Analyses and Results

1. Trees and Node Identities

Branch lengths and node identities for the Murphy *et al.* (1) ML tree, myomorph root tree, and "K/T body size" tree, all with the 16,397-bp data set and a 105 mya mean prior for the placental root.

Tree with branch lengths for 16,397-bp data set

((((Sloth: 0.0578572942,Anteater: 0.0623650084): 0.0094164783,Armadillo: 0.0572305302): 0.0322442137,((((Hedgehog: 0.1392078545,Shrew: 0.1258264678): 0.0123632517,Mole: 0.0879580377): 0.0121989399,(((Phyllostom: 0.0945937341,Free_taile: 0.0472104631): 0.0116820995,(False_vamp: 0.0633704115,(Flying_Fox: 0.0188418469,Rousette: 0.0191538273): 0.0371695005): 0.0048946112): 0.0165262807,((((((Whale: 0.0140275224,Dolphin: 0.0222707941): 0.0198499013,Hippo: 0.0404138600): 0.0050515078,Ruminant: 0.0742379613): 0.0085522183,Pig: 0.0682202252): 0.0060476331,Llama: 0.0626939662): 0.0279684968, ((Horse: 0.0443185833,(Rhino: 0.0290890501,Tapir: 0.0289317375): 0.0052985665): 0.0207923372,((Cat: 0.0469186509,Caniform: 0.0566763915): 0.0235084254,Pangolin: 0.0768207855): 0.0039345272): 0.0017028512): 0.0012539449): 0.0024184758): 0.0111253741,(((Sciurid: 0.0850914642,((Mouse: 0.0425278845,Rat: 0.0462323784): 0.1235036677,(Hystricid: 0.0756784923,Caviomorph: 0.0879289745): 0.0628855607): 0.0055760999): 0.0120897870,(Rabbit: 0.0585024643,Pika: 0.1102127449): 0.0444145927): 0.0059179821,((Flying_Lem: 0.0622042730,Tree_Shrew: 0.1030697599): 0.0041661047, (Strepsirrh: 0.0771985156,Human: 0.0659650908): 0.0097329644): 0.0016018333): 0.0079362557): 0.0095144758): 0.0064056468,((((Tenrecid: 0.1453187340,Golden_Mol: 0.0680711793): 0.0095742492,(Sh_Ear_Ele: 0.0394494700,Lo_Ear_Ele: 0.0366004575): 0.0901634538): 0.0022328898,Aardvark: 0.0695556373): 0.0033397999,((Sirenian: 0.0386004784,Hyrax: 0.0908379326): 0.0030251594,Elephant: 0.0515068155): 0.0149741288): 0.0257744494);

list of names and tip numbers follows:
Sloth 0
Anteater 1
Armadillo 2
Hedgehog 3
Shrew 4
Mole 5
Phyllostom 6
Free_taile 7
False_vamp 8
Flying_Fox 9
Rousette 10

Whale 11
Dolphin 12
Hippo 13
Ruminant 14
Pig 15
Llama 16
Horse 17
Rhino 18
Tapir 19
Cat 20
Caniform 21
Pangolin 22
Sciurid 23
Mouse 24
Rat 25
Hystricid 26
Caviomorph 27
Rabbit 28
Pika 29
Flying_Lem 30
Tree_Shrew 31
Strepsirrh 32
Human 33
Tenrecid 34
Golden_Mol 35
Sh_Ear_Ele 36
Lo_Ear_Ele 37
Aardvark 38
Sirenian 39
Hyrax 40
Elephant 41

list of child1, child2, ..., parent follows:
39 40 42
42 41 43
36 37 44
34 35 45
45 44 46
46 38 47
47 43 48
32 33 49
30 31 50
50 49 51
28 29 52
26 27 53
24 25 54

54 53 55
23 55 56
56 52 57
57 51 58
20 21 59
59 22 60
18 19 61
17 61 62
62 60 63
11 12 64
64 13 65
65 14 66
66 15 67
67 16 68
68 63 69
 9 10 70
 8 70 71
 6 7 72
72 71 73
73 69 74
 3 4 75
75 5 76
76 74 77
77 58 78
 0 1 79
79 2 80
80 78 81
81 48 82

Myomorph root tree

(((((((((Sloth: 0.0576841776,Anteater: 0.0623673367): 0.0094575014,Armadillo: 0.0570017240): 0.0318469558,((((Tenrecid: 0.1451099373,GoldenMol: 0.0680438388): 0.0095382004,(Macroscel: 0.0393870556,Elephantu: 0.0365920156): 0.0900654038): 0.0022390609,Aardvark: 0.0695374588): 0.0032997315,((Sirenian: 0.0385131104,Hyrax: 0.0907872374): 0.0030352359,Elephant: 0.0513945249): 0.0149443576): 0.0318788752): 0.0098827889,(((Hedgehog: 0.1389403737,Shrew: 0.1256441311): 0.0123927625,Mole: 0.0878277261): 0.0122135663,(((Phyllostom: 0.0944533288,Freetaile: 0.0471727795): 0.0116475720,(Falsevamp: 0.0632953488,(FlyingFox: 0.0188257897,Rousette: 0.0191315731): 0.0371083577): 0.0049381040): 0.0164825637,((((((Whale: 0.0140132059,Dolphin: 0.0222384431): 0.0198253268,Hippo: 0.0403690056): 0.0050460658,Ruminant: 0.0741587013): 0.0085328570,Pig: 0.0681394533): 0.0060488340,Llama: 0.0626149448): 0.0279028284,((Horse: 0.0442613688,(Rhino: 0.0290563667,Tapir: 0.0288789649): 0.0052967766): 0.0207640278,((Cat: 0.0468418562,Caniform: 0.0566256677): 0.0234750060,Pangolin: 0.0766693727): 0.0039561623): 0.0016878134): 0.0012787676): 0.0023919561): 0.0110763465):

0.0079206949,((FlyingLem: 0.0621588018,TreeShrew: 0.1028689582): 0.0041591028,(Strepsirrh: 0.0770877568,Human: 0.0659012040): 0.0097311330): 0.0017377890): 0.0055659757,(Rabbit: 0.0584798027,Pika: 0.1100560429): 0.0448194374): 0.0109982455,Sciurid: 0.0864314314): 0.0030983670,(Hystricid: 0.0758724565,Caviomorph: 0.0877775361): 0.0658878795): 0.0060397339,(Mouse: 0.0423255903,Rat: 0.0462682171): 0.1205176818);

list of names and tip numbers follows:
Sloth 0
Anteater 1
Armadillo 2
Tenrecid 3
GoldenMol 4
Macroscel 5
Elephantu 6
Aardvark 7
Sirenian 8
Hyrax 9
Elephant 10
Hedgehog 11
Shrew 12
Mole 13
Phyllostom 14
Freetaile 15
Falsevamp 16
FlyingFox 17
Rousette 18
Whale 19
Dolphin 20
Hippo 21
Ruminant 22
Pig 23
Llama 24
Horse 25
Rhino 26
Tapir 27
Cat 28
Caniform 29
Pangolin 30
FlyingLem 31
TreeShrew 32
Strepsirrh 33
Human 34
Rabbit 35
Pika 36
Sciurid 37

Hystricid 38
Caviomorph 39
Mouse 40
Rat 41

list of child1, child2, ..., parent follows:
40 41 42
38 39 43
35 36 44
33 34 45
31 32 46
46 45 47
28 29 48
48 30 49
26 27 50
25 50 51
51 49 52
19 20 53
53 21 54
54 22 55
55 23 56
56 24 57
57 52 58
17 18 59
16 59 60
14 15 61
61 60 62
62 58 63
11 12 64
64 13 65
65 63 66
 8 9 67
67 10 68
 5 6 69
 3 4 70
70 69 71
71 7 72
72 68 73
 0 1 74
74 2 75
75 73 76
76 66 77
77 47 78
78 44 79
79 37 80
80 43 81

81 42 82

Tree with branch lengths for 16,397-bp data set and "K/T body size" taxa

(((((Hedgehog: 0.1212738458,Shrew: 0.1083111572): 0.0123676901,Mole: 0.0767055340): 0.0110419783,((Phyllostom: 0.0836821141,Freetaile: 0.0407215249): 0.0105712353, (Falsevamp: 0.0554439077,RousetteF: 0.0487742417): 0.0061916054): 0.0161273796): 0.0094596501,((Sciurid: 0.0729025963,(Mouse: 0.0384778034,Rat: 0.0423346143): 0.1088421076): 0.0169243441,(FlyingLem: 0.0568724968,TreeShrew: 0.0901455136): 0.0054892991): 0.0062728918): 0.0130933320,((Tenrecid: 0.1213646053,GoldenMol: 0.0647915681): 0.0109750611,(ShEarEle: 0.0340790940,LoEarEle: 0.0339342429): 0.0770352396): 0.0190706734);

list of names and tip numbers follows:
Hedgehog 0
Shrew 1
Mole 2
Phyllostom 3
Freetaile 4
Falsevamp 5
RousetteF 6
Sciurid 7
Mouse 8
Rat 9
FlyingLem 10
TreeShrew 11
Tenrecid 12
GoldenMol 13
ShEarEle 14
LoEarEle 15

list of child1, child2, ..., parent follows:
14 15 16
12 13 17
17 16 18
10 11 19
8 9 20
7 20 21
21 19 22
5 6 23
3 4 24
24 23 25
0 1 26
26 2 27
27 25 28
28 22 29

