```
                                                   1  *        *       *                        *     *   55
                   hum pol gamma aa seq      (1) -MSRLLWRKVAGATVGPGPVPAPGRWVSSSVPASDPSDGQRRRQQQQQQQQQQQQ   R3P-PEO
           Pan troglodytes (chimpanzee)      (1) -MSRLLWRKVAGATVGPGPVPAPGRWVSSSVPASDPSDGQRRRQQQQQQPQQ--   G11D-Alpers
Macaca mulatta (rhesus monkey) pol gamma     (1) -MSRLLWRKLAGATVVPGPVPAPGRWVSSSVPASDPSDGRRRQQQQLQQPQVP--   18P→S SNP
                          mus pol gamma      (1) -MSRLLWKKVAGAKVASGPVPATARWVSSSVLDPVPSDG--RPPSQMP-------   Q43R-idiopathic
                          rat pol gamma      (1) -MSRLLWKKVAGAKVASGPVPATGRWVSSSVLDPVPSDG--QPQSQMP-------     sporadic Parkinsons
                      Xenopus pol gamma      (1) ----MNRLLQKGTSLVPSWRTRGCRYRRCSYAPQLHAKPLEMETSQRR-------   49Q→E SNP
                   Drosophila pol gamma      (1) -MQFHLIRKYASKVSREHYASSSVKIFRRVKPPQKVNKPKKPENVENG-------   △Glu 43-55 -male
                 scyeast pol gamma mip1      (1) ----MTKLMVRSECMLRMVRRRPLRVQFCARWFSTKKN-----------------     infertility
                    S. pombe pol gamma      (1) ----MFYKACPSTLTCSKWIHSIIKTKKFLYCRHYSSKS----------------
                  Neurospora pol gamma      (1) MLTPVRCRTVPNATVATAARVLRRANLFSRYPRQLGHLRWDSTIAQVLERKG---
                              Consensus      (1)  MSRLLWRKVAGA V  GPVPA  RWVSSSVP   PSDG      Q

                                                56         *  *                  *                        110
                   hum pol gamma aa seq     (55) QPQQPQVLSSEGGQLRHNPLDIQMLSRGLHEQIFGQGGEMPGE----AAVRRSVE   64S→L SNP
           Pan troglodytes (chimpanzee)     (53) -PQQPQVLSSEGGQPRHNPLDIQMLSRGLHEQIFGQGGEMPGE----AAVRRSVE   Q68X - Alpers
Macaca mulatta (rhesus monkey) pol gamma    (53) --------SSEGGQLRHNPLHIQMLSKGLHEQIFGQGGEIPGE----AAVRRSVE   L83P - Alpers
                          mus pol gamma     (46) --------SSENGQLRLNPLLIQMLSRGLHEQIFGCGGEMPDE----AAVQRSVE
                          rat pol gamma     (46) --------SSENGQLRLNPLHIQMLSRGLHEQIFGCGGDVPDE----AAVQRSIE
                      Xenopus pol gamma     (45) ----------------MNPLNIQMLSKGFHEQIFRGKQVQHAE----EDVQRSIT
                   Drosophila pol gamma     (48) -----------PTEYAENLVKVQMISRNLHAQLFPQAPRSISEQQ-VASAKVYKD
                 scyeast pol gamma mip1     (35) ----------TAEAPRINPVGIQYLGESLQRQVFGSCGGKDEVEQSDKLMELSKK
                    S. pombe pol gamma     (36) --------FIDNAPLRINPVGVQYLSPALQNQVFPQQNTQISQ----LHLDLAKF
                  Neurospora pol gamma     (53) --------LGVPSTARHNEIGVQQLSEHLYKQLFPRGNTDPPAP---ELIELAKD
                              Consensus     (56)         SSE GQLR NPL IQMLSRGLHEQIFGQGG  P E    AAV RS E

                                                111 *                           *                   165
                   hum pol gamma aa seq    (106) HLQKHGLWGQPAVPLPDVELRLPPLYGDNLDQHFRLLAQKQSLPYLEAANLLLQA   H110Y-hearing loss, resp.
           Pan troglodytes (chimpanzee)    (103) HLQKHGLWGQPAVPLPDVELRLPPLYGDNLDQHFRLLAQKQSLPYLEAANLLLQA     failure,& failure to
Macaca mulatta (rhesus monkey) pol gamma    (96) HLQKHGLWGQPAAPLPDVELRLPPLYGDNLDQHFRLLAQKQSLPYLEAANSLLQA     thrive
                          mus pol gamma     (89) HLQKHGLWGQPATPLPDVELRLPRLFGGNLDQHFRLLAQKQSLPYLEAAASLLEA   A143V-Alpers, respir.
                          rat pol gamma     (89) HLRKHGLWGQPTTPLPDVQLRLPRLFGGNLDQHFRLLAQKQSLPYLEAAASLSEA    enzyme chain def.
