|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Segment (Protein)** | **Branch (length)** | **Transmission type** | **Likelihood Ratio Test** | **p-value** | **ω distribution over sites** | **Amino acid changes at branch** |
| **PB2** | Node\_548 – Seq\_312 (6.08195) | (Sw)-sw-sw | 45.7504 | 0.0000 | ω1 = 0.0837 (99%)  ω2 = 188 (1.0%) | H127Y, V295M, R299K, T364A, R664K, T666L, I667D, L668T, G669P, K670A, D671K |
| Node\_606 – Seq\_438 (6.76317) | (Sw)-sw-sw | 74.3236 | 0.0000 | ω1 = 0.398 (96%)  ω2 = 0.446 (2.2%)  ω3 = 893 (1.8%) | M64N, M66I, P68L, R70K, W78L, S79I, L154I, S453F, L648V, V649D, R650D, S653E, P654I, V655L, F656N, N659S, A661E, T662N, E677D |
| Node\_667 – Seq\_666 (6.11243) | (Sw)-sw-sw | 46.2322 | 0.0000 | ω1 = 0.167 (99%)  ω2 = 646 (1.1%) | A44S, Y205H, I398V, I463M, P515L, Q522H, G523R, E525V, K526F, T530S, N540T, G541P, N556I |
| Node\_108 – Seq\_017 (0.56291) | (Sw)-sw-sw | 20.8747 | 0.0172 | ω1 = 0.00 (100%)  ω2 = 100000 (0.27%) | E6R, W78G |
| Node\_10 – Seq\_804 (0.39905) | (Hu)-hu-hu | 19.4865 | 0.0345 | ω1 = 10000000000 (100%) | E391D, I554T |
| **PB1** | Node\_384 – Seq\_071 (3.67124) | (Hu)-hu-hu | 44.5574 | 0.0000 | ω1 = 0.611 (99%)  ω2 = 7570 (1.3%) | D27Y, Y30D, S31R, G33V, G35R, T42I, N44H, T57K, N77K, E78G, P79A, T243P, Y324H, T326P, T385P, R468G, T493A, D658E, T663P, W666G, E686V, Q687P, M688H, Y689P, Q690P, C693R |
| Node\_361 – Seq\_219 (1.4607) | (Sw)-sw-sw | 33.9238 | 0.0000 | ω1 = 0.00 (99%)  ω2 = 4980 (0.72%) | V12E, T85Q, Q127K, D565H, L590F |
| Node\_556 –Seq\_403 (1.04465) | (Sw)-sw-sw | 32.4759 | 0.0000 | ω1 = 0.793 (99%)  ω2 = 100000 (0.60%) | K168E, I475N, S578K, F700S, P701L |
| Node\_486 – Seq\_380 (0.62759) | (Hu)-hu-sw | 30.0587 | 0.0002 | ω1 = 0.00 (100%)  ω2 = 100000 (0.27%) | I746D, C747L |
| Node\_493 –Seq\_513 (0.3577) | (Sw)-sw-sw | 28.7716 | 0.0003 | ω1 = 0.00 (100%)  ω2 = 100000 (0.36%) | D581L, E582D, S585A |
| Node\_492 – node\_493 (Node\_1351) (0.30539) | (Sw)-sw-sw | 23.3773 | 0.0043 | ω1 = 0.00 (99%)  ω2 = 1390 (0.92%) | N455M, H456D, E457K, I459A, Q460K, Q584P |
| Node\_675 – Seq\_188 (1.28625) | (Hu)-hu-hu | 23.2869 | 0.0045 | ω1 = 0.00 (99%)  ω2 = 1030 (1.2%) | N597K, L598X, Y599X, N600X, I601X, R602X, N603X, L604X, H605X, I606X, P607X, E608X, V609X, C610X, L611X, K612X, W613X, E614X, L615X, D617E, D618V, D619V, Y620Q, R621Q, G622T, L624X |
| Node\_625 – node\_626 (Node\_1132) (0.54818) | (Sw)-sw-sw | 27.7361 | 0.0097 | ω1 = 0.881 (100%)  ω2 = 10000 (0.17%) | Q202H, S494A |
| Node\_28 – Seq\_323 (0.04549) | (Sw)-sw-sw | 21.1929 | 0.0128 | ω1 = 10000000000 (100%) | K736E |
| Node\_404 – Seq\_154 (1.05703) | (Hu)-hu-hu | 18.6383 | 0.0461 | ω1 = 0.00526 (99%)  ω2 = 780 (0.75%) | S702N, S703I, S704P, Y705W, R706N |