29 18 30

2. Divergence Times and 95% Credibility Intervals for Different Analyses:

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 59.02304 (SD = 2.44326) (53.15753, 62.71712)
Actual time node 43 = 62.47270 (SD = 2.13566) (56.93826, 64.92474)
Actual time node 44 = 18.83750 (SD = 2.32893) (14.57595, 23.64882)
Actual time node 45 = 66.36406 (SD = 3.26759) (59.48388, 72.37778)
Actual time node 46 = 74.40048 (SD = 2.99732) (68.19455, 80.13478)
Actual time node 47 = 76.50247 (SD = 2.95769) (70.34769, 82.18859)
Actual time node 48 = 79.87990 (SD = 2.96720) (73.95456, 85.76950)
Actual time node 49 = 77.14804 (SD = 3.32412) (70.73690, 83.88918)
Actual time node 50 = 82.16058 (SD = 3.21048) (76.09035, 88.69107)
Actual time node 51 = 85.91763 (SD = 3.14664) (80.05815, 92.46869)
Actual time node 52 = 50.93437 (SD = 4.02738) (42.95254, 58.55707)
Actual time node 53 = 38.29035 (SD = 3.94033) (30.73488, 46.04394)
Actual time node 54 = 16.26369 (SD = 2.20428) (12.60509, 21.18303)
Actual time node 55 = 70.39824 (SD = 3.44725) (63.67762, 77.26271)
Actual time node 56 = 73.96173 (SD = 3.31437) (67.54102, 80.68910)
Actual time node 57 = 82.57642 (SD = 3.15953) (76.58101, 89.03784)
Actual time node 58 = 87.34830 (SD = 3.15045) (81.47352, 93.88392)
Actual time node 59 = 55.11207 (SD = 2.54474) (50.54202, 60.18002)
Actual time node 60 = 76.86864 (SD = 1.93597) (73.25095, 80.79214)
Actual time node 61 = 48.84498 (SD = 2.00687) (44.67740, 52.47400)
Actual time node 62 = 56.49179 (SD = 1.06894) (54.24970, 57.94802)
Actual time node 63 = 80.44364 (SD = 2.03598) (76.53664, 84.67371)
Actual time node 64 = 29.62189 (SD = 2.09322) (25.33682, 33.59109)
Actual time node 65 = 52.42555 (SD = 0.39768) (52.01085, 53.47692)
Actual time node 66 = 55.69769 (SD = 0.71657) (54.33053, 57.15122)
Actual time node 67 = 60.53857 (SD = 0.84397) (58.78932, 62.06522)
Actual time node 68 = 63.79277 (SD = 0.83639) (61.88937, 64.94540)
Actual time node 69 = 82.11502 (SD = 2.15194) (77.96865, 86.51092)
Actual time node 70 = 19.97421 (SD = 2.55043) (15.26201, 25.20981)
Actual time node 71 = 58.81118 (SD = 1.11275) (55.82249, 59.96860)
Actual time node 72 = 53.18433 (SD = 2.30962) (48.36350, 57.38287)
Actual time node 73 = 65.29363 (SD = 1.39794) (62.37260, 67.96871)
Actual time node 74 = 83.05883 (SD = 2.26107) (78.75139, 87.70116)
Actual time node 75 = 68.20530 (SD = 2.58972) (63.62805, 73.49147)
Actual time node 76 = 75.93472 (SD = 2.26702) (71.81796, 80.64748)
Actual time node 77 = 85.08075 (SD = 2.52529) (80.32926, 90.34545)
Actual time node 78 = 94.03171 (SD = 3.43594) (87.61081, 101.19990)
Actual time node 79 = 62.19264 (SD = 4.56977) (52.99846, 70.97034)

Actual time node 80 = 71.40311 (SD = 4.08837) (63.28161, 79.31571)
Actual time node 81 = 101.96012 (SD = 4.33026) (93.97155, 111.00536)
Actual time node 82 = 106.65984 (SD = 4.93492) (97.76529, 117.11800)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "semi-random guess" (2) to start Markov chain; all constraints; opossum outgroup

Actual time node 42 = 58.98755 (SD = 2.44161) (53.15628, 62.67459)
Actual time node 43 = 62.44585 (SD = 2.15483) (56.91527, 64.93289)
Actual time node 44 = 18.75516 (SD = 2.33964) (14.51291, 23.66672)
Actual time node 45 = 66.33692 (SD = 3.29986) (59.35052, 72.53748)
Actual time node 46 = 74.40984 (SD = 3.00714) (68.06230, 80.13271)
Actual time node 47 = 76.53694 (SD = 2.96376) (70.38627, 82.16807)
Actual time node 48 = 79.93395 (SD = 2.97849) (73.81284, 85.67560)
Actual time node 49 = 77.22032 (SD = 3.30307) (70.90290, 83.82795)
Actual time node 50 = 82.25236 (SD = 3.19617) (76.23304, 88.89465)
Actual time node 51 = 86.01512 (SD = 3.13791) (80.13942, 92.34079)
Actual time node 52 = 50.93267 (SD = 3.95620) (43.03723, 58.49576)
Actual time node 53 = 38.23319 (SD = 3.90244) (30.62994, 46.11109)
Actual time node 54 = 16.23768 (SD = 2.17306) (12.60920, 21.13371)
Actual time node 55 = 70.44548 (SD = 3.40082) (63.78913, 77.14391)
Actual time node 56 = 74.03444 (SD = 3.26494) (67.70224, 80.52521)
Actual time node 57 = 82.65080 (SD = 3.15516) (76.80535, 89.06730)
Actual time node 58 = 87.44615 (SD = 3.13943) (81.56193, 93.79929)
Actual time node 59 = 55.15028 (SD = 2.58374) (50.56913, 60.31791)
Actual time node 60 = 76.92333 (SD = 1.95545) (73.22055, 80.86130)
Actual time node 61 = 48.85469 (SD = 1.99957) (44.66866, 52.44430)
Actual time node 62 = 56.49677 (SD = 1.06555) (54.25973, 57.93977)
Actual time node 63 = 80.52871 (SD = 2.04328) (76.59159, 84.66349)
Actual time node 64 = 29.61040 (SD = 2.09028) (25.39062, 33.58690)
Actual time node 65 = 52.42836 (SD = 0.40464) (52.01224, 53.47720)
Actual time node 66 = 55.69444 (SD = 0.71162) (54.34277, 57.13618)
Actual time node 67 = 60.52940 (SD = 0.83410) (58.80382, 62.02740)
Actual time node 68 = 63.78283 (SD = 0.83941) (61.86227, 64.94468)
Actual time node 69 = 82.20247 (SD = 2.15156) (78.05764, 86.53504)
Actual time node 70 = 19.86689 (SD = 2.52690) (15.06287, 25.07425)
Actual time node 71 = 58.78080 (SD = 1.16095) (55.71049, 59.96907)
Actual time node 72 = 53.12873 (SD = 2.35030) (48.09337, 57.30183)
Actual time node 73 = 65.29847 (SD = 1.41022) (62.32242, 67.95161)
Actual time node 74 = 83.15135 (SD = 2.25152) (78.79653, 87.61375)
Actual time node 75 = 68.30882 (SD = 2.61794) (63.63094, 73.67134)
Actual time node 76 = 76.03524 (SD = 2.26107) (71.94234, 80.69467)
Actual time node 77 = 85.19189 (SD = 2.50908) (80.38290, 90.22523)
Actual time node 78 = 94.16410 (SD = 3.41494) (87.63235, 101.08570)
Actual time node 79 = 62.33732 (SD = 4.58238) (53.00629, 71.11145)

Actual time node 80 = 71.50441 (SD = 4.11338) (63.40823, 79.54274)
Actual time node 81 = 102.12301 (SD = 4.32151) (93.99970, 110.99339)
Actual time node 82 = 106.86703 (SD = 4.95390) (97.66477, 117.20814)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; diprotodontian outgroup

Actual time node 42 = 59.03948 (SD = 2.46237) (53.15327, 62.73587)
Actual time node 43 = 62.38710 (SD = 2.17738) (56.82564, 64.91664)
Actual time node 44 = 18.79456 (SD = 2.32461) (14.52907, 23.72420)
Actual time node 45 = 66.33850 (SD = 3.23269) (59.66895, 72.29603)
Actual time node 46 = 74.34706 (SD = 2.96147) (68.23739, 79.95168)
Actual time node 47 = 76.46188 (SD = 2.92160) (70.44904, 82.21635)
Actual time node 48 = 79.76176 (SD = 2.93531) (73.82733, 85.55543)
Actual time node 49 = 77.38765 (SD = 3.27627) (71.05147, 83.94959)
Actual time node 50 = 82.39654 (SD = 3.20864) (76.24970, 88.98365)
Actual time node 51 = 86.15926 (SD = 3.12782) (80.37902, 92.51222)
Actual time node 52 = 51.05515 (SD = 4.06718) (42.67798, 58.63079)
Actual time node 53 = 38.34790 (SD = 3.96874) (30.71050, 46.15225)
Actual time node 54 = 16.29435 (SD = 2.22174) (12.62473, 21.09573)
Actual time node 55 = 70.57863 (SD = 3.44227) (63.83831, 77.30906)
Actual time node 56 = 74.18871 (SD = 3.29744) (67.69410, 80.64597)
Actual time node 57 = 82.83072 (SD = 3.13640) (76.90007, 89.18233)
Actual time node 58 = 87.60579 (SD = 3.12561) (81.79252, 93.99543)
Actual time node 59 = 55.14913 (SD = 2.58637) (50.56959, 60.29448)
Actual time node 60 = 76.96491 (SD = 1.93722) (73.31623, 80.87585)
Actual time node 61 = 48.89215 (SD = 2.00858) (44.69115, 52.46708)
Actual time node 62 = 56.48864 (SD = 1.06803) (54.26550, 57.94112)
Actual time node 63 = 80.56912 (SD = 2.02918) (76.75446, 84.74673)
Actual time node 64 = 29.61754 (SD = 2.09773) (25.38987, 33.58403)
Actual time node 65 = 52.42914 (SD = 0.40133) (52.01119, 53.48672)
Actual time node 66 = 55.72036 (SD = 0.71217) (54.34640, 57.13799)
Actual time node 67 = 60.57660 (SD = 0.82863) (58.87037, 62.09737)
Actual time node 68 = 63.82188 (SD = 0.82298) (61.92437, 64.94648)
Actual time node 69 = 82.25839 (SD = 2.13283) (78.23685, 86.56564)
Actual time node 70 = 19.84149 (SD = 2.53210) (15.06444, 25.02434)
Actual time node 71 = 58.80358 (SD = 1.14735) (55.75335, 59.96807)
Actual time node 72 = 53.15422 (SD = 2.34076) (48.23883, 57.29477)
Actual time node 73 = 65.31286 (SD = 1.41950) (62.34003, 68.04582)
Actual time node 74 = 83.24603 (SD = 2.24014) (79.02598, 87.72682)
Actual time node 75 = 68.37282 (SD = 2.61928) (63.71148, 73.72687)
Actual time node 76 = 76.08390 (SD = 2.28081) (71.95939, 80.82278)
Actual time node 77 = 85.30104 (SD = 2.50439) (80.59451, 90.45287)
Actual time node 78 = 94.33573 (SD = 3.40127) (87.89256, 101.32641)
Actual time node 79 = 62.38784 (SD = 4.49783) (53.21348, 71.02684)

