chrX:116,955,617-116,956,155)

```
Human     CATACCA-TTTGCTATGCATTCACATTCA----TGTGTATACATATT----------GTATAATTTTTCTACTGATAAAA // GATCATATTACATTGTATGGATGTATCACATTTTCCCTGTTACTTTTTTTTAGT
Chimp     CATACCA-TTTGGTAGGCATTCACATTCA----TGGGTATACAAATG----------GTATAATTTTTCTCCTGATAAAA // GATCATATTACATTGCATGGATGTATCACATTTTCCCTGTTACTTTTTTTTAGT
Rhesus    CCTACCA-TTTGCTATGCATTCACATTCA----TATGTATACATATT----------GTATAACTTTTCTACTGATAAAA // GATCATATTACATTGTATAGATATATCACATTTTCCCTGTTACTTTTTTTAAAAT
Rabbit    CAGACTT-TTTGTTATGCATTCATTTTCATGTCTATGTATACAAACT----------GTAT-ATTTTTCTACAAATATAA // ATCCATATTCCACTGTACGGATATACCATATTTT-CCTGTTAATTTTTTTCATT
Dog       CAGACCT-TTTCTTGTGCATTTATTCATATATGTATATATATTATAT[ins252bp]GTATAGTTCTTCTAACAAAAGAT // AATAATATTCCATTGTGTACATATGCCATATTTGGCCTGTTACTTTTTTTCATT
Elephant  TAGACCA-TTTTCTATGCATTTATACTGATGTATATGTATATATAAT----------GCATAATCTTTCTACAAATAGAT // AATAACATTCCATTGTATGGATATGCCATATTTGCCCTGTTACTATTTTTCATT
Armadillo CATACCATTTTTCTTTAAATAGACA-GGAT-TATACATAT------------------------------------------ // -----------------------------------TGCCTTGTTACTTTTTTTCAAT
```

Fig. S2. Continued.