                      Xenopus pol gamma     (80) HLKNHELWGQETSTVPDVELQLPKMYGNNIEEHFQILAQKQSLPYLEAANDLLNC
                   Drosophila pol gamma     (91) ELRRHGVDIESSAPVSDVQLKLPPLRGANIEEHFHNIAKEQVQPYEELLLPLVQC
                 scyeast pol gamma mip1     (80) SLKDHGLWGKKTLITDPISFPLPPLQGRSLDEHFQKIGRFNSEPYKSFCEDKFTE
                    S. pombe pol gamma     (79) HLAKHQLLNKETIKLPSFNFRLPPLQGKTISEHFYNIGLEFAEPHLSKAIKFSKI
                  Neurospora pol gamma     (97) HLARHDLLGKTTDKTPPIAFQLPALVGDTLDEHFHKLGVDAAEPFLTHAKQFADA
                              Consensus    (111) HL KHGLWGQPT PLPDVELRLPPL G NLD HFRLLAQKQSLPYLEAA  LL A
```

```
                                                 166                                                 220
                                                                                  *    EXOI
                    hum pol gamma aa seq   (161) QLPPK-PPAWAWAEGWTRYGPEG-EAVPVAIPEERALVFDVEVCLAEGTCPTLAV     193R→Q SNP
             Pan troglodytes (chimpanzee)  (158) QLPPK-PPAWAWAEGWTRYGPEG-EAVPVAIPEERALVFDVEVCLAEGTCPTLAV
Macaca mulatta (rhesus monkey) pol gamma   (151) QLPPQ-PTGWAWAEGWTRYGPEG-EAVPVAIPEERALVFDVEVCLAEGICPTLAV
                           mus pol gamma   (144) QLPPE-PKSWAWAEGWTRYGPEG-EAEPVAIPEERALVFDVEVCLAEGTCPTLAV
                           rat pol gamma   (144) QLPPQ-PRKWVWAEGWTRYGPEG-EAEPVAIPEERALVFDVEVCLAEGTCPTLAV
                      Xenopus pol gamma    (135) QLPAM-PQTWAWQSGWTRYTATG-EKELVDFPDEKAMVFDVEVCVTEGCCPTLAV
                  Drosophila pol gamma     (146) EQLPKRPKRWAFHTGWTAYDPEDGTATPVDHPLEKGLVFDVEVCVSEGQAPVLAT
               scyeast pol gamma mip1      (135) MVARP--AEWLRKPGWVKYVPGM-APVEVAYPDEELVVFDVETLYNVSDYPTLAT
                   S. pombe pol gamma      (134) DTPVQ-PKTWKRQPGWTKYAKDG-SISCVPYPDSDCMVFDVEVLYKVSPFAVVAT
                  Neurospora pol gamma     (152) HLPPK-PTSWVRRSGWTKYNRDG-TTENDVLPQGNMMCFDVEVMYKDNPYAVMAC
                             Consensus     (166) QLPP  P  WAWAEGWTRYGPEG EA PVAIPEERALVFDVEVCLAEG CPTLAV

                                                 221       *  *    *  *     *  *      *             275
                    hum pol gamma aa seq   (214) AISPSAWYSWCSQRLVEERYSWTSQLSPADLIPLEVPTGA--SSPTQRDWQEQLV     C224Y-Alpers, …
             Pan troglodytes (chimpanzee)  (211) AISPSAWYSWCSQRLVEERYSWTSQLSPADLIPLEVPASA--SSPTQRDWQEQLV     R227W-PEO, Alpers, …
Macaca mulatta (rhesus monkey) pol gamma   (204) AISPSAWYSWCSRRLVEERYSWTSQLSPADLIPLEVPAG---ASPTQRDWQEQLV     R227P-multisys. Disor.
                           mus pol gamma   (197) AISPSAWYSWCSRRLVEERYSWTSQLSPADLIPLGGSTSA--SSSIKQDGQEQLV     R232H-Alpers & CMT
                           rat pol gamma   (197) AISPSAWYSWCSRRLVEERYSWTSQLSPADLIPLGVSASA--SSSIQQDWQEQLV     R232G-Alpers & hepatocere.
                      Xenopus pol gamma    (188) AASPQNWYSWCSRRLIEGRYTWSKELLLSDLFPLETSMNC--NYMIKNNWTERLV     W235stop-multisystem
                  Drosophila pol gamma     (201) AVSTKRWYSWVSSKLTKHRLSVEKLEPLDVDTDSERPHYTPDELIPLGTSGPGLV       disorder
               scyeast pol gamma mip1      (187) ALSSTAWYLWCSPFICGGDDPAALIPLNTLN-------------------KEQVI     241P→L SNP
                   S. pombe pol gamma      (187) AVSEDAWYCWLSPWLLGKSEN-DRQLIP-----------S--------NPKGALF     L244P-Alpers
                  Neurospora pol gamma     (205) AGTPDAWYAWLSPWLLGETENKAQLVPMG------------------DPTVDRII     T251I-PEO, Alpers,& infant
                             Consensus     (221) AISPSAWYSWCS RLVEERYSWTSQLSPADLIPLE        S T  DWQEQLV       hepatocerebral

                                                 276                                                 330
                                                  *  EXOII *                          **  **  *              G268A-PEO
                    hum pol gamma aa seq   (267) VGHNVSFDRAHIREQYLIQGSRMRFLDTMSMHMAISGLSSFQRSLWIAAKQGKHK     H277C - Alpers
             Pan troglodytes (chimpanzee)  (264) VGHNVSFDRAHIREQYLIQGSRMRFLDTMSMHMAISGLSSFQRSLWIAAKQGKHK     L304R-PEO, Alpers, &
Macaca mulatta (rhesus monkey) pol gamma   (256) VGHNVSFDRAHIREQYLIQGSHMRFLDTMSMHMAISGLSSFQRSLWIAAKQGKHK      ataxia-nueropathy
                           mus pol gamma   (250) VGHNVSFDRAHIREQYLIQDSRMRFLDTMSMHMAISGLSSFQRSLWMGAKQGKHK     S305R-Alpers
                           rat pol gamma   (250) VGHNVSFDRAHIREQYLIQGSRMHFLDTMSMHMAISGLSSFQRSLWMGAKQGKHK     Q308H-PEO
                      Xenopus pol gamma    (241) VGHNVSFDRAHIKEQYLIKGSKTRFMDTMSMHMAISGLTGFQRTLWMASKYGKKK     R309L-PE
                  Drosophila pol gamma     (256) VGHNVSYDRARLKEQYLIEDTGTRFVDTMSLHMCVSGVTSYQRAMLKS----K-      R309H-Alpers
               scyeast pol gamma mip1      (223) IGHNVAYDRARVLEEYNFRDSKAFFLDTQSLHIASFGLCSRQRPMFMKNN--K-      W312R-PEO+/-,
                   S. pombe pol gamma      (222) VGHNVSFDRQRIREEYNIKSSRNVFLDTMSLHVATHGMCSRQKPTWFKARKAYIR      dysphagia/
                  Neurospora pol gamma     (242) VGHNIGYDRAKILEEYDLKQTRNFFLDTMSLHVAVNGMCSQQRPTWMKHKKAREL      myopathy…