Actual time node 80 = 71.53869 (SD = 4.01128) (63.60939, 79.39592)
Actual time node 81 = 102.23665 (SD = 4.30059) (94.32337, 111.15607)
Actual time node 82 = 106.79878 (SD = 4.88881) (97.98891, 117.13412)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 65 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 59.02289 (SD = 2.45192) (53.07309, 62.68680)
Actual time node 43 = 62.46438 (SD = 2.15350) (56.87772, 64.91162)
Actual time node 44 = 18.85456 (SD = 2.39007) (14.46653, 23.92408)
Actual time node 45 = 66.22229 (SD = 3.25973) (59.41118, 72.38493)
Actual time node 46 = 74.21132 (SD = 2.95193) (68.16131, 79.94741)
Actual time node 47 = 76.29038 (SD = 2.90868) (70.34488, 81.91022)
Actual time node 48 = 79.61032 (SD = 2.89718) (73.78423, 85.34846)
Actual time node 49 = 76.67862 (SD = 3.22671) (70.46332, 83.05107)
Actual time node 50 = 81.60451 (SD = 3.14313) (75.65245, 87.92284)
Actual time node 51 = 85.30407 (SD = 3.05352) (79.57080, 91.58954)
Actual time node 52 = 50.67398 (SD = 4.03734) (42.47712, 58.34717)
Actual time node 53 = 38.15149 (SD = 3.91197) (30.77065, 45.91053)
Actual time node 54 = 16.22410 (SD = 2.18419) (12.56038, 20.93806)
Actual time node 55 = 70.01197 (SD = 3.41648) (63.32226, 76.86252)
Actual time node 56 = 73.53653 (SD = 3.27860) (67.08031, 80.08868)
Actual time node 57 = 82.02748 (SD = 3.10486) (76.19158, 88.40342)
Actual time node 58 = 86.71557 (SD = 3.06192) (80.90362, 93.02253)
Actual time node 59 = 55.12877 (SD = 2.54827) (50.58228, 60.20385)
Actual time node 60 = 76.57099 (SD = 1.91766) (72.97173, 80.47323)
Actual time node 61 = 48.94639 (SD = 1.98224) (44.76133, 52.46173)
Actual time node 62 = 56.50317 (SD = 1.05216) (54.28061, 57.94264)
Actual time node 63 = 80.09534 (SD = 2.01585) (76.27475, 84.26140)
Actual time node 64 = 29.67395 (SD = 2.11771) (25.39657, 33.73154)
Actual time node 65 = 52.43513 (SD = 0.41108) (52.01298, 53.54877)
Actual time node 66 = 55.69154 (SD = 0.70724) (54.33040, 57.11190)
Actual time node 67 = 60.49578 (SD = 0.83930) (58.76958, 62.00540)
Actual time node 68 = 63.72959 (SD = 0.85183) (61.81596, 64.93691)
Actual time node 69 = 81.74002 (SD = 2.13698) (77.73521, 86.10894)
Actual time node 70 = 19.98030 (SD = 2.61948) (15.08982, 25.36940)
Actual time node 71 = 58.76904 (SD = 1.16331) (55.71030, 59.96502)
Actual time node 72 = 53.11850 (SD = 2.36855) (48.10644, 57.37082)
Actual time node 73 = 65.20584 (SD = 1.39581) (62.35041, 67.88247)
Actual time node 74 = 82.65818 (SD = 2.23516) (78.44819, 87.18034)
Actual time node 75 = 68.09450 (SD = 2.56910) (63.57874, 73.37003)
Actual time node 76 = 75.69267 (SD = 2.25527) (71.66599, 80.35358)
Actual time node 77 = 84.61296 (SD = 2.48204) (79.96477, 89.67992)
Actual time node 78 = 93.17821 (SD = 3.33221) (86.93527, 99.94019)
Actual time node 79 = 62.43175 (SD = 4.39044) (53.50239, 70.79763)

Actual time node 80 = 71.54243 (SD = 3.89518) (63.80425, 79.22589)
Actual time node 81 = 100.62027 (SD = 4.20091) (92.86234, 109.18571)
Actual time node 82 = 104.97537 (SD = 4.76849) (96.28025, 114.91241)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 146 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 59.01706 (SD = 2.42262) (53.21595, 62.70925)
Actual time node 43 = 62.46198 (SD = 2.13656) (56.99780, 64.91886)
Actual time node 44 = 18.72596 (SD = 2.30592) (14.53693, 23.59164)
Actual time node 45 = 66.34313 (SD = 3.28022) (59.56788, 72.39288)
Actual time node 46 = 74.47277 (SD = 3.02914) (68.21156, 80.20551)
Actual time node 47 = 76.61749 (SD = 2.99466) (70.48473, 82.39516)
Actual time node 48 = 80.05954 (SD = 3.00263) (74.07521, 86.10621)
Actual time node 49 = 77.44785 (SD = 3.36070) (71.05156, 84.29884)
Actual time node 50 = 82.52344 (SD = 3.25349) (76.51398, 89.23348)
Actual time node 51 = 86.33236 (SD = 3.18037) (80.48097, 93.01237)
Actual time node 52 = 50.97440 (SD = 4.01532) (43.13849, 58.66215)
Actual time node 53 = 38.36251 (SD = 3.90537) (30.74948, 45.99465)
Actual time node 54 = 16.24460 (SD = 2.13210) (12.66238, 20.97622)
Actual time node 55 = 70.61886 (SD = 3.46764) (63.90002, 77.40866)
Actual time node 56 = 74.21799 (SD = 3.32678) (67.88076, 80.93509)
Actual time node 57 = 82.92544 (SD = 3.19477) (76.89681, 89.52641)
Actual time node 58 = 87.78338 (SD = 3.17367) (81.94536, 94.48359)
Actual time node 59 = 55.13740 (SD = 2.57346) (50.54124, 60.24838)
Actual time node 60 = 77.05569 (SD = 1.95601) (73.40827, 81.13594)
Actual time node 61 = 48.82301 (SD = 1.97627) (44.66841, 52.39616)
Actual time node 62 = 56.49412 (SD = 1.05850) (54.25302, 57.93531)
Actual time node 63 = 80.70195 (SD = 2.06965) (76.85646, 85.02223)
Actual time node 64 = 29.56319 (SD = 2.08968) (25.28834, 33.46399)
Actual time node 65 = 52.42835 (SD = 0.40078) (52.01190, 53.48405)
Actual time node 66 = 55.72119 (SD = 0.71837) (54.37075, 57.17531)
Actual time node 67 = 60.57798 (SD = 0.83193) (58.84070, 62.10275)
Actual time node 68 = 63.84109 (SD = 0.82398) (61.95273, 64.94742)
Actual time node 69 = 82.40169 (SD = 2.17205) (78.35537, 86.89329)
Actual time node 70 = 19.92111 (SD = 2.50488) (15.29665, 25.12159)
Actual time node 71 = 58.82515 (SD = 1.11296) (55.83681, 59.97026)
Actual time node 72 = 53.12715 (SD = 2.34555) (48.11767, 57.36855)
Actual time node 73 = 65.31682 (SD = 1.40204) (62.42546, 68.00878)
Actual time node 74 = 83.36853 (SD = 2.27308) (79.14124, 88.03810)
Actual time node 75 = 68.35945 (SD = 2.63696) (63.61999, 73.80582)
Actual time node 76 = 76.16746 (SD = 2.30078) (71.98628, 80.95605)
Actual time node 77 = 85.43834 (SD = 2.53950) (80.78510, 90.72023)
Actual time node 78 = 94.64277 (SD = 3.44781) (88.46147, 101.92845)
Actual time node 79 = 62.02971 (SD = 4.61234) (52.81207, 70.92126)

Actual time node 80 = 71.28978 (SD = 4.15910) (63.20364, 79.49028)
Actual time node 81 = 102.97908 (SD = 4.34873) (95.19901, 112.13211)
Actual time node 82 = 108.01677 (SD = 4.97848) (99.14509, 118.78128)

myomorph root tree; 16,397-bp data set; mean value of prior distribution set at 146 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 34.85927 (SD = 5.14942) (25.61845, 45.88475)
Actual time node 43 = 70.94006 (SD = 7.10491) (56.95986, 85.04873)
Actual time node 44 = 70.69384 (SD = 5.49376) (59.64099, 81.45439)
Actual time node 45 = 94.80215 (SD = 4.69388) (86.21206, 104.79292)
Actual time node 46 = 100.74942 (SD = 4.86312) (91.93577, 111.08810)
Actual time node 47 = 105.26511 (SD = 5.03581) (96.16980, 116.10678)
Actual time node 48 = 55.70312 (SD = 2.80956) (50.65196, 61.26311)
Actual time node 49 = 79.22041 (SD = 2.16283) (75.22343, 83.61612)
Actual time node 50 = 48.61547 (SD = 2.03659) (44.30432, 52.24715)
Actual time node 51 = 56.47263 (SD = 1.07819) (54.25321, 57.94640)
Actual time node 52 = 83.39650 (SD = 2.28762) (79.19350, 88.16580)
Actual time node 53 = 29.45405 (SD = 2.10808) (25.20262, 33.47663)
Actual time node 54 = 52.46103 (SD = 0.42490) (52.01153, 53.56697)
Actual time node 55 = 55.83060 (SD = 0.71544) (54.48442, 57.29529)
Actual time node 56 = 60.79839 (SD = 0.75973) (59.19047, 62.19083)
Actual time node 57 = 64.16775 (SD = 0.66601) (62.50871, 64.97053)
Actual time node 58 = 85.31983 (SD = 2.42498) (80.77232, 90.34138)
Actual time node 59 = 19.31021 (SD = 2.45048) (14.71938, 24.36931)
Actual time node 60 = 58.71352 (SD = 1.23430) (55.34928, 59.96648)
Actual time node 61 = 52.96195 (SD = 2.50018) (47.70849, 57.46592)
Actual time node 62 = 65.81330 (SD = 1.54262) (62.62088, 68.75971)
Actual time node 63 = 86.54550 (SD = 2.58317) (81.77718, 91.91744)
Actual time node 64 = 70.19810 (SD = 3.15660) (64.18377, 76.58684)
Actual time node 65 = 78.59147 (SD = 2.66681) (73.74579, 84.18261)
Actual time node 66 = 89.06138 (SD = 2.92030) (83.70000, 95.19439)
Actual time node 67 = 53.97388 (SD = 2.35163) (50.40870, 59.54558)
Actual time node 68 = 56.86199 (SD = 2.23288) (54.09847, 62.44391)
Actual time node 69 = 17.09945 (SD = 2.05182) (13.40015, 21.40247)
Actual time node 70 = 58.34647 (SD = 2.75216) (53.42863, 64.36997)
Actual time node 71 = 64.75682 (SD = 2.56643) (60.51187, 70.54480)
Actual time node 72 = 66.33043 (SD = 2.53103) (62.21749, 72.07829)
Actual time node 73 = 68.68430 (SD = 2.50791) (64.61790, 74.38718)
Actual time node 74 = 57.13471 (SD = 3.64927) (50.75301, 64.71050)
Actual time node 75 = 65.55613 (SD = 3.26828) (60.43692, 72.73434)
Actual time node 76 = 91.62818 (SD = 3.42020) (85.50241, 98.96765)
Actual time node 77 = 99.64732 (SD = 4.20452) (92.00117, 108.64755)
Actual time node 78 = 107.11541 (SD = 5.14176) (97.80406, 118.26486)
Actual time node 79 = 112.59280 (SD = 5.81285) (102.07313, 125.34286)

Actual time node 80 = 122.98265 (SD = 6.96730) (110.42134, 138.15988)
Actual time node 81 = 125.85885 (SD = 7.30980) (112.69304, 141.73881)
Actual time node 82 = 130.98354 (SD = 8.08261) (116.44164, 148.28819)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints except for minimum and maximum at base of Paenungulata; opossum outgroup