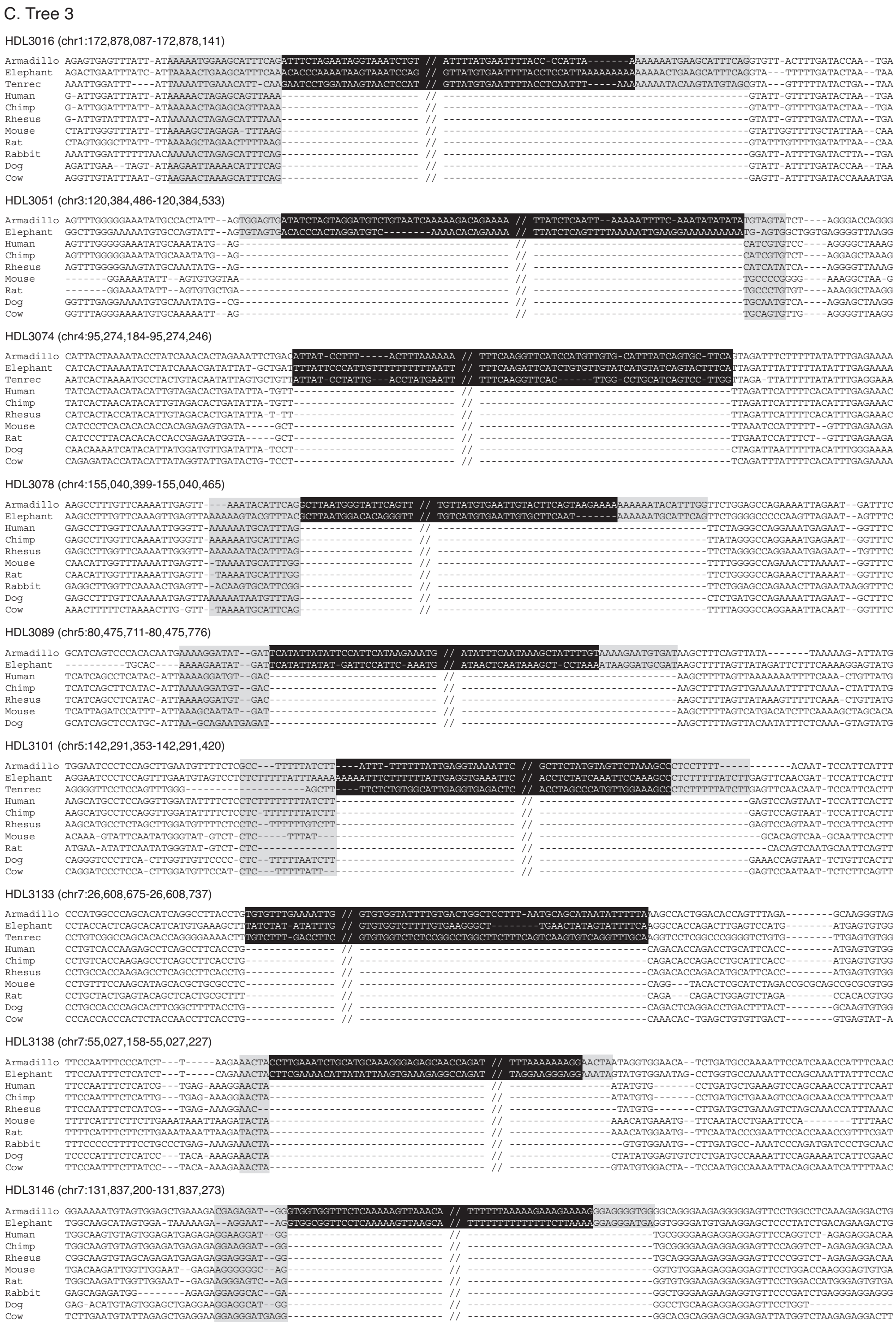

Fig. S2. Continued.

C. Tree 3 (continued)

HDL3161 (chr8:119,095,000-119,095,049)

```
Armadillo AGGGTAGAACGTGGCTCTT-GGAAAGGAGGTGGAAAATGGAGCAGCCACTGTGGACAACA // ATGCATCTAACCTCAATAAAAGCATGGAGAATAAAAGAAGAAAGGAAGGAGGGA-TGGACTTGGAGTCAGAAGT
Elephant  AGGGTAGAGTATGACCCTT-GGAAAGGAGATGTGAAACCG---TACCATTGTGGAAAACA // ATGAATTTCGCCTCATTTAAAA-----AAAAAAAAGGAAGGAAAGAAAGAGGGA-TGGACTTGGAGTCAGAAGT
Human     AGAACAGAATGTGGCACAT-AGAAAGGAT----------------------------------------- // -------------------------------------------GGA-TGGACTTGGAGTCAGAAGT
Chimp     AGAACAGAATGTGGCACAT-AGAAAGGAT----------------------------------------- // -------------------------------------------GGA-TGGACTTGGAGTCAGAAGT
Rhesus    AGGGCAGAATGTGCCACAT-GGAAAGGAT----------------------------------------- // -------------------------------------------GGA-TGGACTTGGAGTCAGAAGT
Mouse     TGGGCATAGCATGCCATTT-AGAAAGCAG----------------------------------------- // -------------------------------------------GGG-TGGACTTGGAGTCAGAAGT
Rat       TGAGCATAGCATGTCATTT-AGAAAGCCA----------------------------------------- // -------------------------------------------AGA-TGGACTTGGAGTCAGAAGT
Rabbit    TGAGCAAGACATGGTGCTTAAGAAAAGAG----------------------------------------- // -------------------------------------------GGC-TGGACTTGGAGTCAGAAGT
Dog       AGGATGGAATGTGGCACTT-AGAAAGAAG----------------------------------------- // -------------------------------------------GGAATGGACTTGGAGTCAGAAGT
Cow       AGGACAGGATGCGGCACCT-AGAGAGCAG----------------------------------------- // -------------------------------------------GGCATGGACTTGGAGTCAGAAGT
```

HDL3214 (chr11:40,857,137-40,857,191)