                             Consensus     (276) VGHNVSFDRAHIREQYLIQGSRMRFLDTMSMHMAISGLSSFQRSLWM AKQGKHK
```

```
                                                 331 * *                     *                     385
                   hum pol gamma aa seq    (322) VQ--PPTKQGQKSQRKARRG--PAISSWDWLDISSVNSLAEVHRLYVGGPPLEKE    324P→S SNP
             Pan troglodytes (chimpanzee)  (319) VQ--PSTKQGQKSQRKARRG--PAISSWDWLDISSVNSLAEVHRLYVGGPPLEKE    T326fsX387-Alpers
Macaca mulatta (rhesus monkey) pol gamma   (311) VQ--GSTKQGQKSQRKARRG--PAISSWDWLDISSVNSLAEVHRLYVGGPPLEKE    W347_L356del-Alpers
                         mus pol gamma     (305) TQ--QSTKRGQKSPRK-ANG--PAISSWDWMDISSANNLADVHNLYVGGPPLEKE
                         rat pol gamma     (305) TQ--HPTKRGQKSQKN-ANG--PAISSWDWMDISSANNLADVHNLYVGGPRLAKE
                    Xenopus pol gamma      (296) GL--QEVKQHIKKTRSNFSG--SPISSWDWVNISSINNLADVHALYVGGPPLEKE
                Drosophila pol gamma       (305) -------KE-------------PAAEDLGWLEQSPLNSLVEVHRLYCGGDTLSKE
             scyeast pol gamma mip1        (274) -------KKEAEVESEVHPEISIEDYDDPWLNVSALNSLKDVAKFHCK-IDLDKT
                  S. pombe pol gamma       (277) SQSTETSEDDDSSSFDDDYQ--NYLKQEPWLAHSSVNSLKDVAKFHCN-ITLDKS
                Neurospora pol gamma       (297) REKAEHESASVELQEVLQGGSLTAEEADLWVDKSSINSLRDVAQFHLN-VKIDKD
                           Consensus       (331)  Q    TK GQKSQR    G  PAISSWDWLDISS NSLADVH LYVGGPPLEKE

                                                 386                 *                     440
                                                  *     *            *    EXOIII              **     *     R374X -Alpers
                   hum pol gamma aa seq    (373) PRELFVKGTMKDIRENFQDLMQYCAQDVWATHEVFQQQLPLFLERCPHPVTLAGM    G380D-PEO
             Pan troglodytes (chimpanzee)  (370) PRELFVKGTMKDIRENFQDLMQYCAQDVWATHEVFQQQLPLFLERCPHPVTLAGM    392L→V SNP
Macaca mulatta (rhesus monkey) pol gamma   (362) PRELFVKGTMKDIRENFQDLMQYCAQDVWATHEVFQQQLPLFLERCPHPVTLAGM    L392V-muscle weakness,
                         mus pol gamma     (355) PRELFVKGSMRDIRENFQDLMQYCARDVWATFEVFQQQLPLFLERCPHPVTLAGM      optic atrophy
                         rat pol gamma     (355) PRELFVKGSMRDIRENFQDLMEYCARDVWATFEVFQQQLPLFLERCPHPVTLAGM    R417T - Alpers
                    Xenopus pol gamma      (347) ARELFVKGSMSDIRTEFQELMRYCALDVQATHEVFQEQFPLFMERCPHPVTLSGM    C418R - Alpers
                Drosophila pol gamma       (340) PRNIFVEGTLEQVRQSFQSLTNYCASDVEATHRILRVLYPLYAERFPHPASLAGM    L424(ct)del452stop-PEO
             scyeast pol gamma mip1        (321) DRDFFASTDKSTIIENFQKLVNYCATDVTATSQVFDEIFPVFLKKCPHPVSFAGL     Alpers
                  S. pombe pol gamma       (329) KRDDFASLEKEPILQKLNELITYCAHDTYSTHQVFKKVFPQFLEVCPHPATFSAM
                Neurospora pol gamma       (351) IRDVFAETDRNVILNQLDDLLTYCAADVQVTHQVYQVVFPNFLGVCPHPVSFAAL
                           Consensus       (386) PRELFVKG M DIRENFQDLM YCA DVWATHEVFQQQLPLFLERCPHPVTLAGM

                                                 441                                                 495
                                                 * ** *                     *           *   **              L428P-Alpers,…
                   hum pol gamma aa seq    (428) LEMGVSYLPVNQ-NWERYLAEAQGTYEELQREMKKSLMDLANDACQLLSGERYKE    M430L-PEO
             Pan troglodytes (chimpanzee)  (425) LEMGVSYLPVNQ-NWERYLAEAQGTYEELQREMKKSLMDLANDACQLLSGERYKD    G431V-PEO
Macaca mulatta (rhesus monkey) pol gamma   (417) LEMGVSYLPVNQ-NWERYLAEAQGTYEELQREMKKSLMDLANDACQLLSGERYKE    S433C-PEO, ataxia, …
                         mus pol gamma     (410) LEMGVSYLPVNQ-NWERYLTEAQNTYEELQREMKKSLMDLANDACQLLSGERYKE    T452stop-PEO
                         rat pol gamma     (410) LEMGVSYLPVNQ-NWERYLTEAQSTYEELQREMKKSLMELANDACQLLSGERYKE    L463F-PEO
                    Xenopus pol gamma      (402) LEMGVSYLPVNQ-NWERYLDEAQTSYEELQKEMKKSLMKLANDACQLLTKDAYKE    A467T-PEO, SANDO,
                Drosophila pol gamma       (395) LEMGSAYLPVNS-NWERYIREAQLTYEDLSIEAKYHLGRRAEEACSLLLDDQYRQ      MERRF, & Alpers….
             scyeast pol gamma mip1        (376) KSLSKCILPTKLNDWNDYLNSSESLYQQSKVQIESKIVQIIKDIVLLKDKPDFYL    N468D-PEO
                  S. pombe pol gamma       (384) LSLGSVFLPVNH-SWTRYINGVEEQYQQMIQLVDQKLSQYAEKAKDLINTKDTVL
                Neurospora pol gamma       (406) RHLASVILPVNK-TWDTYIETAEATYLQMLHGVQERLFTLMERTLDYKADPEKYL
                           Consensus       (441) LEMGVSYLPVNQ NWERYL EAQ TYEELQREMKKSLM LANDACQLLSGERYKE
```

```
                                                496             *             *     *                550
                   hum pol gamma aa seq   (482) DPWLWDLEWDLQEFKQKKAKKVKKEPATASKLPIEGAGAPGDPMDQEDLGPCSEE
             Pan troglodytes (chimpanzee) (479) DPWLWDLEWDLQEFKQKKARKVKKEPATASKLPIEGAGAPGDPMDQEDLGPCSEE
Macaca mulatta (rhesus monkey) pol gamma (471) DPWLWDLEWDLQEFKQKKAKKVKKEPATASKLPIDGAGAPGDPMDQEDLGPRSEE
                         mus pol gamma (464) DPWLWDLEWDLQEFKQKKAKKVKK-PASASKLPIEGAGPFGDPMDQEDPGPPSEE