Actual time node 42 = 68.00473 (SD = 5.46999) (57.26122, 79.05528)
Actual time node 43 = 71.67407 (SD = 5.45070) (61.15118, 82.56064)
Actual time node 44 = 21.70462 (SD = 3.14428) (16.07754, 28.30678)
Actual time node 45 = 74.26377 (SD = 5.43214) (63.91249, 85.33749)
Actual time node 46 = 82.56072 (SD = 5.38437) (72.21560, 93.53891)
Actual time node 47 = 84.63846 (SD = 5.37971) (74.34758, 95.69457)
Actual time node 48 = 87.83074 (SD = 5.34652) (77.74425, 98.84785)
Actual time node 49 = 79.77800 (SD = 3.78770) (72.65938, 87.42514)
Actual time node 50 = 85.02752 (SD = 3.74460) (78.10987, 92.76280)
Actual time node 51 = 88.97096 (SD = 3.71183) (82.26670, 96.68592)
Actual time node 52 = 52.42785 (SD = 4.36037) (43.89430, 60.87156)
Actual time node 53 = 39.33562 (SD = 4.20095) (31.15228, 47.57312)
Actual time node 54 = 16.65393 (SD = 2.27250) (12.81601, 21.77063)
Actual time node 55 = 72.64782 (SD = 3.92072) (65.18362, 80.56945)
Actual time node 56 = 76.38146 (SD = 3.79249) (69.36201, 84.08986)
Actual time node 57 = 85.41851 (SD = 3.70341) (78.72821, 93.14229)
Actual time node 58 = 90.47167 (SD = 3.73144) (83.81735, 98.26129)
Actual time node 59 = 55.43236 (SD = 2.71861) (50.56169, 60.87576)
Actual time node 60 = 78.31975 (SD = 2.15829) (74.42562, 82.81233)
Actual time node 61 = 48.70648 (SD = 2.00468) (44.45589, 52.26649)
Actual time node 62 = 56.47781 (SD = 1.05917) (54.25154, 57.94721)
Actual time node 63 = 82.24841 (SD = 2.29410) (78.03048, 87.06075)
Actual time node 64 = 29.42791 (SD = 2.06989) (25.21391, 33.36809)
Actual time node 65 = 52.43770 (SD = 0.40551) (52.01284, 53.51383)
Actual time node 66 = 55.78292 (SD = 0.71025) (54.43573, 57.23482)
Actual time node 67 = 60.72245 (SD = 0.79138) (59.09984, 62.19089)
Actual time node 68 = 64.04694 (SD = 0.72894) (62.31618, 64.96572)
Actual time node 69 = 84.08931 (SD = 2.43865) (79.55768, 89.15230)
Actual time node 70 = 19.55789 (SD = 2.44136) (14.99784, 24.58339)
Actual time node 71 = 58.78961 (SD = 1.16161) (55.64663, 59.96889)
Actual time node 72 = 53.02198 (SD = 2.39696) (47.90499, 57.26536)
Actual time node 73 = 65.60662 (SD = 1.47364) (62.59243, 68.51715)
Actual time node 74 = 85.16657 (SD = 2.58356) (80.41387, 90.54020)
Actual time node 75 = 69.27292 (SD = 2.94089) (63.87920, 75.29877)
Actual time node 76 = 77.47654 (SD = 2.59298) (72.79813, 82.85629)
Actual time node 77 = 87.49399 (SD = 2.91741) (82.14618, 93.58280)
Actual time node 78 = 97.63509 (SD = 4.09964) (90.24470, 106.20923)

Actual time node 79 = 65.21740 (SD = 5.02087) (55.30371, 75.06677)
Actual time node 80 = 74.84185 (SD = 4.69052) (65.81310, 84.28293)
Actual time node 81 = 106.22921 (SD = 5.14413) (97.02329, 117.11100)
Actual time node 82 = 112.09314 (SD = 6.10977) (101.21987, 125.29859)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia[14]; "hopefully good starting state" (2) for Markov chain; all constraints except for feliform-caniform minimum and maximum; opossum outgroup

Actual time node 42 = 58.98960 (SD = 2.43679) (53.17677, 62.67039)
Actual time node 43 = 62.46360 (SD = 2.14573) (56.99194, 64.92669)
Actual time node 44 = 18.78912 (SD = 2.35641) (14.51179, 23.70979)
Actual time node 45 = 66.37555 (SD = 3.28886) (59.44068, 72.50185)
Actual time node 46 = 74.46506 (SD = 2.99997) (68.20983, 80.14618)
Actual time node 47 = 76.58588 (SD = 2.95747) (70.50563, 82.24655)
Actual time node 48 = 79.98369 (SD = 2.95816) (74.03894, 85.66267)
Actual time node 49 = 77.23921 (SD = 3.32653) (70.93449, 83.94446)
Actual time node 50 = 82.27406 (SD = 3.24575) (76.19772, 88.94427)
Actual time node 51 = 86.03897 (SD = 3.15641) (80.21475, 92.61676)
Actual time node 52 = 50.88088 (SD = 4.10891) (42.68856, 58.85803)
Actual time node 53 = 38.28760 (SD = 3.90120) (30.69611, 46.08920)
Actual time node 54 = 16.25255 (SD = 2.14864) (12.65726, 20.97117)
Actual time node 55 = 70.44672 (SD = 3.46785) (63.69899, 77.34542)
Actual time node 56 = 74.02364 (SD = 3.33342) (67.78218, 80.80834)
Actual time node 57 = 82.66428 (SD = 3.18523) (76.78657, 89.23820)
Actual time node 58 = 87.47373 (SD = 3.16413) (81.64050, 94.04643)
Actual time node 59 = 54.72528 (SD = 3.13956) (48.09161, 60.26139)
Actual time node 60 = 76.86519 (SD = 1.98447) (73.07951, 80.84321)
Actual time node 61 = 48.88136 (SD = 1.99294) (44.72726, 52.42603)
Actual time node 62 = 56.49408 (SD = 1.06957) (54.23903, 57.94960)
Actual time node 63 = 80.53023 (SD = 2.08404) (76.56946, 84.75239)
Actual time node 64 = 29.62249 (SD = 2.07308) (25.45341, 33.54110)
Actual time node 65 = 52.43306 (SD = 0.40070) (52.01214, 53.48871)
Actual time node 66 = 55.70048 (SD = 0.71762) (54.37450, 57.18304)
Actual time node 67 = 60.53550 (SD = 0.83352) (58.86170, 62.07545)
Actual time node 68 = 63.79247 (SD = 0.83273) (61.89469, 64.94799)
Actual time node 69 = 82.21716 (SD = 2.19193) (78.02743, 86.61041)
Actual time node 70 = 19.88120 (SD = 2.62258) (15.06240, 25.38065)
Actual time node 71 = 58.77112 (SD = 1.16833) (55.73684, 59.96634)
Actual time node 72 = 53.08716 (SD = 2.37933) (48.04552, 57.36655)
Actual time node 73 = 65.25867 (SD = 1.41008) (62.27653, 67.93064)
Actual time node 74 = 83.16715 (SD = 2.30258) (78.81399, 87.82927)
Actual time node 75 = 68.31283 (SD = 2.64021) (63.63990, 73.74298)
Actual time node 76 = 76.04868 (SD = 2.31501) (71.78297, 80.86275)
Actual time node 77 = 85.20838 (SD = 2.56158) (80.44010, 90.43033)

Actual time node 78 = 94.18354 (SD = 3.44113) (87.77352, 101.18942)
Actual time node 79 = 62.31667 (SD = 4.64282) (52.86357, 71.15215)
Actual time node 80 = 71.53995 (SD = 4.12888) (63.18424, 79.73067)
Actual time node 81 = 102.14292 (SD = 4.34131) (94.15098, 111.15515)
Actual time node 82 = 106.88709 (SD = 4.96886) (97.78990, 117.43083)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints except shrew-hedgehog minimum; opossum outgroup

Actual time node 42 = 59.04758 (SD = 2.42511) (53.16812, 62.73615)
Actual time node 43 = 62.51332 (SD = 2.11174) (56.99307, 64.92551)
Actual time node 44 = 18.79357 (SD = 2.32737) (14.55527, 23.64639)
Actual time node 45 = 66.38303 (SD = 3.28496) (59.54579, 72.56133)
Actual time node 46 = 74.44417 (SD = 2.98945) (68.28081, 80.15309)
Actual time node 47 = 76.55459 (SD = 2.95372) (70.46231, 82.26650)
Actual time node 48 = 79.92606 (SD = 2.93934) (73.92778, 85.67797)
Actual time node 49 = 77.09322 (SD = 3.28095) (70.71642, 83.65213)
Actual time node 50 = 82.10028 (SD = 3.21903) (76.03798, 88.54280)
Actual time node 51 = 85.86054 (SD = 3.13550) (79.99257, 92.21886)
Actual time node 52 = 50.86772 (SD = 4.05637) (42.80239, 58.56463)
Actual time node 53 = 38.19262 (SD = 3.92216) (30.70179, 45.94013)
Actual time node 54 = 16.24318 (SD = 2.17560) (12.62996, 21.09863)
Actual time node 55 = 70.33695 (SD = 3.45522) (63.65166, 77.16821)
Actual time node 56 = 73.90357 (SD = 3.30256) (67.59193, 80.56049)
Actual time node 57 = 82.52257 (SD = 3.16616) (76.42913, 88.91139)
Actual time node 58 = 87.29741 (SD = 3.14537) (81.47504, 93.74667)
Actual time node 59 = 55.10928 (SD = 2.53099) (50.53678, 60.10033)
Actual time node 60 = 76.81585 (SD = 1.96510) (73.10769, 80.81092)
Actual time node 61 = 48.86371 (SD = 2.00625) (44.68344, 52.41483)
Actual time node 62 = 56.47472 (SD = 1.06972) (54.26226, 57.94812)
Actual time node 63 = 80.38693 (SD = 2.07415) (76.42781, 84.57284)
Actual time node 64 = 29.61552 (SD = 2.06498) (25.39653, 33.59017)
Actual time node 65 = 52.42669 (SD = 0.40153) (52.01033, 53.49784)
Actual time node 66 = 55.69238 (SD = 0.71812) (54.33700, 57.14614)
Actual time node 67 = 60.51416 (SD = 0.84034) (58.79976, 62.06846)
Actual time node 68 = 63.77349 (SD = 0.85102) (61.83532, 64.94794)
Actual time node 69 = 82.05524 (SD = 2.18043) (77.94040, 86.48564)
Actual time node 70 = 19.96229 (SD = 2.55481) (15.30524, 25.29182)
Actual time node 71 = 58.81258 (SD = 1.12886) (55.78154, 59.96593)
Actual time node 72 = 53.12055 (SD = 2.30346) (48.25031, 57.31126)
Actual time node 73 = 65.24946 (SD = 1.40131) (62.38379, 67.94302)
Actual time node 74 = 82.99942 (SD = 2.28143) (78.69359, 87.57619)
Actual time node 75 = 67.95848 (SD = 2.98088) (61.81746, 73.53408)
Actual time node 76 = 75.80713 (SD = 2.40908) (71.20687, 80.75689)
Actual time node 77 = 85.01896 (SD = 2.53734) (80.22492, 90.15595)