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Armadillo AGTCTGTAAATTACTC-CATCAGAGA---CTTAAGCACCTGTCATGAAAAACAGCACTACTCACAATAGCCAA // TGTTATATGACTTCTACCTCAGTA----AAAACCAAACCAAACATATCACTGATAATATCA
Elephant  TTTCTGTAACTG-CTG-CATTAGA-------------------------AAACCACAGCATCCACAATAGCCAA // TGTTATCTCAATTTTATCTCAATAAAACAAAACAAAACAAAGCATATCACTGATACCATCA
Human     CGACTATAAGTAATTC--ATGACGGACATCTTTAA--------------------------------------- // ----------------------------------------AAACATATCATCTATAATAATA
Chimp     CGACTATAAGTAATTC--ATGACAGACATCTTTAA--------------------------------------- // ----------------------------------------AAACATATCATCTATAATAATA
Rhesus    TAAGCATAGATGCCCCAAAGAAGAGACTCCTTTAA--------------------------------------- // ----------------------------------------AGTTATATCATCAAAGTTATCA
Mouse     TGGCTGTGGATAACCC--ATGAGACACACCTTTAG--------------------------------------- // ----------------------------------------AAGTGTAGCATCAATGATGACA
Rat       TGACTGTGGATAACCC--ATGAGACACACCTTTAG--------------------------------------- // ----------------------------------------AAGTGTAGCATCAATGATGGCA
Rabbit    TGACTACACAGAACCC--ACCAGAGACAGTTTTAA--------------------------------------- // ----------------------------------------AAACATATCATCGATAATAGCA
```

HDL3225 (chr11:78,890,805-78,890,848)

```
Armadillo AGATC--AGGC-----------------------GTTCA-----GGTCCTTTTATT-----------TAAAAACAGCG-TATTGAGA // GTCTTTGTGT-GGAATTCATGTCCATTTTTACATAATTCTCAAAGCA
Elephant  AGATTAGAGGC-----------------------ATTCA-----GGTCTATTTAAAGCCAAACAAAAACAAAACTGCTTCATTGAGA // GTTTTTGTGC-AGGATTCAGGCCCATTTTCATATATTTCTCAAAGTG
Tenrec    AGATTAAGGGC-----------------------ATTCC-------------------------------AAACAGCTTGACTGAGA // GTTTCTGTGTGGGGAGTCAGACTCATTTTTAAGTATTCCTCAAAGCA
Human     AAATGAGGGGC-----------------------ATTCA-----GGTCCATTT---------------------------------- // ----------------------------CTGTGTAGTTCCTACAGGA
Chimp     AAATGAGGGGC-----------------------ATTCA-----GGTCCATTT---------------------------------- // ----------------------------CTGTGTAGTTCCTACAGGA
Rhesus    AAATGAGGGGC-----------------------ATTCA-----GGTCCA-TT---------------------------------- // ----------------------------CTGTGTAATTCCTAAAGGA
Mouse     AGATAAGGGGT-----------------------ATCCAGATGGGGTCCATTT---------------------------------- // ----------------------------TTATAAAATCCCTCAAAGA
Rat       AGATGAGGAGT-----------------------ATCCAGAATGGGTTCTTTT---------------------------------- // ----------------------TTTTTTTTTATAAAATAACTCAAAGA
Rabbit    CTATTAGGGGC-----------------------ACTCA-----GGGCCATTT---------------------------------- // ----------------------------TCAAATAATTTTCAAAAGA
Dog       AGATCAGGGGCTTAGAGGCCCCCCCCCTTTTTTTTACA-----GGTCCCTTT---------------------------------- // ----------------------------TTAGGTAATTTTTAAAGGA
```

HDL3266 (chr14:58,026,838-58,026,897)