| **PB1 (PB1-F2)** | Node\_0 – node\_79 (Node\_162) (50.6796) | (?)-sw-sw | 20.1990 | 0.0152 | ω1 = 10000000000 (100%) | G14E, T18I, E22G, R29K, H33P, R37Q, V50G, P52H, I55T, Y57S, R65K, V70G, H86Q |
| **PA** | Node591 – node\_592 (Node1102) (0.49406) | (Sw)-hu-hu | 33.6726 | 0.0000 | ω1 = 10000000000 (100%) | G388S |
| Node\_452 – Seq\_0258 (6.67697) | (Sw)-sw-sw | 36.1129 | 0.0000 | ω1 = 0.235 (99%)  ω2 = 100000 (0.56%) | C95S, K158R, T210A, A215V, L219F, P220L, R230T, P238E, N239W, G240R, M595I |
| Node\_031 – node\_032 (Node100) (0.24643) | (Hu)-hu-hu | 30.4727 | 0.0001 | ω1 = 10000000000 (100%) | L268I |
| Node\_146 – Seq\_0221 (3.27501) | (Hu)-hu-hu | 31.1042 | 0.0001 | ω1 = 0.214 (99%)  ω2 = 66000 (0.77%) | D50X, F51X, H52X, F53X, I54X, N55V, Q57L, G58D, E59D, S60P, I61X, V62X, V63X, E64X, L65X, D66X, D67X, P68X, N69X, A70X, L71X, L72X, K73X, H74X, R75X, F76X, E77X, I78A |
| Node\_425 – Seq\_0517 (8.21139) | (Sw)-sw-sw | 31.7168 | 0.0001 | ω1 = 0.355 (99%)  ω2 = 1060 (0.61%) | H212R, E319D, V438I, M441I, K615N, L666H, L667G, I668N, V669L, Q670L, A671V |
| Node\_034 – Seq\_0283 (1.30148) | (Sw)-sw-sw | 29.1081 | 0.0003 | ω1 = 10000000000 (100%) | R508K, F710V |
| Node009 – Seq\_0177 (19.55068) | (Hu)-hu-hu | 28.3201 | 0.0004 | ω1 = 10000000000 (100%) | I486K |
| Node\_044 – Seq\_0308 (0.15041) | (Hu)-sw-sw | 27.5229 | 0.0006 | ω1 = 10000000000 (100%) | A369T |
| Node\_775 – 5eq\_0836 (7.48185) | (Sw)-sw-sw | 27.7965 | 0.0006 | ω1 = 0.0415 (98%)  ω2 = 9090 (1.7%) | E2Q, I85T, S186A, T208K, L212H, T263E, L275P, H277S, P355S, R356K, I459V, T534K, L549T, V602A |
| Node\_814 – Seq\_0131 (0.84707) | (Hu)-hu-hu | 25.8306 | 0.0015 | ω1 = 10000000000 (100%) | S224P |
| Node\_343 – Seq\_0935 (0.29208) | (Sw)-sw-sw | 24.9349 | 0.0023 | ω1 = 10000000000 (100%) | H535Y |
| Node\_884 – Seq\_0086 (0.289) | (Hu)-hu-hu | 24.4733 | 0.0030 | ω1 = 10000000000 (100%) | F105L |
| Node\_899 – Seq\_0229 (0.28892) | (Hu)-hu-hu | 24.3569 | 0.0031 | ω1 = 10000000000 (100%) | E114K |
| Node\_893 – node\_894 (Node533) (0.17194) | (Hu)-hu-hu | 24.1119 | 0.0035 | ω1 = 10000000000 (100%) | M581L |
| Node\_881 – Seq\_0174 (0.14767) | (Hu)-hu-hu | 24.0455 | 0.0037 | ω1 = 10000000000 (100%) | C489S |
| Node\_863 – Seq\_0966 (0.1267) | (Sw)-sw-sw | 23.9587 | 0.0038 | ω1 = 10000000000 (100%) | E258K |
| Node\_288 – Seq\_0361 (2.18904) | (Sw)-sw-sw | 22.9342 | 0.0064 | ω1 = 0.00 (98%)  ω2 = 100000 (1.8%) | A17G, W88S, A183P, V253L, E300Q, D347H, L417V, R559T, M607I, E677Q |
| Node\_560 – Seq\_0616 (0.28954) | (Sw)-sw-sw | 22.4550 | 0.0081 | ω1 = 10000000000 (100%) | K328R |
| Node\_564 – node\_565 (Node1020) (0.83882) | (Sw)-hu-hu | 22.2314 | 0.0091 | ω1 = 10000000000 (100%) | V100I |
| Node\_898 – Seq\_0077 (0.28893) | (Hu)-hu-hu | 21.9917 | 0.0102 | ω1 = 10000000000 (100%) | V379I |