Actual time node 78 = 93.98593 (SD = 3.40407) (87.65342, 101.06856)
Actual time node 79 = 62.19564 (SD = 4.52124) (52.80477, 70.78893)
Actual time node 80 = 71.40133 (SD = 4.06486) (63.25766, 79.45419)
Actual time node 81 = 101.92719 (SD = 4.25955) (94.07746, 110.76904)
Actual time node 82 = 106.65481 (SD = 4.86160) (97.81532, 116.89446)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints except hippo-Cetacea minimum and base of Cetartiodactyla maximum; opossum outgroup

Actual time node 42 = 58.64571 (SD = 2.48715) (52.91376, 62.56280)
Actual time node 43 = 61.96822 (SD = 2.29503) (56.38512, 64.88166)
Actual time node 44 = 18.41902 (SD = 2.02818) (14.65650, 22.64060)
Actual time node 45 = 65.05158 (SD = 3.06269) (58.69934, 70.68065)
Actual time node 46 = 72.75625 (SD = 2.86498) (66.78519, 78.16200)
Actual time node 47 = 74.71672 (SD = 2.83442) (68.80375, 80.09553)
Actual time node 48 = 77.75422 (SD = 2.82336) (71.89601, 83.09721)
Actual time node 49 = 72.80343 (SD = 2.92125) (67.21037, 78.70705)
Actual time node 50 = 77.70723 (SD = 2.85821) (72.29229, 83.54725)
Actual time node 51 = 81.34512 (SD = 2.77615) (76.20445, 87.05401)
Actual time node 52 = 47.81164 (SD = 3.35306) (41.07994, 54.38338)
Actual time node 53 = 35.63012 (SD = 3.13770) (29.50729, 41.88611)
Actual time node 54 = 15.04287 (SD = 1.64745) (12.35316, 18.68392)
Actual time node 55 = 66.48466 (SD = 2.97064) (60.65498, 72.44953)
Actual time node 56 = 69.90456 (SD = 2.86575) (64.44496, 75.66243)
Actual time node 57 = 78.15552 (SD = 2.78726) (72.97909, 83.81410)
Actual time node 58 = 82.74036 (SD = 2.78030) (77.63067, 88.40568)
Actual time node 59 = 52.68890 (SD = 1.77887) (50.13810, 56.68487)
Actual time node 60 = 72.82123 (SD = 1.84577) (69.43270, 76.68150)
Actual time node 61 = 48.49644 (SD = 1.77765) (44.95935, 51.91411)
Actual time node 62 = 55.67433 (SD = 1.08471) (54.08352, 57.80656)
Actual time node 63 = 76.08183 (SD = 1.93696) (72.57628, 80.08732)
Actual time node 64 = 20.31176 (SD = 2.34322) (15.91733, 25.21121)
Actual time node 65 = 39.84345 (SD = 2.67331) (34.57921, 45.08404)
Actual time node 66 = 44.10212 (SD = 2.64414) (38.85713, 49.26468)
Actual time node 67 = 50.67798 (SD = 2.48096) (45.78023, 55.49247)
Actual time node 68 = 55.26946 (SD = 2.25696) (50.86076, 59.73610)
Actual time node 69 = 77.48199 (SD = 2.01830) (73.82978, 81.67507)
Actual time node 70 = 21.07321 (SD = 2.45640) (16.52288, 26.20648)
Actual time node 71 = 58.29498 (SD = 1.39741) (54.79673, 59.93595)
Actual time node 72 = 52.64962 (SD = 2.13358) (47.96080, 56.50367)
Actual time node 73 = 63.30538 (SD = 1.45895) (60.11312, 65.92650)
Actual time node 74 = 78.48414 (SD = 2.07025) (74.76198, 82.70462)
Actual time node 75 = 65.14877 (SD = 1.63965) (63.09354, 69.07701)
Actual time node 76 = 72.11234 (SD = 1.84021) (68.90160, 76.12242)

Actual time node 77 = 80.51403 (SD = 2.24113) (76.48304, 85.16758)
Actual time node 78 = 89.18261 (SD = 2.98288) (83.72938, 95.40889)
Actual time node 79 = 58.69936 (SD = 3.76694) (51.44139, 66.05546)
Actual time node 80 = 67.62931 (SD = 3.39873) (61.25015, 74.51704)
Actual time node 81 = 96.90881 (SD = 3.75001) (90.05007, 104.76628)
Actual time node 82 = 101.76534 (SD = 4.28988) (93.95645, 110.81821)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints except minimum and maximum for base of Perissodactyla; opossum outgroup

Actual time node 42 = 58.98234 (SD = 2.44648) (53.08788, 62.71803)
Actual time node 43 = 62.45983 (SD = 2.15164) (56.80983, 64.92968)
Actual time node 44 = 18.77928 (SD = 2.36350) (14.46539, 23.67860)
Actual time node 45 = 66.35708 (SD = 3.33408) (59.27711, 72.49070)
Actual time node 46 = 74.45473 (SD = 3.02505) (68.11494, 80.18869)
Actual time node 47 = 76.57917 (SD = 2.97006) (70.43336, 82.34422)
Actual time node 48 = 79.97909 (SD = 2.96444) (73.98955, 85.84718)
Actual time node 49 = 77.40477 (SD = 3.32916) (70.97532, 84.15847)
Actual time node 50 = 82.42050 (SD = 3.22482) (76.25148, 88.98796)
Actual time node 51 = 86.20025 (SD = 3.13364) (80.43161, 92.79845)
Actual time node 52 = 51.00936 (SD = 4.10925) (42.60236, 58.85719)
Actual time node 53 = 38.51957 (SD = 3.92208) (30.91472, 46.30346)
Actual time node 54 = 16.31727 (SD = 2.19630) (12.60757, 21.14801)
Actual time node 55 = 70.64932 (SD = 3.43046) (64.07515, 77.55359)
Actual time node 56 = 74.21407 (SD = 3.30126) (67.83957, 80.86973)
Actual time node 57 = 82.84933 (SD = 3.15651) (77.00446, 89.35138)
Actual time node 58 = 87.64146 (SD = 3.13004) (81.95593, 94.19990)
Actual time node 59 = 56.07940 (SD = 2.75984) (50.79322, 61.31078)
Actual time node 60 = 77.58797 (SD = 2.06851) (73.68652, 81.80746)
Actual time node 61 = 51.83922 (SD = 3.38018) (44.73604, 57.99337)
Actual time node 62 = 59.30981 (SD = 2.84398) (53.40323, 64.54333)
Actual time node 63 = 81.03318 (SD = 2.13697) (77.00638, 85.48922)
Actual time node 64 = 29.61349 (SD = 2.08600) (25.37819, 33.54449)
Actual time node 65 = 52.44553 (SD = 0.41457) (52.01028, 53.55418)
Actual time node 66 = 55.75503 (SD = 0.71292) (54.40299, 57.19226)
Actual time node 67 = 60.64460 (SD = 0.81186) (58.97356, 62.12750)
Actual time node 68 = 63.93581 (SD = 0.78846) (62.09093, 64.96073)
Actual time node 69 = 82.55770 (SD = 2.21073) (78.40242, 87.19104)
Actual time node 70 = 19.80631 (SD = 2.54462) (15.12582, 25.08184)
Actual time node 71 = 58.87664 (SD = 1.06867) (55.96533, 59.97001)
Actual time node 72 = 53.23464 (SD = 2.36457) (48.15547, 57.41475)
Actual time node 73 = 65.59655 (SD = 1.41985) (62.72478, 68.36897)
Actual time node 74 = 83.49558 (SD = 2.30840) (79.14301, 88.35635)
Actual time node 75 = 68.69525 (SD = 2.69794) (63.75678, 74.22415)

Actual time node 76 = 76.41686 (SD = 2.34577) (72.14734, 81.37891)
Actual time node 77 = 85.48882 (SD = 2.55504) (80.74827, 90.88655)
Actual time node 78 = 94.32352 (SD = 3.42572) (88.13525, 101.61541)
Actual time node 79 = 62.27468 (SD = 4.57390) (52.87681, 70.95639)
Actual time node 80 = 71.52734 (SD = 4.08061) (63.34236, 79.62173)
Actual time node 81 = 102.24474 (SD = 4.35600) (94.48306, 111.61900)
Actual time node 82 = 106.95240 (SD = 5.00157) (98.07657, 117.64355)

Murphy *et al.* (1) tree; 16,397-bp data set; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints except for those within Chiroptera; opossum outgroup

Actual time node 42 = 59.23250 (SD = 2.31872) (53.62231, 62.82891)
Actual time node 43 = 62.73532 (SD = 1.99032) (57.55509, 64.92883)
Actual time node 44 = 18.80656 (SD = 2.21524) (14.72926, 23.42535)
Actual time node 45 = 66.80597 (SD = 3.24492) (59.98699, 72.95865)
Actual time node 46 = 75.08150 (SD = 2.98346) (68.83482, 80.74932)
Actual time node 47 = 77.24983 (SD = 2.95230) (71.19945, 82.89344)
Actual time node 48 = 80.72396 (SD = 2.95290) (74.82622, 86.48535)
Actual time node 49 = 78.48608 (SD = 3.33327) (72.02820, 85.14262)
Actual time node 50 = 83.61796 (SD = 3.26332) (77.43453, 90.23220)
Actual time node 51 = 87.48940 (SD = 3.19104) (81.50744, 93.98684)
Actual time node 52 = 51.75940 (SD = 4.00676) (43.74991, 59.50479)
Actual time node 53 = 38.87073 (SD = 3.85173) (31.37619, 46.57865)
Actual time node 54 = 16.46434 (SD = 2.16218) (12.79966, 21.16546)
Actual time node 55 = 71.67475 (SD = 3.43406) (65.19501, 78.50607)
Actual time node 56 = 75.31794 (SD = 3.31512) (68.95898, 81.95447)
Actual time node 57 = 84.08404 (SD = 3.20881) (78.01575, 90.62970)
Actual time node 58 = 88.95031 (SD = 3.20301) (82.99010, 95.43002)
Actual time node 59 = 55.86181 (SD = 2.70453) (50.77401, 61.07290)
Actual time node 60 = 78.41201 (SD = 2.08777) (74.48673, 82.73896)
Actual time node 61 = 48.75279 (SD = 1.98954) (44.57535, 52.34777)
Actual time node 62 = 56.65915 (SD = 1.01934) (54.36997, 57.95196)
Actual time node 63 = 82.10537 (SD = 2.17104) (78.03895, 86.57095)
Actual time node 64 = 29.32979 (SD = 2.06703) (25.14448, 33.26518)
Actual time node 65 = 52.44121 (SD = 0.41350) (52.01222, 53.52575)
Actual time node 66 = 55.80924 (SD = 0.71544) (54.43236, 57.23572)
Actual time node 67 = 60.80991 (SD = 0.76801) (59.20713, 62.22014)
Actual time node 68 = 64.16719 (SD = 0.67002) (62.52476, 64.96781)
Actual time node 69 = 83.84447 (SD = 2.27364) (79.51656, 88.50956)
Actual time node 70 = 25.28160 (SD = 3.71260) (18.51397, 32.98464)
Actual time node 71 = 65.43120 (SD = 2.69339) (60.09126, 70.60231)
Actual time node 72 = 59.11950 (SD = 3.07894) (52.78988, 64.83060)
Actual time node 73 = 70.14107 (SD = 2.34896) (65.60796, 74.78236)
Actual time node 74 = 84.88036 (SD = 2.39427) (80.34373, 89.82168)
Actual time node 75 = 69.70396 (SD = 2.82156) (64.33275, 75.30591)