```
Armadillo AAGGAATTTAAGATTCTTTGCACATTTCATTCTCTTTTTATTGAGGTGACATTCACATAACATAAA // TATTGAAAGTCTTGTA--TTTCATAATATAATC--------------AAATC-TTAATTGCATGAAAA
Elephant  ACAGAATTTAAGGTTTCTTTTTTTTTTTATT--------ATTGAGATAATATTCTCATAATATAAA // TCTCCCGAGTCTTGCACATTTCATAATGTAATT--------------TTACC-TTAATTG--TGAGAA
Human     AAATAATTTAGAGTTTCTTGCACATTTCAT------------------------------------ // -------------------------TATGTAATC--------------TTATAATTATGAGAATGAAAA
Chimp     AAATAATTTAGGGTTTCTTGCACATTTCAT------------------------------------ // -------------------------TATGTAATC--------------TTATAATTGTGAGAATGAAAA
Rhesus    AAATAATTTAGGGCTTCTTGCACATTTCAT------------------------------------ // -------------------------TATATAATC--------------TTATAATTGTGAGAATGAAAA
Rabbit    AAGGAATTTAAGGTTTCTTTCACATTTCAT------------------------------------ // -------------------------TATGTAATC--------------TTAT------GAGAAAGAAAA
Dog       AAGAAATTTAAAATTTCTTGCATATTTCAT------------------------------------ // -------------------------TATCATATATGCACATTTCATTATCATAAATGTGAGAAATAAGG
Cow       AAGAAATTTAAAGTTTCTTATACATCTTAT------------------------------------ // -------------------------TATCATATCTATATATTTCATTATTGTAATTATAAAAATAGAAA
```

HDL3283 (chr15:82,463,369-82,463,426)

```
Armadillo AGGAGGCTTCTTCTCAAAGGGTAATAAAAAGACATAGGAAGGAATGAA // TTATGTTGTTCGAGTTTCA-CTTCAATTTTAAAAAATGAAAGCAAAGGCAATAAAACCCAAGTGTTGCACACACCTCAACGCAACC
Elephant  GGGAGACTTC-TCTTTAAAAGCAGCAAAAAAACATAGAAAGGAATGAA // TTATGTTCTGAAAATTTGAGCTT---------------ACAAAAAGGCAGTAAAATCCAAGGGTTGCAAACACCTCACATCAATT
Human     GGGAAGCTTT-TCATACCAGGCAG------------------------ // ---------------------------------------------------TAAAAGTGAAGGGTTTTGAATGCCCTATACCACTC
Chimp     GGGAAGCTTT-TCATACCGGGCAG------------------------ // ---------------------------------------------------TAAAAGTGAAGGGTTTTGAATGCCCTATACCACTC
Rhesus    GGGAGGCTTT-TCATACCAAGCAG------------------------ // ---------------------------------------------------TAAAAGTGAAGGATTTTGAATGCCCTATACCACTC
Rabbit    GGGAGGCCTT-TCTGACCGGGCAG------------------------ // ---------------------------------------------------TAA-----AAGGGTTTTAACCACCTCAAGCCGATC
Dog       GGGAGGCTTT-TCTTAAAAGCCAG------------------------ // ---------------------------------------------------CAAGAGCCAA------------CATCAAACCGATT
```

HDL3295 (chr16:4,199,680-4,199,750)

```
Armadillo CAGGACGA---GAAAGTT-GGTGCCCTCTCCTTACAGGGGAACCCCCTGGCAC-TCTTCAC // TATGTGAATTTTACCTCAAAAAAAATTTTTTTAAAGAAATAGCCCCATATATTGCTACA-ACA-TTTCTGCCA
Elephant  CATGATGACGGGAAGTTTGGGGGCCCTTTTCCTATAAGAGTGG-CCCTGATGTAGCACCAT // TCGGTGAATTTTACCTCAATAAAGAGAATATAAAAGTGTAACTCCC-CATATTGATACA-ACA-CTTTTCCCA
Tenrec    CAGAATGCTA-GAAAATT-GAAGTTTTTTTCCTTCAAGAGTAC-CCCTGAACCAGCTCCCC // TATGTTAAT-CAGCTTCAATAAAGAGTAGACT--------------CATATTGAAAGA-ACA-TGCTTCCCA
Human     CAGAAAGATGTGAAGCTT-GGTG-CCTTTTATTATAGAGGAGC-CCC-------------- // ----------------------------------------------GTGGATTGAAATATACAACTTTTCCCC
Chimp     CAGAAAGATGTGAAGCTG-GGTG-CCTTT--ATA-AGAGGAGC-CCC-------------- // ----------------------------------------------G-GGAT-GAAGAATACAACTTTTCCCC
Rhesus    CAGAAAGATGTGAAGCTT-GGTG-CCTTTTACTACAGAGGAGC-CCC-------------- // ----------------------------------------------GTGGATTGAAATATACAACTTTTCCCC
Mouse     CTGAAGGACCAGAAGCTC-------------CTAAAGAGGAGC-CCT-------------- // ----------------------------------------------ATATACAAATGTATAAAACTTTACCCC
Rat       CTGAAGGATGGGAAGCTC-TGGG-GCACTTATTATAGAGGAGC-CCT-------------- // ----------------------------------------------ATATAAAAATGTGTAAAACTTTACCCC
Rabbit    CAAAAGGACAGGAAGCTT-TGCA-CCTCTGATTATCAAGGAGC-CC--------------- // ----------------------------------------------ATGTGTGGACGCAGAAAACTTCCCCTC
Dog       CAGAAAGA--GGAAATTTGGGTGTCTCTTAATTATAAAAGAGT-TGC-------------- // ----------------------------------------------TTACACTGATTGG-ACA-CTTTC-ACA
Cow       CAGAAGGATGGGAAGTTTGGGTG-CCTTTCATTATAAAGGAGC-CC--------------- // ----------------------------------------------ATATGTTGATGTA-ATA-CTCCCTCCA
```

HDL3314 (chr16:81,850,341-81,850,415)

