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Supplementary information

Near-atomic cryo-electron microscopy structures of varicella-zoster virus capsids

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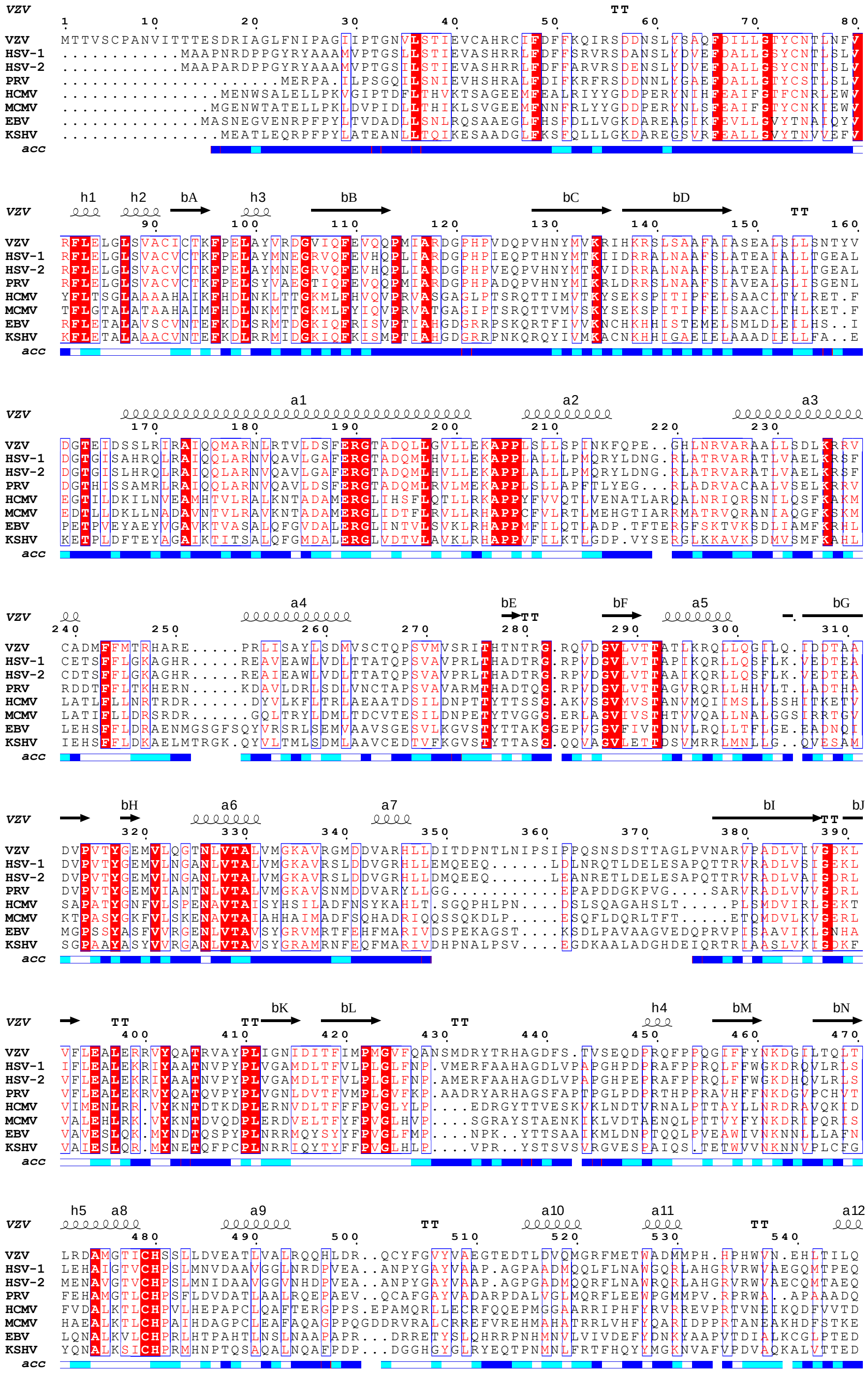