Actual time node 76 = 77.66566 (SD = 2.45055) (73.13103, 82.68557)
Actual time node 77 = 86.83171 (SD = 2.61090) (81.85770, 92.21214)
Actual time node 78 = 95.71587 (SD = 3.46191) (89.29430, 102.85866)
Actual time node 79 = 63.05764 (SD = 4.55519) (53.58746, 71.59940)
Actual time node 80 = 72.47070 (SD = 4.09454) (64.10897, 80.40829)
Actual time node 81 = 103.73076 (SD = 4.34904) (95.62037, 112.73834)
Actual time node 82 = 108.41107 (SD = 4.92849) (99.34870, 118.72274)

Murphy *et al.* (1) tree; nuclear genes only; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 59.51501 (SD = 2.46142) (53.62368, 63.24012)
Actual time node 43 = 62.35734 (SD = 2.20125) (56.78984, 64.92398)
Actual time node 44 = 17.09026 (SD = 2.24617) (13.03184, 21.82528)
Actual time node 45 = 66.73571 (SD = 3.33778) (59.82165, 72.97510)
Actual time node 46 = 74.13232 (SD = 3.04118) (67.92789, 79.94843)
Actual time node 47 = 76.71098 (SD = 3.00675) (70.57258, 82.46465)
Actual time node 48 = 79.40506 (SD = 3.02550) (73.27174, 85.31912)
Actual time node 49 = 77.24846 (SD = 3.39342) (70.78813, 84.35221)
Actual time node 50 = 84.37006 (SD = 3.30424) (78.14824, 91.30455)
Actual time node 51 = 86.77843 (SD = 3.24475) (80.83181, 93.59547)
Actual time node 52 = 50.18318 (SD = 4.13376) (41.88645, 58.29530)
Actual time node 53 = 37.40783 (SD = 4.00181) (29.61758, 45.35983)
Actual time node 54 = 15.89117 (SD = 2.16290) (12.43676, 20.76853)
Actual time node 55 = 70.50444 (SD = 3.55016) (63.63621, 77.63705)
Actual time node 56 = 73.90075 (SD = 3.41482) (67.28436, 80.87473)
Actual time node 57 = 83.08504 (SD = 3.26478) (76.97733, 89.82484)
Actual time node 58 = 87.78826 (SD = 3.25113) (81.86361, 94.66517)
Actual time node 59 = 55.54069 (SD = 2.71247) (50.65855, 60.88893)
Actual time node 60 = 77.26175 (SD = 2.01769) (73.42655, 81.45144)
Actual time node 61 = 49.55746 (SD = 1.98634) (45.37080, 53.11027)
Actual time node 62 = 56.48835 (SD = 1.06079) (54.24523, 57.94223)
Actual time node 63 = 80.98442 (SD = 2.11958) (77.05503, 85.38660)
Actual time node 64 = 29.84717 (SD = 2.18206) (25.39179, 34.04242)
Actual time node 65 = 52.44177 (SD = 0.41349) (52.01155, 53.54034)
Actual time node 66 = 55.62077 (SD = 0.73128) (54.25167, 57.10585)
Actual time node 67 = 60.61748 (SD = 0.83527) (58.90145, 62.19118)
Actual time node 68 = 63.83278 (SD = 0.81580) (61.99274, 64.94863)
Actual time node 69 = 82.52870 (SD = 2.21358) (78.41367, 87.07600)
Actual time node 70 = 18.58814 (SD = 2.55028) (13.91602, 23.97799)
Actual time node 71 = 58.72291 (SD = 1.18797) (55.62633, 59.96548)
Actual time node 72 = 52.75671 (SD = 2.40521) (47.57208, 57.06885)
Actual time node 73 = 64.85607 (SD = 1.43070) (61.86517, 67.54994)
Actual time node 74 = 83.45649 (SD = 2.31982) (79.14399, 88.26063)
Actual time node 75 = 68.12961 (SD = 2.65827) (63.52840, 73.55305)

Actual time node 76 = 76.00244 (SD = 2.34346) (71.70764, 80.95286)
Actual time node 77 = 85.27591 (SD = 2.57276) (80.55099, 90.71475)
Actual time node 78 = 94.74090 (SD = 3.54954) (88.39148, 102.15290)
Actual time node 79 = 61.39612 (SD = 4.63176) (52.28342, 70.26401)
Actual time node 80 = 69.92523 (SD = 4.18313) (61.86822, 78.18231)
Actual time node 81 = 102.71424 (SD = 4.47777) (94.66012, 112.31458)
Actual time node 82 = 107.47852 (SD = 5.14011) (98.36027, 118.75427)

Murphy *et al.* (1) tree; 1st + 2nd codon positions; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 58.49939 (SD = 3.02862) (52.05437, 63.49356)
Actual time node 43 = 61.19105 (SD = 2.68949) (55.18004, 64.84766)
Actual time node 44 = 18.38448 (SD = 2.72691) (13.47568, 24.07465)
Actual time node 45 = 60.30225 (SD = 3.98153) (52.22498, 67.84437)
Actual time node 46 = 70.50840 (SD = 3.59134) (63.36698, 77.36773)
Actual time node 47 = 73.05361 (SD = 3.47140) (66.03656, 79.75570)
Actual time node 48 = 75.96105 (SD = 3.38923) (69.19470, 82.53244)
Actual time node 49 = 74.29985 (SD = 3.73342) (67.17061, 81.86531)
Actual time node 50 = 83.69013 (SD = 3.35097) (77.47516, 90.67754)
Actual time node 51 = 84.00007 (SD = 3.35383) (77.81249, 91.02861)
Actual time node 52 = 47.65042 (SD = 4.28517) (39.23410, 56.11377)
Actual time node 53 = 35.65725 (SD = 3.93793) (28.32178, 43.63833)
Actual time node 54 = 15.16638 (SD = 2.03771) (12.20607, 19.85247)
Actual time node 55 = 67.07394 (SD = 3.73109) (59.93486, 74.54985)
Actual time node 56 = 71.77015 (SD = 3.54383) (65.03371, 78.98200)
Actual time node 57 = 80.94239 (SD = 3.41297) (74.59647, 88.02873)
Actual time node 58 = 85.24606 (SD = 3.35570) (79.03344, 92.31268)
Actual time node 59 = 55.63844 (SD = 2.82001) (50.63990, 61.35952)
Actual time node 60 = 75.45785 (SD = 2.27865) (71.22341, 80.09744)
Actual time node 61 = 50.42321 (SD = 2.45708) (45.32813, 54.95182)
Actual time node 62 = 56.50702 (SD = 1.06933) (54.26641, 57.94491)
Actual time node 63 = 78.83981 (SD = 2.19464) (74.81421, 83.36240)
Actual time node 64 = 29.18258 (SD = 2.70165) (23.86439, 34.41256)
Actual time node 65 = 52.72165 (SD = 0.65810) (52.02152, 54.45048)
Actual time node 66 = 54.24755 (SD = 1.01120) (52.49616, 56.44040)
Actual time node 67 = 59.74490 (SD = 1.30392) (57.19449, 62.25114)
Actual time node 68 = 63.05507 (SD = 1.23882) (60.28167, 64.89223)
Actual time node 69 = 79.12542 (SD = 2.21498) (75.02058, 83.69194)
Actual time node 70 = 17.76521 (SD = 2.77010) (12.75178, 23.53706)
Actual time node 71 = 58.58084 (SD = 1.26727) (55.32712, 59.95861)
Actual time node 72 = 51.00612 (SD = 2.77083) (45.23208, 56.18392)
Actual time node 73 = 62.18004 (SD = 1.55973) (58.81736, 65.06124)
Actual time node 74 = 80.20489 (SD = 2.29728) (75.96601, 84.91272)
Actual time node 75 = 65.81384 (SD = 2.09385) (63.11134, 70.80011)

Actual time node 76 = 70.54739 (SD = 2.24406) (66.68897, 75.38484)
Actual time node 77 = 82.49090 (SD = 2.56471) (77.83319, 87.77124)
Actual time node 78 = 90.54669 (SD = 3.41560) (84.34223, 97.71485)
Actual time node 79 = 60.91880 (SD = 4.33101) (53.41457, 70.05913)
Actual time node 80 = 66.75961 (SD = 3.95573) (60.50907, 75.49353)
Actual time node 81 = 100.19321 (SD = 4.53907) (92.13492, 109.78932)
Actual time node 82 = 102.50371 (SD = 4.86995) (93.80705, 113.06121)