                         rat pol gamma (464) DPWLWDLEWDLQEFKQKKAKKVKK-TASASKLPIEGAGPFGDPMDQEDPGPPSEE
                      Xenopus pol gamma (456) DPWLWDLEWDIQESKQKKTKISKK--QKKANEAAESVGNKLVEDHNEDPGPPTEK
                   Drosophila pol gamma (449) NLWLWDEDWSVQELKLKQPPKRKP----------------------LPTVEIKDS
                 scyeast pol gamma mip1 (431) KDPWLSQLDWTTKPLRLTKKGVPAK------------------------------
                     S. pombe pol gamma (438) KDPWLRQLDWTPCNLYRKLKKATQE------------------------------
                   Neurospora pol gamma (460) SDPWLSQLDWSGQEIKMAKPKKKG------------------------------
                              Consensus (496) DPWLWDLEWDLQEFKQKKAKKVKK  A ASKLPIEGAG  GDPMDQED GP SEE

                                                551      *             **      *    *    *         605
                   hum pol gamma aa seq   (537) EEFQQDVMARACLQKLKGTTELLPKRPQHLPGHPGWYRKLCPRL-----------
             Pan troglodytes (chimpanzee) (534) EEFQQDVMARACLQKLKGTTELLPKRPQHLPGHPGWYRKLCPRL-----------
Macaca mulatta (rhesus monkey) pol gamma (526) EEFQQDVMARACLQKLKGTTELLPKRPQHLPGHPGWYRKLCPRL-----------
                         mus pol gamma (518) EELQRSVTAHNRLQQLRSTTDLLPKRPQHLPGHPGWYRKLCPRL-----------
                         rat pol gamma (518) EELQQNIMAHTRLQQLKSTTDLLPKRPQHLPGHPGWYRKLCPRL-----------
                      Xenopus pol gamma (509) EESRPSMGKLYLEDLKLKTLPLLPKRNQHLPGHPGWYRKLCPKL-----------
                   Drosophila pol gamma (482) GNTPEERRLQAKFQHLYDQQALLPARRPLLPGYPLWYRKLCRKPPAKREDEILED
                 scyeast pol gamma mip1 (456) --------------------------CQKLPGFPEWYRQLFFSK-----------
                     S. pombe pol gamma (463) -----------VP------------------VVPKWYKKAYCKT-----------
                   Neurospora pol gamma (484) --------------------DVERPALNQKLPGYPQWYKDLFVKVPKELSGLDEPD
                              Consensus (551) EE Q    A   LQ L  TT LLPKRPQHLPGHPGWYRKLCPRL

                                                606      * *       *     * *           *     *   *  660
                   hum pol gamma aa seq   (581) ---DDPAWTPGPSLLSLQMRVTPKLMALTWDGFPLHYSERHGWGYLVPGRRDNLA
             Pan troglodytes (chimpanzee) (578) ---DDPAWTPGPSLLSLQMRVTPKLMALTWDGFPLHYSERHGWGYLVPGRRDNLA
Macaca mulatta (rhesus monkey) pol gamma (570) ---DDPAWTPGPSLLSLQMRVTPKLMALTWDGFPLHYSERHGWGYLVPGRRDNLA
                         mus pol gamma (562) ---DDPAWAPGPSLLSLQMRVTPKLMALTWDGFPLHYSDSHGWGYLVPGRRDNLT
                         rat pol gamma (562) ---DDPAWTPGPSLLSLQMRVTPKLMALTWDGFPLHYSDSHGWGYLVPGRRDNLT
                      Xenopus pol gamma (553) ---EDPDWLPGPGLISLQMRLTPKLMRLTWDGYPLHYSEKHGWGYLVPGRKNNKL
                   Drosophila pol gamma (537) ---DEEPWSPGASEISTGMQIAPKLLSLCWEGYPLHYEREQGWGFLVPFRSDS--
                 scyeast pol gamma mip1 (474) --------DTVEPKITIKSRIIPILFKLSWENSPVIWSKESGWCFNVPHEQVET-
                     S. pombe pol gamma (478) ---------EKRAVITAKSRLAPILLRLKWKKHPLAWSDTYGWVFSVERTSKD--
                   Neurospora pol gamma (520) KEQENRKARHEFINLTVRSRIAPLLLKLSWEGYPLFWSDQFGWTFQVPR--EK--
                              Consensus (606)    DDPAW PGPSLLSLQMRVTPKLMALTWDGFPLHYS  HGWGYLVPGRRDNL
```

Q497H-Ataxia-Neuropathy
S511N-PEO
G517V- Ataxia-Neuropathy

546R→C SNP
K561M- dysmorphia, hypotonia, liver insufficiencies,
R562Q-PEO
H569Q - Alpers
R574W-PEO+myopathy dysphagia & Alpers
R579W-PEO

P587L-PEO, Alpers,& inf. hepatocerebral
P589L - Alpers
R597W - PEO
M603L-PEO w/ ptosis
L605R - Alpers
R617C-muscle weakness, exercise intolerance, hearing loss, arhythymia
L623W-Liver Dysf., hypoketotic,&hypogly.
R627W-PEO, Alpers, & SANDO
R627Q-ataxia-myopathy, Alpers, PEO, ataxia-nueropathy, & MELAS

```
                                                 661            *             *                     715
                   hum pol gamma aa seq   (633) KLPTGTTLESAGVVCPYRAIESLYRKHCLEQGKQQLMPQEAGLAEEFLLTDNSAI
             Pan troglodytes (chimpanzee) (630) KLPTGTTLESAGVVCPYRAIESLYRKHCLEQGKQQLMPQEAGLAEEFLLTDNSAI
Macaca mulatta (rhesus monkey) pol gamma   (622) KLPTGTTLESAGVVCPYRAIESLYRKHCLEQGKQQLTPQEAGLAEEFLLTDNSAI
                         mus pol gamma     (614) EPPVSPTVESAAVTCPYRAIESLYRKHCLEQGKQQLEPQEVDLAEEFLLTDSSAM
                         rat pol gamma     (614) ELPVSPTEESAAVTCPYRAIESLYRRHCLDQGKQQLETQETDLAEEFLLTDS-AM
                    Xenopus pol gamma      (605) NNEEEE--E--IIPCPYRAIEDIYAEYSKNKTKDGCLSQHSTIPEEFMLTDDNSM
                  Drosophila pol gamma     (587) -----------------EGVDRLPMEQLLARCPVPEFARLSASKAESDMAFDMLP
               scyeast pol gamma mip1      (520) --------------------------------------YKAKN------YVLADSV
                   S. pombe pol gamma      (522) ---------------------------------------------EIPMLLD-QGLV
                  Neurospora pol gamma     (571) ----------------------------------------------AETFIQRQMTP
                             Consensus     (661)   P   T ESA V CPYRAIESLYR HCL QGKQQL  QE  LAEEFLLTD  A