| Node\_548 – Seq\_0456 (0.14956) | (Hu)-sw-sw | 21.9648 | 0.0104 | ω1 = 10000000000 (100%) | G329C |
| Node\_334 – Seq\_0521 (2.31991) | (Sw)-sw-sw | 20.9866 | 0.0169 | ω1 = 10000000000 (100%) | E351D |
| Node\_341 – Seq\_0179 (0.38831) | (Sw)-sw-hu | 20.8081 | 0.0185 | ω1 = 10000000000 (100%) | D682N |
| Node\_447 – Seq\_0186 (0.10502) | (Hu)-hu-hu | 20.6961 | 0.0195 | ω1 = 10000000000 (100%) | A70T |
| **PA**  **(PA-X)** | Node\_146 – Seq\_0221 (3.27501) | (Hu)-hu-hu | 27.5073 | 0.0006 | ω1 = 0.427 (98%)  ω2 = 63700 (2.3%) | D50X, F51X, H52X, F53X, I54X, N55V, Q57L, G58D, E59D, S60P, I61X, V62X, V63X, E64X, L65X, D66X, D67X, P68X, N69X, A70X, L71X, L72X, K73X, H74X, R75X, F76X, E77X, I78A |
| Node\_775 – Seq\_0836 (7.48185) | (Sw)-sw-sw | 25.6317 | 0.0015 | ω1 = 0.00 (97%)  ω2 = 143 (2.9%) | E2Q, I85T, S186A, L205S, Q208R, S212I |
| Node\_712 – Seq\_0492 (10.17196) | (Hu)-hu-sw | 25.1383 | 0.0019 | ω1 = 0.505 (92%)  ω2 = 79.3 (7.6%) | H144C, F148L, F150S, D160E, Y161L, E165A, A169Y, I171F, T173M, F176C, R179M, Q180H, E181Q, R185M, L187R, D189N, K198M, R199K, K202E, K203E, L205S, L207I, C211S |
| **HA (H1)** | Node\_688 – Seq\_0362 (1.89771) | (Sw)-sw-sw | 61.4624 | 0.0000 | ω1 = 0.505 (97%)  ω2 = 227 (3.0%) | V33D, T35K, V36I, E38P, T42K, S46R, V47E, E51L, H54Q, C59S, K62R, I64R, A65S, L67Q, L69V, G70A, N71S, N73I, A75V, L79S, I88F, V97A, S325T, T332P, N336H, H369Y |
| Node\_595 – Seq\_0499 (5.64687) | (Sw)-sw-sw | 50.4977 | 0.0000 | ω1 = 0.541 (98%)  ω2 = 310 (1.7%) | H45P, H54Q, N55F, K57M, L58R, K62S, G63V, A65C, Q68R, G70K, N71T, S73T, V74N, W77R, E83K, D114N, V169A, N171D, L173S, G224E, T283I, N393T, V519L |
| Node\_933 – Seq\_0500 (0.0929) | (Sw)-sw-sw | 198.1019 | 0.0000 | ω1 = 0.354 (38%)  ω2 = 1.00 (56%)  ω3 = 100000 (5.9%) | V5I, I133R, F134T, P135R, K136S, A137K, W140X, P141X, N142X, H143X, D144X, T145X, N146Q, G147N, V148M, T149I, A150T, A151X, C152X, P153C, Y154F, A155T, G156R, A157S, S159R, R162K, N163Y, L164P, I165A, W166L, L167N, K169D, E171Q, N172M, Y174N, P175L, K176T, L177N, S178C, K179T, Y181G, I182R, N183V, N184H, K185H, L190P, I192L |
| Node\_1007 – Seq\_0530 (2.54773) | (Sw)-sw-sw | 58.9458 | 0.0000 | ω1 = 0.608 (0.080%)  ω2 = 0.650 (99%)  ω3 = 59500 (1.3%) | L5I, I532K, T535P, L540S, F551L, W552S, C554R, G557V, L559T, Q560A, C561R, R562K |
| Node\_707 – Seq\_0597 (1.46323) | (Hu)-hu-sw | 87.9093 | 0.0000 | ω1 = 0.00000000658 (97%)  ω2 = 10400 (3.4%) | L69S, N396H, I399L, N403D, N424Y, L432Q, L442F, L451Y, V458E, K459Y, R466S, K470L, I476N, G477R, K496S, D517L |
| Node\_726 – Seq\_1062 (6.44001) | (Sw)-sw-sw | 45.5379 | 0.0000 | ω1 = 0.302 (95%)  ω2 = 102 (5.4%) | K136E, H196P, H209D, E211D, N212H, V218L, H221P, R225P, K235W, Q239H, N244I, E251G, T255I, E272Q, S274T, S279P, G280R, S284A, N285H, M288L, N292C, Q299P, I302M, G304V, S305T, Q309H, N310T, H312P, V314L, T315S, P320A, K321T, Y322F, S325F, K327E, M330R, G333M, K466R, I476L, K486G, S497G |