Murphy *et al.* (1) tree; 3rd codon positions; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 58.05671 (SD = 3.02257) (51.36279, 62.96490)
Actual time node 43 = 61.70444 (SD = 2.58703) (55.42909, 64.88696)
Actual time node 44 = 16.12953 (SD = 2.31960) (12.07307, 21.22968)
Actual time node 45 = 71.67654 (SD = 4.26850) (63.21062, 80.03279)
Actual time node 46 = 77.47108 (SD = 3.93737) (69.61817, 85.33583)
Actual time node 47 = 78.96893 (SD = 3.94412) (71.07828, 86.95004)
Actual time node 48 = 80.42387 (SD = 3.91816) (72.68042, 88.19869)
Actual time node 49 = 79.59403 (SD = 4.27955) (71.54273, 88.19880)
Actual time node 50 = 84.90947 (SD = 4.21202) (76.96152, 93.45514)
Actual time node 51 = 88.79143 (SD = 4.02710) (81.36674, 97.12982)
Actual time node 52 = 54.65990 (SD = 4.85332) (44.89386, 63.94782)
Actual time node 53 = 36.50232 (SD = 4.35877) (28.18917, 45.31255)
Actual time node 54 = 16.82590 (SD = 2.42135) (12.74343, 22.13406)
Actual time node 55 = 74.49217 (SD = 4.28956) (66.21144, 83.02505)
Actual time node 56 = 76.49311 (SD = 4.17600) (68.47081, 84.95077)
Actual time node 57 = 85.32215 (SD = 4.07638) (77.66732, 93.59684)
Actual time node 58 = 90.23890 (SD = 4.04184) (82.78292, 98.65829)
Actual time node 59 = 55.69698 (SD = 2.93983) (50.50029, 61.51188)
Actual time node 60 = 79.32558 (SD = 2.65690) (74.38563, 84.75015)
Actual time node 61 = 48.38439 (SD = 2.48121) (43.23308, 52.99229)
Actual time node 62 = 56.15972 (SD = 1.13099) (54.13018, 57.91574)
Actual time node 63 = 82.05439 (SD = 2.62049) (77.28260, 87.49610)
Actual time node 64 = 31.55428 (SD = 2.73432) (26.13205, 36.79200)
Actual time node 65 = 52.52568 (SD = 0.49271) (52.01487, 53.85336)
Actual time node 66 = 56.67690 (SD = 1.06252) (54.62757, 58.77603)
Actual time node 67 = 60.70811 (SD = 1.12656) (58.40782, 62.85528)
Actual time node 68 = 63.80173 (SD = 0.93227) (61.54772, 64.95278)
Actual time node 69 = 84.93503 (SD = 2.78660) (79.75260, 90.70149)
Actual time node 70 = 19.43262 (SD = 2.96706) (14.07952, 25.59641)
Actual time node 71 = 58.54608 (SD = 1.37600) (54.88715, 59.95953)
Actual time node 72 = 55.00838 (SD = 3.35687) (48.02038, 61.37951)
Actual time node 73 = 68.72114 (SD = 2.12690) (64.59712, 73.01055)
Actual time node 74 = 85.63428 (SD = 2.86629) (80.28963, 91.58190)
Actual time node 75 = 69.67436 (SD = 3.38067) (63.75905, 76.60991)

Actual time node 76 = 80.52319 (SD = 2.97471) (75.13073, 86.80437)
Actual time node 77 = 86.97081 (SD = 3.08048) (81.23523, 93.45497)
Actual time node 78 = 98.18453 (SD = 4.32905) (90.18486, 107.47860)
Actual time node 79 = 59.33133 (SD = 5.43083) (48.73177, 69.96840)
Actual time node 80 = 71.15819 (SD = 4.88991) (62.10666, 81.05503)
Actual time node 81 = 103.44878 (SD = 4.96674) (94.42564, 114.02667)
Actual time node 82 = 109.07171 (SD = 5.58761) (99.06650, 120.84176)

Murphy *et al.* (1) tree; exons only; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 58.55938 (SD = 2.74761) (52.26974, 62.76528)
Actual time node 43 = 61.87552 (SD = 2.48328) (55.76631, 64.89130)
Actual time node 44 = 17.03463 (SD = 2.32482) (12.86639, 21.90956)
Actual time node 45 = 65.97513 (SD = 3.61145) (58.46504, 72.59570)
Actual time node 46 = 74.24436 (SD = 3.29983) (67.37147, 80.42628)
Actual time node 47 = 76.19752 (SD = 3.26474) (69.35256, 82.41448)
Actual time node 48 = 78.77827 (SD = 3.26317) (71.95734, 85.03235)
Actual time node 49 = 78.22164 (SD = 3.66479) (71.34697, 85.81315)
Actual time node 50 = 85.56825 (SD = 3.57606) (78.92005, 92.98480)
Actual time node 51 = 87.54254 (SD = 3.51634) (81.08650, 94.82201)
Actual time node 52 = 51.54401 (SD = 4.36675) (43.10348, 60.00850)
Actual time node 53 = 36.60124 (SD = 4.07418) (28.87169, 44.72753)
Actual time node 54 = 16.30502 (SD = 2.31432) (12.52541, 21.43002)
Actual time node 55 = 71.21246 (SD = 3.84161) (63.77195, 78.87582)
Actual time node 56 = 74.58432 (SD = 3.69507) (67.44472, 81.94146)
Actual time node 57 = 83.66016 (SD = 3.53825) (77.03944, 90.96859)
Actual time node 58 = 88.58270 (SD = 3.52225) (82.13142, 95.85474)
Actual time node 59 = 55.48477 (SD = 2.70063) (50.55864, 60.86424)
Actual time node 60 = 77.72241 (SD = 2.15070) (73.64263, 82.09601)
Actual time node 61 = 48.89659 (SD = 2.12167) (44.52759, 52.71711)
Actual time node 62 = 56.45435 (SD = 1.08124) (54.21499, 57.94432)
Actual time node 63 = 80.96126 (SD = 2.21585) (76.76934, 85.44691)
Actual time node 64 = 30.98683 (SD = 2.21579) (26.54698, 35.19852)
Actual time node 65 = 52.45491 (SD = 0.42272) (52.01187, 53.56977)
Actual time node 66 = 55.67896 (SD = 0.77745) (54.19070, 57.22110)
Actual time node 67 = 60.51554 (SD = 0.88467) (58.68514, 62.13904)
Actual time node 68 = 63.81266 (SD = 0.85052) (61.84824, 64.94989)
Actual time node 69 = 82.74742 (SD = 2.33228) (78.37276, 87.44989)
Actual time node 70 = 18.11070 (SD = 2.47543) (13.56285, 23.17781)
Actual time node 71 = 58.77755 (SD = 1.16266) (55.65849, 59.96756)
Actual time node 72 = 52.44684 (SD = 2.56583) (47.03341, 57.15897)
Actual time node 73 = 65.50231 (SD = 1.52260) (62.40881, 68.42029)
Actual time node 74 = 83.78890 (SD = 2.45428) (79.23847, 88.85087)
Actual time node 75 = 68.36828 (SD = 2.80861) (63.50890, 74.15737)

Actual time node 76 = 76.25496 (SD = 2.45509) (71.81246, 81.41625)
Actual time node 77 = 85.65910 (SD = 2.71431) (80.66501, 91.22100)
Actual time node 78 = 95.66920 (SD = 3.81944) (88.71617, 103.60531)
Actual time node 79 = 60.97842 (SD = 4.78454) (51.68805, 70.37816)
Actual time node 80 = 70.33391 (SD = 4.35596) (61.98168, 79.10897)
Actual time node 81 = 103.29612 (SD = 4.70377) (94.82124, 113.18263)
Actual time node 82 = 107.82694 (SD = 5.30971) (98.30160, 119.01559)

Murphy *et al.* (1) tree; 3' UTRs only; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 60.50644 (SD = 2.60578) (54.29885, 64.26107)
Actual time node 43 = 62.31636 (SD = 2.30553) (56.39850, 64.92374)
Actual time node 44 = 17.44513 (SD = 3.69943) (11.22811, 25.84853)
Actual time node 45 = 70.40703 (SD = 5.94365) (58.91607, 82.41175)
Actual time node 46 = 71.45146 (SD = 5.96261) (60.02273, 83.56450)
Actual time node 47 = 79.03404 (SD = 5.26049) (69.28248, 89.95131)
Actual time node 48 = 81.53036 (SD = 5.22880) (71.92894, 92.42869)
Actual time node 49 = 68.61902 (SD = 6.09006) (56.77065, 80.85809)
Actual time node 50 = 74.09661 (SD = 5.63755) (63.40505, 85.44093)
Actual time node 51 = 79.94042 (SD = 4.91768) (70.95258, 90.23976)
Actual time node 52 = 41.44442 (SD = 7.32801) (28.26665, 56.87621)
Actual time node 53 = 44.49844 (SD = 6.16960) (32.78168, 57.18834)
Actual time node 54 = 14.48962 (SD = 2.14998) (12.07321, 20.00888)
Actual time node 55 = 66.24059 (SD = 5.85709) (55.07374, 77.93680)
Actual time node 56 = 72.56193 (SD = 5.50862) (62.26922, 83.91765)
Actual time node 57 = 79.70427 (SD = 4.88044) (70.75468, 89.79695)
Actual time node 58 = 81.64458 (SD = 4.87535) (72.82954, 91.64518)
Actual time node 59 = 55.60740 (SD = 3.44658) (50.31690, 62.33294)
Actual time node 60 = 73.80313 (SD = 4.07958) (65.91922, 82.11518)
Actual time node 61 = 52.71331 (SD = 2.17644) (48.07394, 56.56383)
Actual time node 62 = 56.05957 (SD = 1.14096) (54.12161, 57.90125)
Actual time node 63 = 79.45493 (SD = 3.59143) (72.99844, 87.04589)
Actual time node 64 = 20.84139 (SD = 4.67989) (12.56695, 30.69578)
Actual time node 65 = 53.36474 (SD = 1.20835) (52.04095, 56.38730)
Actual time node 66 = 55.92420 (SD = 1.82653) (52.83643, 59.85148)
Actual time node 67 = 60.27096 (SD = 2.06156) (55.97717, 63.84580)
Actual time node 68 = 62.70784 (SD = 1.74751) (58.52970, 64.91665)
Actual time node 69 = 80.56616 (SD = 3.64534) (74.01334, 88.44504)
Actual time node 70 = 22.75553 (SD = 5.88751) (12.31081, 34.78507)
Actual time node 71 = 55.12503 (SD = 3.48232) (46.89908, 59.79279)
Actual time node 72 = 51.52899 (SD = 4.72209) (41.69368, 59.90775)
Actual time node 73 = 58.00514 (SD = 3.62357) (49.76667, 63.80195)
Actual time node 74 = 81.45312 (SD = 3.72892) (74.77056, 89.56556)
Actual time node 75 = 68.82611 (SD = 4.05091) (63.28217, 78.17413)

Actual time node 76 = 76.20646 (SD = 4.19033) (68.73632, 85.13652)
Actual time node 77 = 82.79477 (SD = 3.89254) (75.86520, 91.22995)
Actual time node 78 = 86.61728 (SD = 4.56333) (78.61262, 96.69639)
Actual time node 79 = 66.81710 (SD = 5.76992) (58.91004, 80.22686)
Actual time node 80 = 67.99675 (SD = 5.73909) (60.36359, 81.61007)
Actual time node 81 = 94.11649 (SD = 5.74685) (84.22506, 106.77517)
Actual time node 82 = 97.20960 (SD = 6.11096) (86.69782, 110.46267)

Murphy *et al.* (1) tree; mtRNA genes; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; all constraints; opossum outgroup