MCP

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HSV-1  ............MAAPNRDPPGYRYAAAMVPTGSLLSTIEVASHRRLFDFFSRVRSDANSLYDVEFDALLGSYCNTLSLV
HSV-2  ............MAAPARDPPGYRYAAAMVPTGSILSTIEVASHRRLFDFFARVRSDENSLYDVEFDALLGSYCNTLSLV
PRV    ......................MERPA.ILPSGQILSNIEVHSHRALFDIFKRFRSDDNNLYGAEFDALLGTYCSTLSLV
HCMV   ................MENWSALELLPKVGIPTDFLTHVKTSAGEEMFEALRIYYGDDPERYNIHFEAIFGTFCNRLEWV
MCMV   ...............MGENWTATELLPKLDVPIDLLTHIKLSVGEEMFNNFRLYYGDDPERYNLSFEAIFGTYCNKIEWV
EBV    ..............MASNEGVENRPFPYLTVDADLLSNLRQSAAEGLFHSFDLLVGKDAREAGIKFEVLLGVYTNAIQYV
KSHV   ................MEATLEQRPFPYLATEANLLTQIKESAADGLFKSFQLLLGKDAREGSVRFEALLGVYTNVVEFV

VZV    RFLELGLSVACICTKFPELAYVRDGVIQFEVQQPMIARDGPHPVDQPVHNYMVKRIHKRSLSAAFAIASEALSLLSNTYV
HSV-1  RFLELGLSVACVCTKFPELAYMNEGRVQFEVHQPLIARDGPHPIEQPTHNYMTKIIDRRALNAAFSLATEAIALLTGEAL
HSV-2  RFLELGLSVACVCTKFPELAYMNEGRVQFEVHQPLIARDGPHPVEQPVHNYMTKVIDRRALNAAFSLATEAIALLTGEAL
PRV    RFLELGLSVACVCTKFPELSYVAEGTIQFEVQQPMIARDGPHPADQPVHNYMIKRLDRRSLNAAFSIAVEALGLISGENL
HCMV   YFLTSGLAAAHAIKFHDLNKLTTGKMLFHVQVPRVASGAGLPTSRQTTIMVTKYSEKSPITIPFELSAACLTYLRET.F
MCMV   TFLGTALATAAHAIMFHDLNKMTTGKMLFYIQVPRVATGAGIPTSRQTTVMVSKYSEKSPITIPFEISAACLTHLKET.F
EBV    RFLETALAVSCVNTEFKDLSRMTDGKIQFRISVPTIAHGDGRRPSKQRTFIVVKNCHKHHISTEMELSMLDLEILHS..I
KSHV   KFLETALAACVNTEFKDLRRMIDGKIQFKISMPTIAHGDGRRPNKQRQYIVMKACNKHHIGAEIELAAADIELLFA..E

VZV    DGTEIDSSLRIRAIQQMARNLRTVLDSFERGTADQLLGVLLEKAPPLSLLSPINKFQPE..GHLNRVARAALLSDLKRRV
HSV-1  DGTGISAHRQLRAIQQLARNVQAVLGAFERGTADQMLHVLLEKAPPLALLLPMQRYLDNG.RLATRVARATLVAELKRSF
HSV-2  DGTGISLHRQLRAIQQLARNVQAVLGAFERGTADQMLHVLLEKAPPLALLLPMQRYLDNG.RLATRVARATLVAELKRSF
PRV    DGTHISSAMRLRAIQQLARNVQAVLDSFERGTADQMLRVLMEKAPPLSLLAPFTLYEG...RLADRVACAALVSELKRRV
HCMV   EGTILDKILNVEAMHTVLRALKNTADAMERGLIHSFLQTLLRKAPPYFVVQTLVENATLARQALNRIQRSNILQSFKAKM
MCMV   EDTLLDKLLNADAVNTVLRAVKNTADAMERGLIDTFLRVLLRHAPPCFVLRTLMEHGTIARRMATRVQRANIAQGFKSKM
EBV    PETPVEYAEYVGAVKTVASALQFGVDALERGLINTVLSVKLRHAPPMFILQTLADP.TFTERGFSKTVKSDLIAMFKRHL
KSHV   KETPLDFTEYAGAIKTITSALQFGMDALERGLVDTVLAVKLRHAPPVFILKTLGDP.VYSERGLKKAVKSDMVSMFKAHL