```
Armadillo TTTCTCATCTGTGAAATGGGGATCATTAGGGCATCCACAG---------CAGGG-GCTGAGTAAAAG // TGAGTTTCA---CATCAAAGAGTCCCTGGGTCCCA-----GCATGATTTTCCAGATGAAATGGGAG
Elephant  TTTCTCATCTGTGAGATGGGGATAATAAGACTTTCCACAATCTCGAAAACATTGTGCTCAGTGAAG // TCCACCTCAATTTTTAAAAATCATACCCATGTCATA-----GAATGCTTCTCCAGATGAAATGGGAG
Tenrec    TTTCTCATCTTGCAGACAGGAGTAATC------TGCAGAATCTCAAAACATAATGCTCAGTGAAG // TTCACCTCAATTGCAAATAATCACATCCGTGGCATAAGGCTGCTTGCTTCTCCAGAGGAAATGGGAG
Human     TTTCTCATCTGTGAAGTGGAGCTAAT--GAGAATC------------------------------ // -------------------TGGTATCCACGTCATT-----GAATGCTTCTCAGCATGAAATGGGAG
Chimp     TTTCTCATCTGTGAAGTGGAGCTAAT--GAGAATC------------------------------ // -------------------TGGTATCCACGTCATT-----GAATGCTTCTCAGGATGAAATGGGAG
Rhesus    TTTCTCATATGTGAAATGGAGCTAAT--GAGAATC------------------------------ // -------------------TGGTATTCACGTCACT-----GAATGCTTCTCAGGATGAAATGGGAG
Mouse     CTTCTCTCCTGTGAAAGGGGAGC------------------------------------------ // -------------------TCGTAAAAACGTC-CA-----GCAT---TCTCAGCATCACCAGGAAA
Rat       CTTCTCTACTGTGAAAGGGGAGC------------------------------------------ // -------------------TCGTAAAAATTCC-CA-----GCAT---TCTCAGCACCATGAGGAAA
Rabbit    TTTCTCATCTGTGGGATGAGCAGCTAATGAGCGAATC---------------------------- // -------------------CAGGA---------------------------------GCCACATGGGGC
Dog       CTTCTCCACTGTGAAATGTAGATAATGAGGGGATC------------------------------ // -------------------AAGCCCCCATGTCACT-----GGGTGCTTCTCCCGATGAAATGGGGG
Cow       TTTCTCATTAGTGGAATGGAGATA---AGAGGATT------------------------------ // -------------------CAGTATTCACATTAGT-----GGCTGCTTCTCCTGATGAAATAGACT
```

HDL3324 (chr17:51,247,531-51,247,598)

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Armadillo ATTAATTTAAAAGTTTGAAAAGTAT---GTAAACTGTTCTAGAACTATTATATAGTGGTGATGG // TGTTATGTGAATTTTACCAGAA--TAAA-AATAAATAGAT--------GAT-AGATAGAATTAAATCTAT
Elephant  ATGTAAAATATTATTCAAAAGCATTACGTAAAATGTTCTGGAAATA---GATAGTCCTGATGG // TATTTTATGAATTTTACCATGA--CAAAGAATATACGAAA---TTTCAAATTATTTAT-ATTAAATATAC
Tenrec    GTGTCAAATCTGATGCCAAAGGT-------------TCAGGACTTA-------GTGGTATTGG // TGTTAT-CTTTTTATCCCAGGATTCCGTGAACTCTCCAAAGCCCCC--------TTAT-GTTAAACATAC
Human     ATTAGTTTAAGAGTTTAAAAAGCATGATT------------------------------------ // ------------------------------ATATTTGAAATTATTGGGAATTATTTAT-AGTAAATACAC
Chimp     ATTAGTTTAAGGTTTAAAAAGCATGATT------------------------------------- // ------------------------------ATATTTGAAATTATTGGGAATTATTTAT-AGTAAATACAC
Rhesus    ATTAGTTTAAAAGTTTAAAAAGCATGATT------------------------------------ // ------------------------------ATATTTGACATTATTTGGAATTATTTAT-AGTTAATACAC
Dog       GTTAATTTAAAAGTTTAAAAAGGATCA-------------------------------------- // -------------------------------CCTTTAAAAATGCTTGGAATTATGTAT-GTTAAATATAC
Cow       ATTAGTCTAAAGTTTTAAAAAGTATAATC------------------------------------ // ------------------------------ACATTTGAAATTATTTGGCGGTATTTAT-ATTAAATGTAC
```