| Node\_1027 – Seq\_1108 (1.97404) | (Sw)-sw-sw | 40.3591 | 0.0000 | ω1 = 1.00 (99%)  ω2 = 629 (1.5%) | N142S, H154Y, S201T, N210Y, R221T, R224S, K235N, V250C, P252T, G253V, D254N, I256Q, T261S, A272T, V288I, I316M, G317E |
| Node\_604 – Seq\_1259 (5.17704) | (Sw)-sw-sw | 40.1559 | 0.0000 | ω1 = 0.259 (98%)  ω2 = 115 (2.3%) | S53R, S127L, T144N, G148A, A150S, E182K, D238G, F346R, G347Y, A348I, I349F, G359D, M360E, G363V, W364R, N393T, K470Q, M524V |
| Node\_901 – Seq\_0203 (4.94775) | (Sw)-sw-sw | 28.9494 | 0.0004 | ω1 = 0.330 (99%)  ω2 = 9090 (1.3%) | A3T, G23D, N27H, V33D, S86L, T99P, K227I, P234W, N244S, I250V, T255K, L264V, P267S, G276N, P287S, T294S, T332R, I337V, Q381L, E400D, Q415H, V519I, V541I |
| Node\_232 – Seq\_0950 (9.35363) | (Hu)-?-sw | 29.2350 | 0.0004 | ω1 = 0.0 (92%)  ω2 = 48.2 (7.6%) | D18E, N27Y, V33D, E51Q, C59S, L87V, T89R, W93R, N104D, Y108F, D114H, V125L, P135A, N142I, W166C, P175R, V191E, S202T, P228R, Q239E, T248S, D254E, S279C, S284P, D362H, A387G, V398L, T407S, L442H, E448Q, L456V, C487S, C491W, G525R, S558T |
| Node\_652 – Seq\_0187 (1.99507) | (Hu)-hu-hu | 26.7378 | 0.0013 | ω1 = 0.169 (98%)  ω2 = 200 (1.7%) | I201V, D289G, A326S, Y500K, D501K, Y505N, E508K, S509T, L511K, E514D, I516S, G518A, V519G |
| Node\_27 – Seq\_0309 (6.81738) | (Sw)-sw-sw | 22.6044 | 0.0102 | ω1 = 0.184 (98%)  ω2 = 38.5 (2.0%) | L86F, A90T, A113T, Q204H, T206P, Y208S, Y212L, P234S, T257I, M282I, I314M, V337I, G390K, I391G, S392E, N393F, I443V |
| Node\_1214 – Seq\_0141 (3.55733) | (Hu)-hu-hu | 20.9847 | 0.0229 | ω1 = 0.00 (93%)  ω2 = 72.8 (6.6%) | T14P, L167V, V168G, L192V, A202G, A211G, E251D, D254A, A270P, A301G, S305I, C319W, Y322G, K327R, L328W, L330V, A331G, A348G, A350G, M360V, Y365D, A387G, N438S, T450S, Y502S, Y527S, T535P, A537P, S555C |
| Node\_238 – Seq\_0097 (0.17597) | (Hu)-hu-hu | 20.7112 | 0.0263 | ω1 = 10000000000 (100%) | F226L |
| Node\_1214 – Seq\_0140 (3.56555) | (Hu)-hu-hu | 19.8620 | 0.0403 | ω1 = 1.00 (97%)  ω2 = 147 (3.1%) | N27T, D31A, D34A, T35P, T42P, D52A, K57T, C59S, L67F, A90P, Y95S, C152M, Y174S, T180P, Y181S, V189A, D203A, A211P, T219P, S220P, T326P, T332P, A350P, H368P, E372D, A378P, A379P, T384P, A387P, T407P, A408P, F413S, N471T, A473P, Y484S, C491S |