                                                 716                  *       *   *  *              *770
                   hum pol gamma aa seq   (688) WQTVEELDYLEVEAEAKMENLR--AAVPGQPLALTARGGPKDTQPSYHHGNGPYN
             Pan troglodytes (chimpanzee) (685) WQTVEELDYLEVEAEAKMENLR--AAVPGQPLALTARGGPKDTQPSYHHGNGPYN
Macaca mulatta (rhesus monkey) pol gamma   (677) WQTVEELDYLEVEAEAKMENLR--AAVPGQPLALTAPGGPKDSQPNYHHGNGPYN
                         mus pol gamma     (669) WQTVEELGCLDVEAEAKMEN-----SGLSQPLVLPAACAPKSSQPTYHHGNGPYN
                         rat pol gamma     (668) WQTVEELGCLDVEAEATVES-----SGLSQPLVPPTACAPKTSQPTYHHGNGPYN
                    Xenopus pol gamma      (656) WQKVEELSRTEMDLSSEVPATAKAKKRNNSSEHPVKLEMEFDSLPDNHHGNSPCG
                  Drosophila pol gamma     (625) GQVEQHLGKREHYKKLSQKQ-------QR-------------LETQYQGSGVWCN
               scyeast pol gamma mip1      (532) SQEEEE-----------------------------------------------IRTHN
                   S. pombe pol gamma      (533) PCSREE-------------------------------------------------DT
                  Neurospora pol gamma     (582) VQFEDP-------------------------------------------------DVDDR
                             Consensus     (716) WQTVEEL  LEVEAEA  E          QPL       PK  QP YHHGNGPYN

                                                 771  * **  *  *       *   *                  *      825
                   hum pol gamma aa seq   (741) DVDIPGCWFFKLPHKDGNSCNVGSPFAKDFLPKMEDGTLQA-GPGGASGPRALEI
             Pan troglodytes (chimpanzee) (738) DVDIPGCWFFKLPHKDGNSCNVGSPFAKDFLPKMEDGTLQA-GPGGASGPRALEI
Macaca mulatta (rhesus monkey) pol gamma   (730) DVDIPGCWFFKLPHKDGNSCNVGSPFAKDFLPKMEDGTLQA-GPGGASGPRALEI
                         mus pol gamma     (719) DVNIPGCWFFKLPHKDGNNYNVGSPFAKDFLPKMEDGTLQA-GPGGASGPRALEI
                         rat pol gamma     (718) DVDIPGCWFFKLPHKDGNNYNVGSPFAKDFLPKMEDGTLQA-GPGGARGPRALEI
                    Xenopus pol gamma      (711) DVNVSGCWFYKLPHKDGNANNVGSPFAKDFLPKMEDGTLQA-STGDSSATRALEI
                  Drosophila pol gamma     (660) KVLDDCCFFLKLPHKNGPSFRVGNPLSKDFLNKFAENVLSSGDPSCQAAARVIDI
               scyeast pol gamma mip1      (543) LGLQCTGVLFKVPHPNGPTFNCTNLLTKSYNHFFEKGVLKSESE---LAHQALQI
                   S. pombe pol gamma      (541) KLDYNNYIFFKVPHKDGPEARCVRHSPNHITHTSKRVFYNQ---IMKWLKKALEM
                  Neurospora pol gamma     (593) LRMDVDHKYFKLPHKDGPNARCVNPMAKGYLPYFEKGILSS---EYPYAKEALEM
                             Consensus     (771) DVDIPGCWFFKLPHKDGN  NVGSPFAKDFLPKMEDGTLQA GPGGASGPRALEI
```

P648R-PEO+MYOPATHY & SANDO
662E→K SNP
R709stop-PEO
Q715X-Alpers
c.2157+5_+6-Alpers
722R→H SNP
G737R- Alpers, CMT, & Parkinsonism
G746S-PEO
W748S- Alpers & ataxia nueropathy
F749S-Alpers
L752P-Epilepsy
K755E-Liver Dysf., hypoketotic,&hypogly
G763R-PEO & SANDO
A767D-Alpers
2354ins(g)G785stop-PEO

```
                                                 826          *                    **  *                880
                                                 NKMISFWRNAHKRISSQMVVWLPRSALPRAVIRHPDYDE---EGLYGAILPQVVT   R807P-PEO
                    hum pol gamma aa seq   (795) NKMISFWRNAHKRISSQMVVWLPRSALPRAVIRHPDYDE---EGLYGAILPQVVT   R807C- SANDO
            Pan troglodytes (chimpanzee)   (792) NKMISFWRNAHKRISSQMVVWLPRSALPRAVIRHPDYDE---EGLYGAILPQVVT   c.2480+1-Alpers
Macaca mulatta (rhesus monkey) pol gamma   (784) NKMISFWRNAHKRISSQMVVWLPRSALPRAVIRHPDYDE---EGLYGAILPQVVT   IVS15-9 c.2485del-
                           mus pol gamma   (773) NKMISFWRNAHKRISSQMVVWLPRSALPRVVTRHPSFDE---EGHYGAILPQVVT    Alpers
                           rat pol gamma   (772) NKMISFWRNAHKRISSQMVVWLPRSALPRAVTRHPSFDE---ESHYGAILPQVVT   Y831C-PEO &
                       Xenopus pol gamma   (765) NKMISFWRNAHKRISSQMVVWMKKNELHRTITRDPEFDE---ENKYGAILAQVVS    Parkinsonism
                    Drosophila pol gamma   (715) ARMMSYWRNNRDRIMGQLVVWLDSQQLPNEFTG--EKCQ---PIAYGAICPQVVA
                 scyeast pol gamma mip1    (595) NSSGSYWMSARERIQSQFVVPSCKFPNEFQSLSAKSSLNNEKTNDLAIIIPKIVP
                      S. pombe pol gamma   (593) SASCSYWSSARDRIRSQMVVWDKDAELGVPSSVD--G--------FGIILPCIIP
                    Neurospora pol gamma   (645) NASCSYWISARERIKNQMVVYEDQLPPSQRFVNKDADSN---TPIGGFVLPQVIP
                               Consensus   (826) NKMISFWRNAHKRISSQMVVWLPRSALPR V RHP  DE   E  YGAILPQVVT

                                                 881                                   PolA      935   G848S-PEO & Alpers, &
                                                  ** *** *      * *        *     *     ** **     *      MELAS
                    hum pol gamma aa seq   (847) AGTITRRAVEPTWLTASNARPDRVGSELKAMVQAPPGYTLVGADVDSQELWIAAV   T849H-Alpers
            Pan troglodytes (chimpanzee)   (844) AGTITRRAVEPTWLTASNARPDRVGSELKAMVQAPPGYTLVGADVDSQELWIAAV   T851A- Alpers
Macaca mulatta (rhesus monkey) pol gamma   (836) AGTITRRAVEPTWLTASNARPDRVGSELKAMVQAPPGYTLVGADVDSQELWIAAV   R852C-Alpers
                           mus pol gamma   (825) AGTITRRAVEPTWLTASNARPDRVGSELKAMVQAPPGYVLVGADVDSQELWIAAV   R853Q-Myocerebrohepat.