HDL3347 (chr20:38,866,617-38,866,657)

```
Armadillo GACAGTATTAAAAATGCAAGGCTC-AGAA-------------GGAATGAAGGTGTGATCC // GTGTATATATCACCAT------------AATAAAAACAATTTTAAGTGTGACACTTTCCTCAGAGCTGACCCAG
Elephant  GGCCATGTTAAAAACGCAAGGCCCCAGAATCGTGTTCAGTCATAAAGAGAAATGGAGTCC // GTATATTTTACCACATTTCTTTTTTTGTTTGTTTGTTTGTTTAAACATAAGGCTCCAGTCAGAGCCTC-TTG-
Human     GTCCGTATTAAAAATGC-------------------------------------------- // -------------------------------------------------------AAGACTCTAGTCAGAGCCTA-CCAG
Chimp     GTCCATATTAAAAATGC-------------------------------------------- // -------------------------------------------------------AAGACTCTAGTCAGAGCCTA-CCAG
Rhesus    GTCCGTATTAAAAATGC-------------------------------------------- // -------------------------------------------------------AAGACTCTAGTCAGAGCCTA-CCAG
Rabbit    ATCAATGTTAAACATCA-------------------------------------------- // -------------------------------------------------------AAGACT--AGTCAGAGCCCG-CCAG
Dog       GCCAGTGTTAGGAATGC-------------------------------------------- // -------------------------------------------------------AAGACTCCAGTCAGAGCTGACCCAG
Cow       GCCAGTGTTAAAACCCC-------------------------------------------- // -------------------------------------------------------TAGGCTCCGGTCAGAGCTGACCCAG
```

Fig. S2. Continued.

C. Tree 3 (continued)

HDL3355 (chr21:40,217,656-40,217,687)