| **HA (H3)** | Node\_190 – node\_191 (Node\_684) (1.9383) | (Hu)-hu-hu | 37.0272 | 0.0000 | ω1 = 1.00 (98%) ω2 = 100000 (2.0%) | N440S, A441F, L443F, D454G, L455Q, D457A, E459A, M460I, N461I, K462X, L463X, F464X, E465X, K466X, T467X, K468X, K469X, Q470X, L471X, R472X, E473X, N474X, A475X, E476X, D477X, M478X, G479X, N480X, G481X, C482X, F483X, K484X, I485X, Y486X, H487X, K488X, C489X, D490X, N491X, A492X, C493X, I494X, G495X, S496X, I497X, R498X, N499X, G500X, T501X, Y502X, D503X, H504X, D505X, V506X, Y507X, R508X, D509X, E510X, A511X, L512X, N513X, N514X, R515X, F516X, Q517X, I518X, K519X, G520X, V521X, E522X, L523X, K524X, S525X, G526X, Y527X, K528X, D529X, W530X, I531X, L532X, W533X, I534X, S535X, F536X, A537X, I538X, S539X, C540X, F541X, L542X, L543X, C544X, V545X, A546X, L547X, L548X, G549X, F550X, I551X, M552X, W553X, A554X, C555X, Q556X, K557X, G558X, N559X, I560X, R561X, C562X, N563X, I564X, C565X, I566X |
| Node\_191 – Seq\_070 (4.05328) | (Hu)-hu-hu | 44.0971 | 0.0000 | ω1 = 0.385 (97%) ω2 = 458 (2.7%) | S61N, N137Y, T144A, R158K, N160T, S440C, F443S, A446S, N449D, I453A, A459V, I461F, X462C, X463F, X464L, X465S, X466D, X467L, X468R, X469S, X470Q, X471L, X472A, X473V, X474G, X475Y, X476M, X477D, X478M, X479G, X480N, X481G, X482C, X483F, X484K, X485I, X486Y, X487H, X488K, X489C, X490D, X491N, X492A, X493C, X494I, X495G, X496S, X497I, X498R, X499N, X500G, X501T, X502Y, X503D, X504H, X505D, X506V, X507Y, X508R, X509D, X510E, X511A, X512L, X513N, X514N, X515R, X516F, X517Q, X518I, X519K, X520G, X521V, X522E, X523L, X524K, X525S, X526G, X527Y, X528K, X529D, X530W, X531I, X532L, X533W, X534I, X535S, X536F, X537A, X538I, X539S, X540C, X541F, X542L, X543L, X544C, X545V, X546A, X547L, X548L, X549G, X550F, X551I, X552M, X553W, X554A, X555C, X556Q, X557K, X558G, X559N, X560I, X561R, X562C, X563N, X564I, X565C, X566 |
| Node\_191 – Seq\_071 (3.91082) | (Hu)-hu-hu | 31.5950 | 0.0000 | ω1 = 1.00 (98%) ω2 = 1740 (2.2%) | N161S, A214S, V239I, N328S, S438G, Y439H, S440R, F441C, L444P, V445D, A446E, E448K, Q450Y, T452S, I453W, G454S, Q455E, S458L, I460V, I461V, X462L, X463H, X464S, X465G, X466H, X467T, X468R, X469S, X470Q, X471L, X472R, X473E, X474N, X475A, X476E, X477D, X478M, X479G, X480N, X481G, X482C, X483F, X484K, X485I, X486Y, X487H, X488K, X489C, X490D, X491N, X492A, X493C, X494I, X495G, X496S, X497I, X498R, X499N, X500G, X501T, X502Y, X503D, X504H, X505D, X506V, X507Y, X508R, X509D, X510E, X511A, X512L, X513N, X514N, X515R, X516F, X517Q, X518I, X519K, X520G, X521V, X522E, X523L, X524K, X525S, X526G, X527Y, X528K, X529D, X530W, X531I, X532L, X533W, X534I, X535S, X536F, X537A, X538I, X539S, X540C, X541F, X542L, X543L, X544C, X545V, X546A, X547L, X548L, X549G, X550F, X551I, X552M, X553W, X554A, X555C, X556Q, X557K, X558G, X559N, X560I, X561R, X562C, X563N, X564I, X565C, X566I |
| Node\_110 – Seq\_218 (1.51154) | (Sw)-sw-sw | 33.7977 | 0.0000 | ω1 = 0.185 (99%) ω2 = 479 (1.3%) | V4I, F7L, T251D, I252T, T264Q, Y273S, P300S, I304F, K308Y |
| Node\_330 – Seq\_413 (1.95566) | (Sw)-sw-sw | 60.6726 | 0.0000 | ω1 = 0.00 (96%) ω2 = 106 (4.4%) | G216W, I494L, T501I, D509V, N514H, F516L, Q517L, G520H, V521F, L523M, L525V, W530S, W533G, I534N, A537R, S539A, F541C, L542Q, A545H, L547T, A554P |