VZV    CADMFFMTRHARE.....PRLISAYLSDMVSCTQPSVMVSRITHTNTRG.RQVDGVLVTTATLKRQLLQGILQ.IDDTAA
HSV-1  CETSFFLGKAGHR.....REAVEAWLVDLTTATQPSVAVPRLTHADTRG.RPVDGVLVTTAPIKQRLLQSFLK.VEDTEA
HSV-2  CDTSFFLGKAGHR.....REAIEAWLVDLTTATQPSVAVPRLTHADTRG.RPVDGVLVTTAAIKQRLLQSFLK.VEDTEA
PRV    RDDTFFLTKHERN.....KDAVLDRLSDLVNCTAPSVAVARMTHADTQG.RPVDGVLVTTAGVRQRLLHHVLT.LADTHA
HCMV   LATLFLLNRTRDR......DYVLKFLTRLAEAATDSILDNPTTYTTSSG.AKVSGVMVSTANVMQIIMSLLSSHITKETV
MCMV   LATIFLLDRSRDR......GQLTRYLDMLTDCVTESILDNPETYTVGGG.ERLAGVIVSTHTVVQALLNALGGSIRRTGV
EBV    LEHSFFLDRAENMGSGFSQYVRSRLSEMVAAVSGESVLKGVSTYTTAKGGEPVGGVFIVTDNVLRQLLTFLGE.EADNQI
KSHV   IEHSFFLDKAELMTRGK.QYVLTMLSDMLAAVCEDTVFKGVSTYTTASG.QQVAGVLETTDSVMRRLMNLLG..QVESAM

VZV    DVPVTYGEMVLQGTNLVTALVMGKAVRGMDDVARHLLDITDPNTLNIPSIPPQSNSDSTTAGLPVNARVPADLVIVGDKL
HSV-1  DVPVTYGEMVLNGANLVTALVMGKAVRSLDDVGRHLLEMQEEQ......LDLNRQTLDELESAPQTTRVRADLVSIGEKL
HSV-2  DVPVTYGEMVLNGANLVTALVMGKAVRSLDDVGRHLLDMQEEQ......LEANRETLDELESAPQTTRVRADLVAIGDRL
PRV    DVPVTYGEMVIANTNLVTALVMGKAVSNMDDVARYLLGG...........EPAPDDGKPVG....SARVRADLVVVGDRL
HCMV   SAPATYGNFVLSPENAVTAISYHSILADFNSYKAHLT.SGQPHLPN....DSLSQAGAHSLT.....PLSMDVIRLGEKT
MCMV   KTPASYGKFVLSKENAVTAIAHHAIMADFSQHADRIQQSSQKDLP.....ESQFLDQRLTFT.....ETQMDVLKVGERL
EBV    MGPSSYASFVVRGENLVTAVSYGRVMRTFEHFMARIVDSPEKAGST....KSDLPAVAAGVEDQPRVPISAAVIKLGNHA
KSHV   SGPAAYASYVVRGANLVTAVSYGRAMRNFEQFMARIVDHPNALPSV....EGDKAALADGHDEIQRTRIAASLVKIGDKF

VZV    VFLEALERRVYQATRVAYPLIGNIDITFIMPMGVFQANSMDRYTRHAGDFS.TVSEQDPRQFPPQGIFFYNKDGILTQLT
HSV-1  IFLEALEKRIYAATNVPYPLVGAMDLTFVLPLGLFNP.VMERFAAHAGDLVPAPGHPDPRAFPPRQLFFWGKDRQVLRLS
HSV-2  VFLEALEKRIYAATNVPYPLVGAMDLTFVLPLGLFNP.AMERFAAHAGDLVPAPGHPEPRAFPPRQLFFWGKDHQVLRLS
PRV    VFLEALEKRVYQATQVPYPLVGNLDVTFVMPLGVFKP.AADRYARHAGSFAPTPGLPDPRTHPPRAVHFFNKDGVPCHVT
HCMV   VIMENLRR.VYKNTDTKDPLERNVDLTFFFPVGLYLP....EDRGYTTVESKVKLNDTVRNALPTTAYLLNRDRAVQKID
MCMV   VALEHLRK.VYKNTDVQDPLERDVELTFYFPVGLHVP....SGRAYSTAENKIKLVDTAENQLPTTVYFYNKDRIPQRIS
EBV    VAVESLQK.MYNDTQSPYPLNRRMQYSYYFPVGLFMP....NPK..YTTSAAIKMLDNPTQQLPVEAWIVNKNNLLLAFN
KSHV   VAIESLQR.MYNETQFPCPLNRRIQYTYFFPVGLHLP....VPR..YSTSVSVRGVESPAIQS.TETWVVNKNNVPLCFG