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Armadillo AGCA-TCTCCTTGCTATGGAGACCAGGGGAGCTTCTTCCTTTGCATTGGCCTAGGTTTTATACATATTTTAACAGTTTTATTGA // TCACTCCATATTTAAGTTAAATTGTTTAAGGAAGTGCC--AGCGTCTTTT
Elephant  ACTGCCTTCCTTGCTGTGGAGACCCAAGAAGACTCTTCTTTTGCATTTTCC----ATGTTTTGTTTTTAAATAGCTTTACTGA // TAACTCTAT------GTTTAATCGCTTGAAGAACCGCC--AGACTGTTTT
Tenrec    ------------------------------------------------------------------------TAGCTTTATGGA // TAAGGTCACTCCATGTTTTAGT-ATTTGAAGAATTGTC--AGATTGTTTT
Human     TGTGCCCTCGTAGCTA-------------------------------------------------------------------- // --------------------------AGGAGAAT-GTC-------CTTTT
Chimp     TGTGCCCTCGTAGCTA-------------------------------------------------------------------- // --------------------------AGGAGAAT-GTC-------CTTTT
Rhesus    CGTGTCCTCGTAGCTA-------------------------------------------------------------------- // --------------------------AGGAGAAT-GTC-------CTTCT
Mouse     AAGGTCCTCCTAACCA-------------------------------------------------------------------- // --------------------------CAGAGACT-GGGGTGGGCCCTTCT
Rat       AGGGTCCTCCTAATTG-------------------------------------------------------------------- // --------------------------TAGAGACT-GGGGTGGGCTCTTCT
Dog       AGTG-CCTCCTAGCGA-------------------------------------------------------------------- // --------------------------CCGTGCCT-GGG--GAC-------
Cow       AGGG-CCTCCCAGCTG-------------------------------------------------------------------- // --------------------------TGGGGCCT-GGT--GGCACCTTTC
```

HDL3366 (chrX:38,147,932-38,147,990)

```
Armadillo CCAAAGGTAAGGAAAC-GTTCTGCCATGAAAT-TATTCCCCT-ATTTTTTTTTTGAGGTGAAATTCACATA // ATGTATGACGGTTCTAATTTCTACACATCCAGCTAATCCCCTCCATCTTAAATCATTCCCAGAT
Elephant  CCAAAGGTAGCGAAAC-CTTCTGCCATGAAAC-AATCTCCCACTTATTTTTACTGAGGTGAAATTCACATA // ATATACAAAGGTTCCAATTTCTCCACAT-TATCTAATCCCC----TCTTAAATCACCCCCAGAT
Tenrec    CCAAAGGTAGGGAAAC-ATTCTACCATGACAC-AATCCCCCA-TTAATTTTATTGCGTTGAAATTCACATA // ATGAACAAAGTTATCAATTTCTGAATAT-CATCTAATCCCT----TCTTAAATTACCCCCAGGT
Human     CCAAAGGTAGGGAAAC-TTTTTGCCTTGAAACTAACCCCT------------------------------- // --------------------------------------------CTCTTAAATCATCCTCAGAT
Chimp     CCAAAGGTAGGGAAAC-TTTTTGCCTTGAAACTAACCCCT------------------------------- // --------------------------------------------CTCTTAAATCATCCTCAGAT
Rhesus    CCAAAGGTAGGGAAAC-TTTTTGCCTTGAAACTAACCCCT------------------------------- // --------------------------------------------CTCTTAAATCATCCTCAGAT
Mouse     CCAAAGGTAGGAACACTGTCTTGCCT-GAAAA-AATATCT------------------------------- // --------------------------------------------CTGTTGA-------TCAGAG
Rat       CCAAAGGTAGGAATGCTGTCTGGCCT-GAAAA-AGCTTCT------------------------------- // --------------------------------------------CTGGTGG-------TCAGAA
Rabbit    CCAAAGGTAGGAAAGC-GTCCTGCCTCGACACTAACCCCC------------------------------- // ---------------------------------------------TCTTAAATCATACCCCAAT
Dog       CCAAAGGTAGGGGAAC-TTCCTGCCCTGAAACTAAGCCCC------------------------------- // ---------------------------------------------TCTTAAATCA-TCCCAGTT
Cow       CCAAAGGTAGGGAAAC-TTTCTGCCTTGAAACTAACCCCC------------------------------- // --------------------------------------------CTTTGAAAGCATTCCCAGAT
```

HDL3369 (chrX:44,916,611-44,916,688)