Actual time node 42 = 55.31097 (SD = 4.14748) (46.55412, 62.49848)
Actual time node 43 = 61.84285 (SD = 2.53539) (55.61053, 64.90401)
Actual time node 44 = 37.28264 (SD = 6.59867) (25.81674, 51.32340)
Actual time node 45 = 60.66895 (SD = 7.31457) (46.80170, 75.53977)
Actual time node 46 = 73.29164 (SD = 6.32651) (61.28505, 86.36994)
Actual time node 47 = 73.90419 (SD = 6.34069) (61.89807, 87.02202)
Actual time node 48 = 82.43968 (SD = 5.55339) (72.10205, 93.90571)
Actual time node 49 = 73.81060 (SD = 6.27848) (62.07230, 86.57330)
Actual time node 50 = 58.21156 (SD = 7.10349) (44.78634, 72.88614)
Actual time node 51 = 74.31792 (SD = 6.29647) (62.62444, 87.18556)
Actual time node 52 = 56.48927 (SD = 6.75853) (43.79334, 70.33316)
Actual time node 53 = 51.88724 (SD = 7.49127) (38.00789, 67.18893)
Actual time node 54 = 23.58095 (SD = 4.90644) (15.09957, 34.29675)
Actual time node 55 = 67.38472 (SD = 6.37529) (55.41909, 80.37619)
Actual time node 56 = 72.87914 (SD = 6.17744) (61.47234, 85.38784)
Actual time node 57 = 76.98934 (SD = 6.00840) (65.76908, 89.51120)
Actual time node 58 = 83.69529 (SD = 5.54670) (73.44017, 95.12632)
Actual time node 59 = 53.77545 (SD = 2.93875) (50.11943, 60.88099)
Actual time node 60 = 71.74685 (SD = 4.18417) (63.34680, 79.93246)
Actual time node 61 = 40.85622 (SD = 5.82523) (29.58370, 52.04576)
Actual time node 62 = 55.87763 (SD = 1.15159) (54.09080, 57.87985)
Actual time node 63 = 74.73911 (SD = 3.69437) (67.75224, 82.22369)
Actual time node 64 = 26.98126 (SD = 4.46598) (19.01114, 36.28970)
Actual time node 65 = 54.10839 (SD = 1.75943) (52.06579, 58.51824)
Actual time node 66 = 57.09466 (SD = 2.29329) (53.10016, 61.73472)
Actual time node 67 = 59.29754 (SD = 2.32451) (54.69208, 63.58936)
Actual time node 68 = 62.20627 (SD = 2.06506) (57.32537, 64.88973)
Actual time node 69 = 78.67706 (SD = 3.56972) (72.18559, 86.18253)
Actual time node 70 = 31.39763 (SD = 5.06277) (21.92201, 41.63362)
Actual time node 71 = 55.66891 (SD = 3.32697) (47.56211, 59.83468)
Actual time node 72 = 53.79148 (SD = 5.86791) (42.61506, 65.53248)
Actual time node 73 = 65.13867 (SD = 4.25883) (56.87766, 73.71309)
Actual time node 74 = 79.44634 (SD = 3.63032) (72.86834, 87.09759)
Actual time node 75 = 68.45813 (SD = 4.15385) (63.21529, 78.41875)

Actual time node 76 = 73.80990 (SD = 4.87451) (65.62918, 84.46139)
Actual time node 77 = 83.80984 (SD = 4.20930) (76.26694, 92.93742)
Actual time node 78 = 88.48515 (SD = 4.93525) (79.81555, 99.12881)
Actual time node 79 = 66.77012 (SD = 7.84500) (51.95619, 82.54278)
Actual time node 80 = 81.35225 (SD = 7.06325) (68.16742, 95.89481)
Actual time node 81 = 93.97970 (SD = 5.67597) (83.94150, 105.92776)
Actual time node 82 = 96.53507 (SD = 5.82509) (86.27752, 108.82941)

16,397-bp data set with "K/T body size" taxa; mean value of prior distribution set at 105 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; rat-mouse minimum, megadermatid-pteropodid minimum and maximum, and hedgehog-shrew minimum constraints were employed; opossum outgroup

Actual time node 16 = 25.79050 (SD = 3.95710) (18.86680, 34.62144)
Actual time node 17 = 75.89259 (SD = 5.37745) (66.23002, 87.41380)
Actual time node 18 = 85.40020 (SD = 5.41913) (76.13196, 97.48777)
Actual time node 19 = 79.20005 (SD = 4.08696) (72.19530, 88.39711)
Actual time node 20 = 15.60534 (SD = 1.90059) (12.48238, 19.86607)
Actual time node 21 = 70.30944 (SD = 3.96301) (63.31728, 78.85440)
Actual time node 22 = 84.51665 (SD = 4.20905) (77.45196, 94.05009)
Actual time node 23 = 57.92997 (SD = 1.70705) (53.78127, 59.93098)
Actual time node 24 = 54.01575 (SD = 2.40516) (48.85390, 58.28946)
Actual time node 25 = 65.16529 (SD = 1.98203) (61.03855, 68.96477)
Actual time node 26 = 65.29372 (SD = 2.03272) (63.06712, 70.51451)
Actual time node 27 = 73.09892 (SD = 2.54190) (69.20294, 79.15772)
Actual time node 28 = 81.73488 (SD = 3.43377) (76.15962, 89.70275)
Actual time node 29 = 90.23930 (SD = 4.56641) (82.72058, 100.74859)
Actual time node 30 = 102.11652 (SD = 6.34365) (91.49069, 116.21416)

16,397-bp data set with "K/T body size" taxa; mean value of prior distribution set at 65 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; rat-mouse minimum, megadermatid-pteropodid minimum and maximum, and hedgehog-shrew minimum constraints were employed; opossum outgroup

Actual time node 16 = 25.67478 (SD = 3.94509) (18.78921, 34.27888)
Actual time node 17 = 74.67510 (SD = 4.95890) (65.47658, 85.29592)
Actual time node 18 = 83.91616 (SD = 4.94813) (75.17654, 94.69847)
Actual time node 19 = 78.30695 (SD = 3.82635) (71.77568, 86.56803)
Actual time node 20 = 15.62934 (SD = 1.92015) (12.51412, 19.95361)
Actual time node 21 = 69.73970 (SD = 3.75645) (63.03293, 77.58950)
Actual time node 22 = 83.42591 (SD = 3.95575) (76.65135, 92.06676)
Actual time node 23 = 57.91071 (SD = 1.74121) (53.58417, 59.92863)
Actual time node 24 = 53.96822 (SD = 2.39637) (48.82218, 58.17985)
Actual time node 25 = 64.98880 (SD = 1.94825) (60.89990, 68.67545)
Actual time node 26 = 65.08649 (SD = 1.86312) (63.06306, 69.84094)

Actual time node 27 = 72.65324 (SD = 2.39279) (68.85275, 78.04345)
Actual time node 28 = 80.88349 (SD = 3.26328) (75.34498, 88.02596)
Actual time node 29 = 88.81325 (SD = 4.26821) (81.39663, 98.13646)
Actual time node 30 = 99.75396 (SD = 5.82445) (89.53775, 112.37645)

16,397-bp data set with "K/T body size" taxa; mean value of prior distribution set at 146 million years for the base of crown-group Placentalia; "hopefully good starting state" (2) for Markov chain; rat-mouse minimum, megadermatid-pteropodid minimum and maximum, and hedgehog-shrew minimum constraints were employed; opossum outgroup

Actual time node 16 = 25.99935 (SD = 3.92723) (19.26454, 34.59454)
Actual time node 17 = 76.77762 (SD = 5.57453) (66.97789, 88.95542)
Actual time node 18 = 86.47847 (SD = 5.61232) (76.96989, 98.81250)
Actual time node 19 = 79.89137 (SD = 4.24966) (72.71912, 89.35910)
Actual time node 20 = 15.67304 (SD = 1.90869) (12.56486, 19.93907)
Actual time node 21 = 70.82142 (SD = 4.12539) (63.52615, 79.85909)
Actual time node 22 = 85.30280 (SD = 4.36379) (78.19742, 95.37808)
Actual time node 23 = 57.96634 (SD = 1.70721) (53.68418, 59.94461)
Actual time node 24 = 54.03329 (SD = 2.42083) (48.72840, 58.37202)
Actual time node 25 = 65.31980 (SD = 2.01138) (61.16440, 69.17975)
Actual time node 26 = 65.44970 (SD = 2.10022) (63.07904, 70.80596)
Actual time node 27 = 73.46128 (SD = 2.59772) (69.37992, 79.42209)
Actual time node 28 = 82.33530 (SD = 3.52502) (76.56756, 90.51076)
Actual time node 29 = 91.22766 (SD = 4.71635) (83.48285, 101.98794)
Actual time node 30 = 103.75564 (SD = 6.55944) (92.79795, 118.52694)

3. Basal Divergences in Tubulidentata, Hyracoidea, Proboscidea, Sirenia, Pholidota, Scandentia, Dermoptera, and Macroscelidea

Our taxon sampling indexes basal or near basal divergences in 10 of 18 eutherian orders, but not for Tubulidentata, Hyracoidea, Proboscidea, Sirenia, Pholidota, Scandentia, Dermoptera, and Macroscelidea. Available evidence suggests that none of these orders has crown-group cladogenesis as far back as the K/T boundary. *Orycteropus afer* is the sole living representative of the order Tubulidentata and crown-group diversity is entirely intraspecific. Hyracoids first appear in the fossil record in the early Eocene and were formerly a diverse group (3). Present diversity includes only one extant family (Procaviidae) that first appears in the fossil record in the early Miocene (3), so it is highly unlikely that divergences within this family approach the K/T boundary. *Elephas* and *Loxodonta* are the only extant genera in Proboscidea, and paleontological data suggest that these two genera diverged approximately 5 mya (4). Sirenia includes the extant families Dugongidae (dugongs) and Trichechidae (manatees). Domning (5) estimated that these families diverged in the late Eocene to early Oligocene based on the fossil record. Application of the Thorne *et al.* (2) approach with a smaller data set (mtRNA genes; *VWF*; *IRBP*) suggests that these families diverged in the Oligocene (C. Douady, M. Springer, and M. Stanhope, unpublished data). Stem pholidotans are known from the late Paleocene (3). However, crown-group Pholidota includes only one family (Manidae). The oldest fossils from crown-group Manidae are of middle Eocene age. The oldest fossils from crown-group

Scandentia are from the middle Eocene. Dermoptera (3) includes fossils from the early Paleocene, but there is only a single extant genus (*Cynocephalus*); the oldest *Cynocephalus* fossils are from the Recent (3). Finally, Macroscelidea includes a single extant family (Macroscelididae) with four extant genera: *Macroscelides*, *Elephantulus*, and *Petrodromus* are included in the subfamily Macroscelidinae; *Rhynchocyon* is included in the subfamily Rhynchocyoninae. Taxonomic sampling from Murphy *et al.* (1) did not include *Rhynchocyon*, but application of the Thorne *et al.* (2) approach with a smaller data set (mtRNA genes; *VWF; IRBP*) suggests that *Rhynchocyon* diverged from other elephant shrews approximately in the Eocene (C. Douady, M. Springer, and M. Stanhope, unpublished data).

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