VZV    LRDAMGTICHSSLLDVEATLVALRQQHLDR..QCYFGVYVAEGTEDTLDVQMGRFMETWADMMPH.HPHWVN.EHLTILQ
HSV-1  LEHAIGTVCHPSLMNVDAAVGGLNRDPVEA..ANPYGAYVAAP.AGPAADMQQLFLNAWGQRLAHGRVRWVAEGQMTPEQ
HSV-2  MENAVGTVCHPSLMNIDAAVGGVNHDPVEA..ANPYGAYVAAP.AGPGADMQQRFLNAWRQRLAHGRVRWVAECQMTAEQ
PRV    FEHAMGTLCHPSFLDVDATLAALRQEPAEV..QCAFGAYVADARPDALVGLMQRFLEEWPGMMPV.RPRWA..APAAADQ
HCMV   FVDALKTLCHPVLHEPAPCLQAFTERGPPS.EPAMQRLLECRFQQEPMGGAARRIPHFYRVRREVPRTVNEIKQDFVVTD
MCMV   HAEALKTLCHPAIHDAGPCLEAFAQAGPPQGDDRVRALCRREFVREHMAHATRRLVHFYQARIDPPRTANEAKHDFSTKE
EBV    LQNALKVLCHPRLHTPAHTLNSLNAAPAPR...DRRETYSLQHRRPNHMNVLVIVDEFYDNKYAAPVTDIALKCGLPTED
KSHV   YQNALKSICHPRMHNPTQSAQALNQAFPDP...DGGHGYGLRYEQTPNMNLFRTFHQYYMGKNVAFVPDVAQKALVTTED
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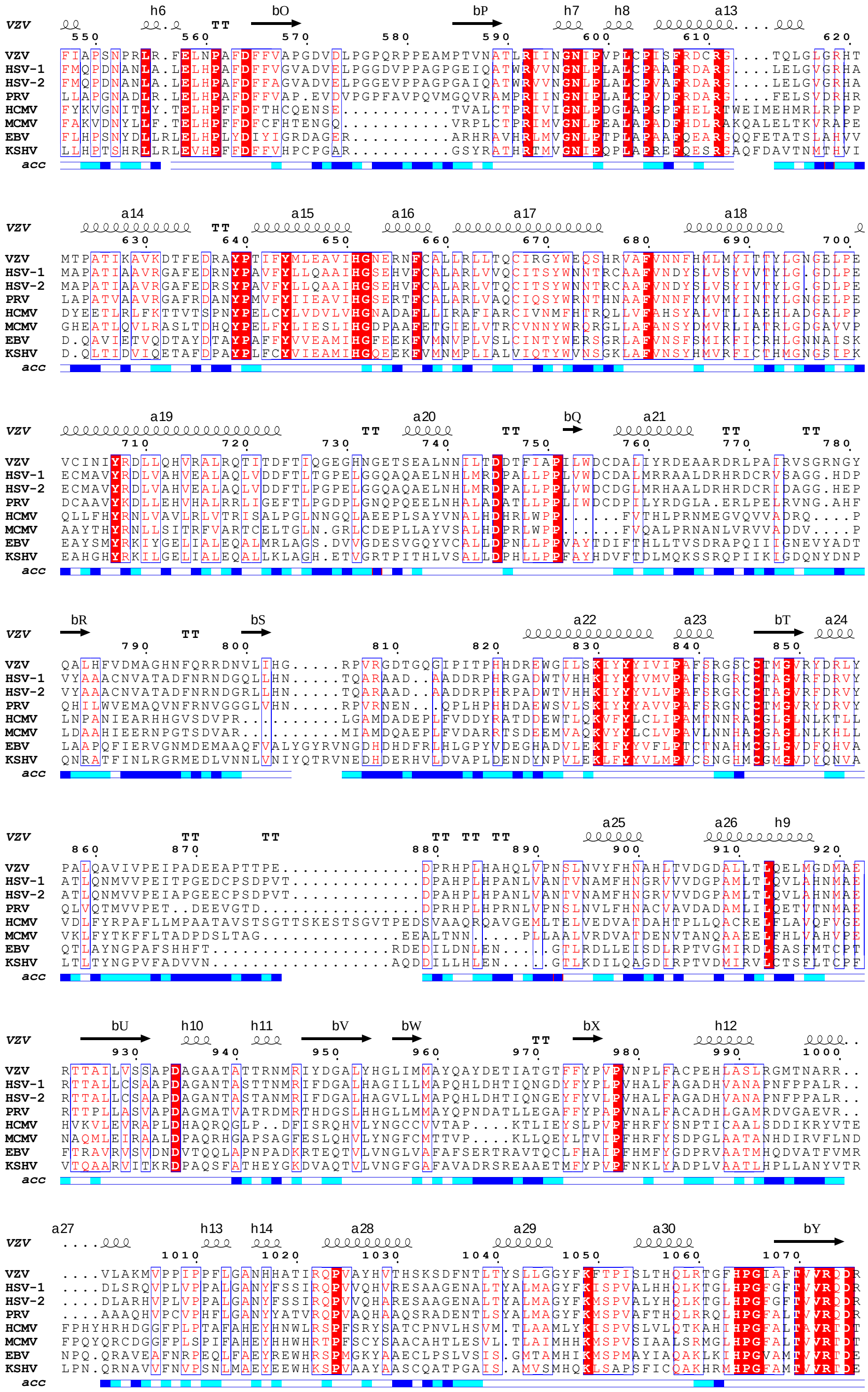