```
Armadillo ACCTTTCAAAGCTAGAGGCCCACTTGGTGGTGATCACTGTCAACCCCTCCTT-----ATTTCTTTTAA--TTTTG // TCTGATTTCTGTCTCCATGGCCCCTC-TTCCATGGTGTAGCCAACATCTTGAGC-ACCC
Elephant  ACTTTCTGTAGCCAGAGGCTTATGTGGTAGGGATCA-TGCCTCCCCCCGA----CTCATTTTAAAGAAAATCTTG // CCGCTAATCTGTCTTCACAGCCTCCTT-TTTCATGAGGTAGCCAACATCTTGGACGACCA
Tenrec    ACCTTCTACAGCCAGAGATTTATGTGAT-GGGAG-ATTATTTCGCCCCCGCTACCTAATTTTAGAGAAATATTTG // CCACTAATCTGTTGCCACAACCTCAACTTTTCATGAAGCAGTCAATATCTTGGGCAACCT
Human     ACGTTTGGCAGCCAGAGGCTCACTTAGTAGTGATTATGGCCTCC------------------------------- // ------------------------TC-TTCCATTGGGTAGCCCACACCTTGGATGACCC
Chimp     ACCTTTGGCAGCCAGAGGCTCACTTAGTAGTGATTATGGCCTCC------------------------------- // ------------------------TC-TTCCGCTGGGTAGCCCACACCTTGGATGACCC
Rhesus    ACCTTTGGCAGCCAGAGGCTCACTTAGTAGTGAGCGTGGCCGCC------------------------------- // ------------------------TC-TTCCATTGGGTAGCCCACACCTTGGATGACTC
Mouse     ATGGTTGACATTCAAAATCTCACCTGGTAGTGCTCACA------------------------------------- // ----------------------------------GGGTTGCCAAAATCTTGAACTACCT
Rat       ACAGCTGATATCCAAAGTCTCACCTGGTAGTGCTTACA------------------------------------- // ----------------------------------GGGTTACCAACATCTTGAACTACCT
Dog       AACTCCGGCAGCCAGA-GCTCACTGGGTAGCAGTCACGGCCTCT------------------------------- // ------------------------CT-CCCATGGGGGTAGCCAACGTCTTGGATGACCG
Cow       ACCTTTGGCAGCCAGAGGCTCCCTTGGTGGCGATCATGGCCTCT------------------------------- // ------------------------TC-ATCTATGAGGTAGTCAACACCTTGAGTGACCC
```

Fig. S2. Continued.

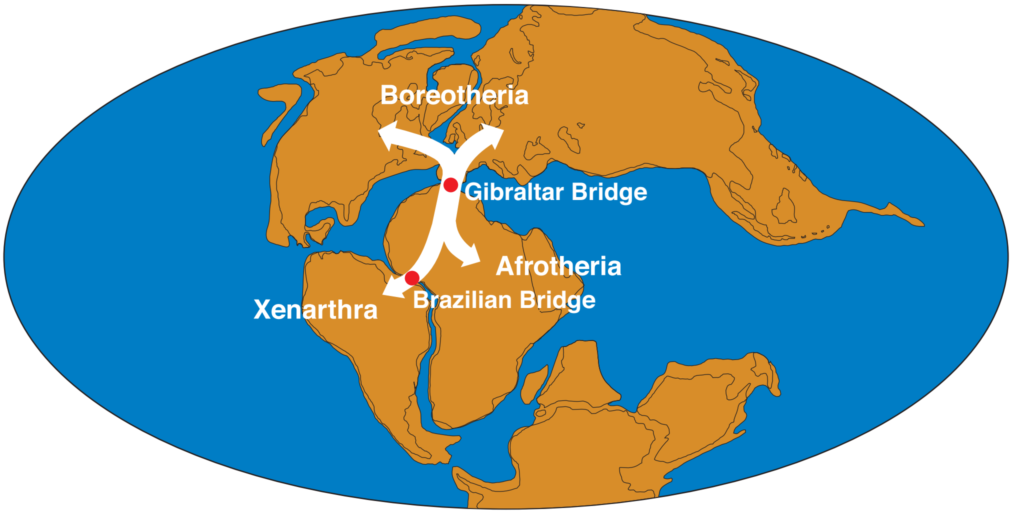

Fig. S3. Global paleogeographic map at 120 Ma. The Gibraltar and Brazilian Bridges (red dots) represent the final connections between Africa-Laurasia and Africa-South America, respectively. Arrows indicate divergence and dispersal of a common ancestor of placental mammals.