| Node\_152 – node\_153 (Node\_562) (11.63431) | (Sw)-sw-sw | 29.3909 | 0.0001 | ω1 = 0.163 (97%) ω2 = 267 (2.7%) | F15L, A16R, V50I, A85S, R108K, V128I, D149N, T171Y, F175I, A179M, V183T, D189A, V208I, R217K, D241G, V258I, L260I, T264N, R277H, I284M, R285K, G291D, K292T, D320A, K342R, I494M, G495E |
| Node\_363 – Seq\_192 (1.65352) | (Sw)-sw-sw | 27.2187 | 0.0003 | ω1 = 0.315 (98%) ω2 = 98.0 (2.4%) | V146I, A154T, N172K, Q372K, Y439D, S461N, L463K, F464S, R466K, T467K, R468E, Q470N, E476A, D477V, M478T, C482R, Y486H, D490V, G495Q |
| Node\_217 – Seq\_350 (15.93445) | (Sw)-sw-sw | 25.9471 | 0.0006 | ω1 = 0.0962 (95%) ω2 = 22.7 (5.3%) | N25S, M26T, I41L, E66R, N69D, Q73R, E78K, Q91H, K99E, V104I, H110Y, A122S, N137T, S140D, T147A, A151G, S153Y, A154S, R158G, S160V, T171H, H172K, N174E, F175Y, E181N, E188D, Q189K, T264P, N312K, T329A, L330V, I339R, D364H, Y367D, R370T, N373P, E375G, R377T |
| Node\_263 – Seq\_157 (1.64658) | (Sw)-sw-sw | 24.0637 | 0.0016 | ω1 = 0.838 (100%) ω2 = 100000 (0.42%) | A179T, R236K, P289S, I560S, C565H, I566G |
| Node\_328 – Seq\_249 (1.69911) | (Sw)-sw-sw | 23.1471 | 0.0025 | ω1 = 0.638 (99%) ω2 = 1700 (0.57%) | T3A, I304L, L471R, R515V, K557T |
| **NP** | Node\_094 – Seq\_174 (5.24698) | (Sw)-?-sw | 54.4039 | 0.0000 | ω1 = 0.681 (95%) ω2 = 291 (4.7%) | Q42L, G54R, E107K, D114N, Q149L, R150I, R152I, A153P, V155L, G158E, R162T, Q168H, R175T, A178S, A182P, V183L, K184R, R195Q, I197M, N202Y, K227I, G228W, F230L, A233P, A234P, Q235L, A237L, Q241A, V242L, |
| Node\_6 – Seq\_385 (28.57858) | (Sw)-sw-sw | 39.5814 | 0.0000 | ω1 = 0.439 (97%) ω2 = 286 (3.5%) | A2V, S3L, W207R, P277L, A278D, V280G, A284V, H289Y, D290N, N309S, R317S, P322S, A323V, S326N, Q327H, L328I, V329I, P334H, F335S, A336S, D340G, V343G, A366E, T378N, S392N, Q409H, P410R, T411S, T423K, T424P, M426R, T442R, M447K, M448K, S450R, R452I, S457A, F458E, D468E, T472Q, V476M, P477Q, D480Q, S486Y, F489Y |
| Node\_503 – Seq\_549 (8.70997) | (Sw)-sw-sw | 52.5326 | 0.0000 | ω1 = 0.0953 (97%) ω2 = 98.7 (3.2%) | G34A, I109T, L133V, T171S, L172V, P173S, A178R, M196K, K198E, R199S, D203S, R216W, A218S, C223R, I225R, F230L, M239E, V242I, R246P, N247P, V313F |
| Node\_639 – Seq\_726 (3.69539) | (Hu)-hu-hu | 61.1303 | 0.0000 | ω1 = 0.424 (98%) ω2 = 435 (2.1%) | R26Q, F39L, R55V, L56I, I61T, T62S, R65M, M66P, V67N, S69F, F71S, D72V, E81A, P89L, K91R, I96T, V119E, W120S, G126P, P248Q |
| Node\_433 – Seq\_145 (2.03844) | (Hu)-?\_sw | 27.3928 | 0.0005 | ω1 = 0.200 (99%) ω2 = 100000 (0.79%) | Q149Y, E454K, D455N, D497R, S498R, X499L |