                           rat pol gamma   (824) AGTITRRAVEPTWLTASNARPDRVGSELKAMVQAPPGYVLVGADVDSQELWIAAV   R853W-PEO w/ptosis &
                       Xenopus pol gamma   (817) AGTITRRAVEPTWLTASNARADRVGSELKAMVQVPPGYHLIGADVDSQELWIAAI    Parkinsonism
                    Drosophila pol gamma   (765) CGTLTRRAMEPTWMTASNSRPDRLGSELRSMVQAPPGYRLVGADVDSQELWIASV   V855A-muscle weakness
                 scyeast pol gamma mip1    (650) MGTITRRAVENAWLTASNAKANRIGSELKTQVKAPPGYCFVGADVDSEELWIASL   A862T-Ataxia & PEO
                      S. pombe pol gamma   (638) MGTVTRRAVENTWLTASNSKKNRLGSELKAMIRAPDGYTFVGADVDSEELWIVAL   N864S-PEO
                    Neurospora pol gamma   (697) MGTITRRAVERTWLTASNAKKNRVGSELKAMVRAPPGYVFVGADVDSEELWIASV   E873stop- Alpers
                               Consensus   (881) AGTITRRAVEPTWLTASNARPDRVGSELKAMVQAPPGY LVGADVDSQELWIAAV   Q879H-Alpers
                                                                                                            T885S-Alpers
                                                                                                            L886P-Alpers
                                                                                                            G888S-Alpers
                                                                                                            A889T-PEO
                                                                                                            E895G-Myopathic MDS

                                                 936                                                PolB  990
                                                                 *   *    *        *          *          * *   T914P-PEO, Alpers…
                    hum pol gamma aa seq   (902) LGDAHFAGMHGCTAFGWMTLQGRKSRGTDLHSKTATTVGISREHAKIFNYGRIYG   W918R - PEO
            Pan troglodytes (chimpanzee)   (899) LGDAHFAGMHGCTAFGWMTLQGRKSRGTDLHSKTATTVGISREHAKIFNYGRIYG   G923D-PEO
Macaca mulatta (rhesus monkey) pol gamma   (891) LGDAHFAGMHGCTAFGWMTLQGRKSRGTDLHSKTATTVGISREHAKVFNYGRIYG   D930N-Alpers
                           mus pol gamma   (880) LGDAHFAGMHGCTAFGWMTLQGRKSRGTDLHSKTAATVGISREHAKIFNYGRIYG   H932Y-PEO, & SANDO
                           rat pol gamma   (879) LGDAHFAGMHGCTAFGWMTLQGRKSRGTDLHSKTAATVGISREHAKVFNYGRIYG   R943C-Myocerebrohep
                       Xenopus pol gamma   (872) LGEAHFAGIHGCTAFGWMTLQGKKSSGTDLHSKTASTVGISREHAKVFNYGRIYG   R943H-PEO
                    Drosophila pol gamma   (820) LGDAYACGEHGATPLGWMTLSGSKSNGSDMHSITAKAVGISRDHAKVINYARIYG   R953C-PEO
                 scyeast pol gamma mip1    (705) VGDSIFN-VHGGTAIGWMCLEGTKNEGTDLHTKTAQILGCSRNEAKIFNYGRIYG   Y955C-PEO, &
                      S. pombe pol gamma   (693) MGDSQFR-LHGATALGMMTLEGKKSEGTDLHSKTAAILGVSRDSAKVFNYGRLYG    Parkinsonism…
                    Neurospora pol gamma   (752) VGDATFK-LHGGNAIGFMTLEGTKSQGTDLHSRTASILGITRNDAKVFNYGRIYG
                               Consensus   (936) LGDAHFAGMHGCTAFGWMTLQGRKSRGTDLHSKTA TVGISREHAKVFNYGRIYG
```

```
                                                 991                                                1045
                                                 *   *  ***
                   hum pol gamma aa seq   (957)  AGQPFAERLLMQFNHRLTQQEAAEKAQQMYAATKGLRWYRLSDEGEWLVRELNLP    A957S-PEO
             Pan troglodytes (chimpanzee) (954)  AGQPFAERLLMQFNHRLTQQEAAEKAQQMYAATKGLRWYRLSDEGEWLVRELNLP    A957P-Alpers
Macaca mulatta (rhesus monkey) pol gamma (946)  AGQPFAERLLMQFNHRLTQQEAAEKAQQMYAITKGLRWYRLSDEGEWLVRELHLP    F961S - adPEO
                         mus pol gamma (935)  AGQSFAERLLMQFNHRLTRQEAAEKAQQMYAVTKGLRRYRLSADGEWLVKQLNLP    R964C-Mitoch. tox.to
                         rat pol gamma (934)  AGQSFAERLLMQFNHRLSRQEAADKAQQMYAVTKGLRRYRLSDDGEWLVKQLNVP      NRTI'S
                    Xenopus pol gamma (927)  AGQPFAERLLMQFNHRLTQEQAAEKAKQMYAVTKGIRRYILSKEGEWLVEELGIS    L965stop-PEO
                  Drosophila pol gamma (875)  AGQLFAETLLRQFNPTFSASEAKAKAMKMFSITKGKRVYRLREEFHDELEDRAYS    L966R-Alpers
               scyeast pol gamma mip1 (759)  AGAKFASQLLKRFNPSLTDEETKKIANKLYENTKGKTK-RSK-------------
                   S. pombe pol gamma (747)  AGLKHTTLLLMQMNPTLKTAEAKELAKKLYASTKGVKSKMSKRLQEMGLPKLT--
                  Neurospora pol gamma (806)  AGLKFASQLLRQFNPSLTEAETTAIATKLYDATKGAKTNRKS-------------
                             Consensus (991)  AGQ FAERLLMQFNHRLT QEAAEKAQQMYA TKGLR YRLS EGEWLV  L  P

                                                 1046   *                          *   *          1100
                   hum pol gamma aa seq (1012)  VDRTEGGWISLQDLRKVQRETARKSQWKK-WEVVAERAWKGGTESEMFNKLESIA    W1020stop-Alpers
             Pan troglodytes (chimpanzee) (1009)  VDRTEGGWISLQDLRKVQRETARKSQWKK-WEVVAERAWKGGTESEMFNKLESIA    R1047Q-PEO
Macaca mulatta (rhesus monkey) pol gamma (1001)  VDRTEGGWISLQDLRKVQREAARKSHRKK-WEVIAERAWKGGTESEMFNKLESIA    R1047W-Alpers & PEO
                         mus pol gamma (990)  VDRTEDGWVSLQDLRMIRREASRKSRWKK-WEVASERAWTGGTESEMFNKLESIA    G1051R-PEO, & SANDO
                         rat pol gamma (989)  VDRTEDGWVSLQDLRKIRREASRKSRWKK-WEVVTERAWTGGTESEMFNKLESIA
                    Xenopus pol gamma (982)  VERGEENSVNLQDLRKIQKDATKRSRRK--WNLVSRRIWTGGTESQMFNKLETIA
                  Drosophila pol gamma (930)  SYEASRLAIQ---------------RNRTLAEVFHRPNWQGGTESAMFNRLEEIA
               scyeast pol gamma mip1 (800)  ----------------------------------LFKKFWYGGSESILFNKLESIA
                   S. pombe pol gamma (800)  -------------------------------------FWSQGTESFVFNKLEAMA
                  Neurospora pol gamma (848)  --------------------------------LYKRPFWRGGTESFVFNMLEEFA
                             Consensus (1046)  VDRTE GW SLQDLRK  RE  RKS  KK WEV  ERAW GGTESEMFNKLESIA

                                                 1101      *  *                 **       ***   *    1155
                   hum pol gamma aa seq (1066)  TSDIPRTPVLGCCISRALEPSA---VQEEFMTSRVNWVVQSSAVDYLHLMLVAMK    G1076V-PEO
             Pan troglodytes (chimpanzee) (1063)  TSDIPRTPVLGCCISRALEPSA---VQEEFMTSRVNWVVQSSAVDYLHLMLVAMK    I1079L-adPEO
Macaca mulatta (rhesus monkey) pol gamma (1055)  TSDIPRTPVLGCRISRALEPSA---VQGEFMTSRVNWVVQSSAVDYLHLMLVAMK    S1095R-adPEO
                         mus pol gamma (1044)  MSDTPRTPVLGCCISRALEPSV---VQGEFITSRVNWVVQSSAVDYLHLMLVAMK    R1096C-PEO & Alpers
                         rat pol gamma (1043)  MSDTPRTPVLGCCISRALEPSV---VQGEFMTSRVNWVVQSSAVDYLHLMLVAMK    R1096H-Alpers
                    Xenopus pol gamma (1035)  MSPSPKTPVLGCRISRALEPTA---VKGEFITSRVNWVVQSSAVDYLHLMLVAMK    S1104C-PEO
                  Drosophila pol gamma (970)  TGSQPRTPFLGGRLSRALEADTGPEQEQRFLPTRINWVVQSGAVDFLHLMLVSMR    A1105T-PEO
               scyeast pol gamma mip1 (822)  EQETPKTPVLGCGITYSLMKKN--LRANSFLPSRINWAIQSSGVDYLHLLCCSME    V1106I-PEO
                   S. pombe pol gamma (818)  QLPSPRTPVLDAGIQQALSSKN--LSKNSFMTSRVNWAIQSSAVDYLHLLLVSMN    H1110Y-mtDNA depletion
                  Neurospora pol gamma (871)  EQERPRTPVLGAGITEALMSRWVS--KGGFLTSRINWAIQSSGVDYLHLLIIAMD
                             Consensus (1101)   SD PRTPVLGC ISRALEPS    VQGEFMTSRVNWVVQSSAVDYLHLMLVAMK
```

```
                                                                                                                  R1128H-Micorcephaly
                                                                                                                  H1134R-mtDNA depletion
                                                                                                                  E1136K- mtDNA depletion
                                                                  Pol C
                                                 1156       *     * * *   **  *              * **    1210        R1138C-PEO
                                hum pol gamma aa seq  (1118) WLFEEFAIDGRFCISIHDEVRYLVREEDRYRAALALQITNLLTRCMFAYKLGLND   1142R→W SNP
                          Pan troglodytes (chimpanzee)  (1115) WLFEEFAIDGRFCISIHDEVRYLVREEDRYRAALALQITNLLTRCMFAYKLGLND   1143E→G SNP,PEO,…
                   Macaca mulatta (rhesus monkey) pol gamma (1107) WLFEEFAIDGRFCISIHDEVRYLVREEDRYRAALALQITNLLTRCMFAYKLGLND   1146R→C SNP
                                         mus pol gamma  (1096) WLFEEFAIDGRFCISIHDEVRYLVREEDRYRAALALQITNLLTRCMFAYKLGLND   3482+2TX21splice-
                                         rat pol gamma  (1095) WLFEEFAIDGRFCISIHDEVRYLVREEDRYRAALALQITNLLTRCMFAYKLGLND     Alpers
                                      Xenopus pol gamma  (1087) WLFEAYDIDGRFCISIHDEVRYLVHSKDRYRAALALQITNLLTRCMFASRLGIQD   M1163R-Alpers
                                   Drosophila pol gamma  (1025) WLMG---SHVRFCLSFHDELRYLVKEELSPKAALAMHITNLMTRSFCVSRIGLQD   F1164I-PEO
                                scyeast pol gamma mip1   (875) YIIKKYNLEARLCISIHDEIRFLVSEKDKYRAAMALQISNIWTRAMFCQQMGINE
                                     S. pombe pol gamma  (871) HLIKKYYLEARLSLTVHDEVRYLSSDKDKYRVAFALQVANLWTRAFFCQRLGINE
                                   Neurospora pol gamma  (924) YLTRRFNLACRLAITVHDEIRYLAEEPDKYRVAMALQIANLWTRVMFAQQVGIQD
                                              Consensus  (1156) WLFEEFAIDGRFCISIHDEVRYLVREEDRYRAALALQITNLLTRCMFAYKLGLND

                                                 1211                                                   1265
                                                 *  *        *  *   *    *        *    *
                                hum pol gamma aa seq  (1173) LPQSVAFFSAVDIDRCLRKEVTMDCKTPSNPTGMERRYGIPQGEALDIYQIIELT
                          Pan troglodytes (chimpanzee)  (1170) LPQSVAFFSAVDIDRCLRKEVTMDCKTPSNPTGMERRYGIPQGEALDIYQIIELT   L1173fs stop- Alpers
                   Macaca mulatta (rhesus monkey) pol gamma (1162) LPQSVAFFSAVDIDRCLRKEVTMDCKTPSNPTGMERRYGIPQGEALDIYQIIELT   S1176L-PEO
                                         mus pol gamma  (1151) LPQSVAFFSAVDIDQCLRKEVTMDCKTPSNPTGMERRYGIPQGEALDIYQIIELT   D1184N-PEO
                                         rat pol gamma  (1150) LPQSVAFFSAVDIDQCLRKEVTMDCKTPSNPTGMERKYGIPQGEALDIYQIIELT   R1187W-?