| **NA (N1)** | Node\_321 – seq\_119 (2.91135) | (Hu)-hu-hu | 42.9902 | 0.0000 | ω1 = 0.377 (91%)  ω2 = 53.6 (8.9%) | R77K, V80G, K84N, A86G, N88I, P93L, A98F, S101K, D103N, S105R, I108F, K111R, E119N, E128K, A138V, N146E, Y170F, T188I, D330E, S340F, N344K, Y353F, G354N, T362S, F371Y, Q377R, A381G, D384G, N392K, I393K, E398K, F406C, L415P, D416G, C417G, I418V, N434K, T438I, S442G, S444R, C446S |
| Node\_331 – seq\_126 (2.8777) | (Hu)-hu-hu | 65.3259 | 0.0000 | ω1 = 0.328 (94%)  ω2 = 166 (6.1%) | K6R, I8L, I10L, G11C, S12W, C14W, Y402D, E411Q, V424I, I427K, R428K, R430Q, E432N, E433R, N434K, T435I, S439C, G440A, F445I, C446F, G447V, D449N, T452I, V453I, G454F, W455S, S456T, W457C, D459R, G460L, A461W, E462A |
| Node\_335 – seq\_127 (2.02968) | (Hu)-hu-hu | 49.6517 | 0.0000 | ω1 = 0.231 (97%)  ω2 = 359 (2.5%) | E228K, S366I, R368A, F371L, M373S, I374K, W375M, D376N, G379R, W380K, T381I, G382M, D384I, N385H, K386N, F387L |
| Node\_321 – seq\_153 (2.72916) | (Hu)-hu-hu | 36.2948 | 0.0000 | ω1 = 0.543 (94%)  ω2 = 87.6 (6.0%) | A81V, I264V, G333V, C335G, V338A, A343V, G348L, K352N, G354V, N355D, V357G, W358R, I359M, K363S, K369R, I374S, D376P, Q377K, N378K, W380S, T383A, N385K, F387L, S388T, I389K, Q391E, V394G, G395R, K397E, A400G, Y402N, V407D, T413L, L415V, P420S, L426Q, W437C, S441G, I443R, V448D, D449N, D451A, G454C, W455C, G460A, L463S, F465L |
| Node\_168 – Seq\_475 (2.03597) | (Hu)-hu-sw | 48.6841 | 0.0000 | ω1 = 0.111 (99%)  ω2 = 522 (1.2%) | S21N, R64Q, T81A, S385W, S386I, F387R, S388Q, M389Q, D398G |
| Node\_249 – Seq\_677 (6.09972) | (Sw)-sw-sw | 48.7125 | 0.0000 | ω1 = 0.427 (92%)  ω2 = 40.9 (8.1%) | I29T, I34T, Q64P, Y66P, I69L, S70G, A75P, Q78L, S79M, V81I, P82S, V83M, L85I, L91R, C92S, A98D, N104R, V106I, G109S, K111I, G112W, I122K, F133L, L134S, T135H, G147T, T148P, D151I, R152W, S153T, R156Q, C161N, P162H, G164E, E165A, Y170H, F174L, A181P, W190C, T215I, I216R, K217T, R220K, L224F, E228K, E230K, C231I, S237T, C238Y, F239I, A251V, Y253F, I255V, K265Q, P272R, E278G, C281F, S286N |
| Node\_155 – Seq\_350 (3.23388) | (Sw)-sw-sw | 27.8493 | 0.0004 | ω1 = 1.00 (97%)  ω2 = 99.6 (3.3%) | T9N, M15K, V17I, S21G, L24F, I26M, G27E, N28K, I29L, V30A, W33X, S35Y, H36P, S37F, Q39F, T40P, G41S, H45Y, Q51P, V53G, V57G, N58K, R64P, I69L, N71H, A75G, T76N, D79G, T81A, L85P, S90L, V99G, S101R, N104H, I117L, C129W, R130T, T131N, H144P, M159V, S176L, M389L, D462E |
| Node\_179 – Seq\_025 (10.19964) | (Sw)-sw-hu | 27.6185 | 0.0005 | ω1 = 0.0803 (99%)  ω2 = 720 (0.74%) | A157R, V177I, P250Q, R327P |
| Node\_441 – Seq\_622 (3.09441) | (Sw)-sw-sw | 25.1369 | 0.0016 | ω1 = 0.120 (99%)  ω2 = 100000 (0.95%) | V264I, Y276P, E278S, C279Y, Y282F, E287V, I289T, R430Q |
| Node\_117 – Seq\_251 (1.38611) | (Sw)-sw-sw | 24.3434 | 0.0024 | ω1 = 0.385 (99%)  ω2 = 1120 (0.78%) | I16V, I38V, K43R, I117M, E259K, N329I, K332R, I467Q, D468E, K469Q, X470K |
| **NA (N2)** | Node\_531 – seq\_092 (3.12813) | (Hu)-hu-hu | 120.9998 | 0.0000 | ω1 = 0.00 (94%)  ω2 = 422 (6.1%) | N2H, I73X, T138K, K328I, N329I, D330G, S331I, S333T, S334K, H336R, C337S, L338K, P340R, N341I, N342Q, E343I, G346Y, H347Q, K350N, W352F, A353L, F354S, D355P, G357A, M362S, N367Y, T369K |
| Node\_539 – seq\_095 (4.29804) | (Hu)-hu-hu | 79.1552 | 0.0000 | ω1 = 0.551 (97%)  ω2 = 100000 (3.0%) | V396I, I397K, V398R, D399Y, R400N, G401I, D402H, R403A, S404N, G405C, Y406H, S407L, G408D, D463A, L464M, N465S, M467F, I469X |
| Node\_600 – seq\_244 (3.58434) | (Sw)-sw-sw | 35.5473 | 0.0000 | ω1 = 0.535 (97%)  ω2 = 138 (3.3%) | P3Q, Q5K, K6R, S12C, I77L, L81I, Y84N, T153S, A188S, S204R, Y207F, D213N, W218G, I222N, L223F, C230S, C232F, I233T, N234K, C237A, T238P, A246G, D251V, E259K, V275I, C278G, C280V, P285L, C289G, C291F, D330A, S331R, V360M |
| Node\_440 – seq\_433 (1.15397) | (Sw)-sw-sw | 31.1080 | 0.0001 | ω1 = 0.901 (99%)  ω2 = 3280 (1.2%) | L338V, N339Y, P340S, E343S, K350N, V360S, W361X, I366L, G382X |
| Node\_184 – node\_185 (node292)  (1.77149) | (Sw)-sw-sw | 30.0848 | 0.0002 | ω1 = 0.303 (98%)  ω2 = 100000 (1.5%) | I47N, T69S, T71I, H184Y, N368E, E369D, F390L, N401R, D402N, E432S |
| Node\_555 – node\_557 (node\_637) (0.98069) | (Hu)-hu-hu | 30.1084 | 0.0002 | ω1 = 0.273 (99%)  ω2 = 1050 (0.85%) | G93Q, K220Q, D221N, I307M, K308E, K344R, G345X, G346X, T369D |
| Node\_520 – seq\_065 (0.77052) | (Hu)-hu-hu | 24.2632 | 0.0030 | ω1 = 10000000000 (100%) | R60K, T148I, K369R |
| Node\_437 – seq\_434 (1.84403) | (Sw)-sw-sw | 24.2529 | 0.0030 | ω1 = 1.00 (99%)  ω2 = 986 (1.5%) | D304E, E346K, H347Q, V349M, K350I, G351C, W352E, A353S, D356G, D359A, V360L, W361S, M362L, T365A, I366L, N367T, S416I |
| Node\_4 – seq\_024 (0.18805) | (Hu)-hu-hu | 21.7724 | 0.0105 | ω1 = 10000000000 (100%) | P468H |
| Node\_5 – seq\_003 (0.20471) | (Hu)-hu-hu | 21.0719 | 0.0149 | ω1 = 10000000000 (100%) | E74D, I77K |
| Node\_219 – node\_220 (node\_029) (3.53197) | (Sw)-sw-sw | 19.1275 | 0.0395 | ω1 = 0.00 (95%)  ω2 = 29.7 (4.7%) | I17F, F37S, E41W, C42Y, S44P, A46T, N48S, I50M, M51X, P52X, I58V, T69A, K75R, E83N, K378R |
| **MP (M1)** | Node\_185 – Seq\_234 (10.0392) | (Sw)-sw-sw | 21.0835 | 0.0077 | ω1 = 0.00 (99%)  ω2 = 85.3 (0.86%) | T184H, A202R |
| **MP (M2)** | - | - | - | - | - | - |
| **NS (NS1)** | Node\_396 – Seq\_045 (1.82011) | (Sw)-hu-hu | 31.7863 | 0.0001 | ω1 = 0.259 (99%)  ω2 = 100000 (1.5%) | Q40L, L43P, R206H, P212S |
| Node\_280 – Seq\_446 (2.25894) | (Sw)-sw-sw | 19.2982 | 0.0305 | ω1 = 0.204 (99%)  ω2 = 5170 (1.0%) | S7I, T80N |
| **NS (NEP)** | Node\_280 – Seq\_446 (2.25894) | (Sw)-sw-sw | 20.8302 | 0.0124 | ω1 = 0.00 (99%)  ω2 = 100000 (0.86%) | S7I |
| Node\_049 – Seq\_238 (2.62767) | (Hu)-?-sw | 19.4866 | 0.0244 | ω1 = 10000000000 (100%) | D27G, G53R |