                                      Xenopus pol gamma  (1142) VPQSVAFFSAVDIDKCLRKEVTMDCSTPSNPNGMEKRYGIPQGEALDIYQILKVT   K1191N-Alpers
                                   Drosophila pol gamma  (1077) LPMSVAFFSSVEVDTVLRKECTMDCKTPSNPHGLRIGYGIQPGQSLSVAEAIEKA   K1191R-Myocerebrohep.
                                scyeast pol gamma mip1   (930) LPQNCAFFSQVDIDSVIRKEVNMDCITPSNKTAIPHGEALDINQLLDKSNSKLGK   D1196N-Myopathy
                                     S. pombe pol gamma  (926) LPQSVAFFSSVDIDHVLRKDVKMDCVTPSNKVPIPPGEELTIESVLEKLEQSGQS   G1205A-hearing loss,
                                   Neurospora pol gamma  (979) LPQSCAFFSAVDIDHVLRKEVDMDCITPSNPIPIAHGESIDIFQILEKGDDAKLD     failure to thrive,&
                                              Consensus  (1211) LPQSVAFFSAVDID CLRKEVTMDCKTPSNPTGMERRYGIPQGEALDIYQIIELT     ETC complex defic.
                                                                                                                  Y1210fs-1216stop-
                                                                                                                    Alpers

                                                 1266                                                   1320
                                                   *     *
                                hum pol gamma aa seq  (1228) KGSLEKRSQPGP-------------------------------------------   1230S→F SNP
                          Pan troglodytes (chimpanzee)  (1225) KGSLEKRSQPGP-------------------------------------------   1236Q→H SNP, PEO
                   Macaca mulatta (rhesus monkey) pol gamma (1217) KGSLEKRSQPGP-------------------------------------------     Alpers
                                         mus pol gamma  (1206) KGSLEKRSQPGP-------------------------------------------
                                         rat pol gamma  (1205) KGSLEKRSQPGP-------------------------------------------
                                      Xenopus pol gamma  (1197) KGVL-----------------------------------------------
                                   Drosophila pol gamma  (1132) GGNDVSQWDWIKKS-----------------------------------------
                                scyeast pol gamma mip1   (985) PNLDIDSKVSQYAYNYREPVFEEYNKSYTPEFLKYFLAMQVQSDKRDVNRLEDEY
                                     S. pombe pol gamma  (981) LEPLEQIQCFVDVKATTSAEITEEDKKNIAYLKAQAFY-----------------
                                   Neurospora pol gamma  (1034) DSIVPQSQYAPRLENIPYTPRVPVMQRLRERAEAGDHQAFLRFIRAQITNSDEEL
                                              Consensus  (1266) KGSLEKRSQPGP
```

```
                                                 1321                                                1375
                   hum pol gamma aa seq  (1240) -------------------------------------------------------
           Pan troglodytes (chimpanzee)  (1237) -------------------------------------------------------
Macaca mulatta (rhesus monkey) pol gamma  (1229) -------------------------------------------------------
                         mus pol gamma  (1218) -------------------------------------------------------
                         rat pol gamma  (1217) -------------------------------------------------------
                      Xenopus pol gamma  (1201) -------------------------------------------------------
                   Drosophila pol gamma  (1146) -------------------------------------------------------
                 scyeast pol gamma mip1  (1040) LRECTSKEYARDGNTAEYSLLDYIKDVEKGKRTKVRIMGSNFLDGTKNAKADQRI
                     S. pombe pol gamma  (1019) -------------------------------------------------------
                   Neurospora pol gamma  (1089) KRIIAETRYSDPYGAFSLASNGRVSGNPHQRHAAVHASTKTAAAPSKPSIASRFD
                              Consensus  (1321)

                                                 1376                                                1430
                   hum pol gamma aa seq  (1240) -------------------------------------------------------
           Pan troglodytes (chimpanzee)  (1237) -------------------------------------------------------
Macaca mulatta (rhesus monkey) pol gamma  (1229) -------------------------------------------------------
                         mus pol gamma  (1218) -------------------------------------------------------
                         rat pol gamma  (1217) -------------------------------------------------------
                      Xenopus pol gamma  (1201) -------------------------------------------------------
                   Drosophila pol gamma  (1146) -------------------------------------------------------
                 scyeast pol gamma mip1  (1095) RLPVNMPDYPTLHKIANDSAIPEKQLLENRRKKENRIDDENKKKLTRKKNTTPME
                     S. pombe pol gamma  (1019) -------------------------------------------------------
                   Neurospora pol gamma  (1144) SVSQASRIKSVAAGSDEPTIRATKAQGKAMAKASGTKLAASTKDTVLNVTIKKKV
                              Consensus  (1376)

                                                 1431                                                1485
                   hum pol gamma aa seq  (1240) -------------------------------------------------------
           Pan troglodytes (chimpanzee)  (1237) -------------------------------------------------------
Macaca mulatta (rhesus monkey) pol gamma  (1229) -------------------------------------------------------
                         mus pol gamma  (1218) -------------------------------------------------------
                         rat pol gamma  (1217) -------------------------------------------------------
                      Xenopus pol gamma  (1201) -------------------------------------------------------
                   Drosophila pol gamma  (1146) -------------------------------------------------------
                 scyeast pol gamma mip1  (1150) RKYKRVYGGRKAFEAFYECANKPLDYTLETEKQFFNIPIDGVIDDVLNDKSNYKK
                     S. pombe pol gamma  (1019) -------------------------------------------------------
                   Neurospora pol gamma  (1199) AAPEMAAVPSTSSESKSKASATTSTTTTENATASPSSSSNVDAKKTTSKTKPTHK
                              Consensus  (1431)
```

```
                                                 1486                                                1537
                   hum pol gamma aa seq  (1240) ---------------------------------------------------
           Pan troglodytes (chimpanzee)  (1237) ---------------------------------------------------
Macaca mulatta (rhesus monkey) pol gamma  (1229) ---------------------------------------------------
                         mus pol gamma  (1218) ---------------------------------------------------
                         rat pol gamma  (1217) ---------------------------------------------------
                      Xenopus pol gamma  (1201) ---------------------------------------------------
                   Drosophila pol gamma  (1146) ---------------------------------------------------
                 scyeast pol gamma mip1  (1205) KPSQARTASSSPIRKTAKAVHSKKLPARKSSTTNRNLVELERDITISREY--
                     S. pombe pol gamma  (1019) ---------------------------------------------------
                   Neurospora pol gamma  (1254) KETEGEPFPSLDDPVIAARLEAVSKTSPGTRASVAAKLDALASFCHASCCGC
                              Consensus  (1486)
```