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HSV-1  FMQPDNANLA.LELHPAFDFFVGVADVELPGGDVPPAGPGEIQATWRVVNGNLPLALCPAAFRDARG....LELGVGRHA
HSV-2  FMQPDNANLA.LELHPAFDFFAGVADVELPGGEVPPAGPGAIQATWRVVNGNLPLALCPVAFRDARG....LELGVGRHA
PRV    LLAPGNADLR.LELHPAFDFFVAP.EVDVPGPFAVPQVMGQVRAMPRIINGNIPLALCPVDFRDARG....FELSVDRHR
HCMV   FYKVGNITLY.TELHPFFDFTHCQENSE...........TVALCTPRIVIGNLPDGLAPGPFHELRTWEIMEHMRLRPPP
MCMV   FAKVDNYLLF.TELHPFFDFCFHTENGQ...........VRPLCTPRIMVGNLPEALAPADFHDLRAKQALELTKVRAPE
EBV    FLHPSNYDLLRLELHPLYDIYIGRDAGER..........ARHRAVHRLMVGNLPTPLAPAAFQEARGQQFETATSLAHVV
KSHV   LLHPTSHRLLRLEVHPFFDFFVHPCPGAR..........GSYRATHRTMVGNIPQPLAPREFQESRGAQFDAVTNMTHVI

VZV    MTPATIKAVKDTFEDRAYPTIFYMLEAVIHGNERNFCALLRLLTQCIRGYWEQSHRVAFVNNFHMLMYITTYLGNGELPE
HSV-1  MAPATIAAVRGAFEDRNYPAVFYLLQAAIHGSEHVFCALARLVVQCITSYWNNTRCAAFVNDYSLVSYVVTYLG.GDLPE
HSV-2  MAPATIAAVRGAFEDRSYPAVFYLLQAAIHGSEHVFCALARLVTQCITSYWNNTRCAAFVNDYSLVSYIVTYLG.GDLPE
PRV    LAPATVAAVRGAFRDANYPMVFYIIEAVIHGSERTFCALARLVAQCIQSYWRNTHNAAFVNNFYMVMYINTYLGNGELPE
HCMV   DYEETLRLFKTTVTSPNYPELCYLVDVLVHGNADAFLLIRAFIARCIVNMFHTRQLLVFAHSYALVTLIAEHLADGALPP
MCMV   GHEATLQVLRASLTDHQYPELFYLIESLIHGDPAAFETGIELVTRCVNNYWRQRGLLAFANSYDMVRLIATRLGDGAVVP
EBV    D.QAVIETVQDTAYDTAYPAFFYVVEAMIHGFEEKFVMNVPLVSLCINTYWERSGRLAFVNSFSMIKFICRHLGNNAISK
KSHV   D.QLTIDVIQETAFDPAYPLFCYVIEAMIHGQEEKFVMNMPLIALVIQTYWVNSGKLAFVNSYHMVRFICTHMGNGSIPK

VZV    VCINIYRDLLQHVRALRQTITDFTIQGEGHNGETSEALNNILTDDTFIAPILWDCDALIYRDEAARDRLPAIRVSGRNGY
HSV-1  ECMAVYRDLVAHVEALAQLVDDFTLTGPELGGQAQAELNHLMRDPALLPPLVWDCDALMRRAALDRHRDCRVSAGG.HDP
HSV-2  ECMAVYRDLVAHVEALAQLVDDFTLPGPELGGQAQAELNHLMRDPALLPPLVWDCDGLMRHAALDRHRDCRIDAGG.HEP
PRV    DCAAVYKDLLEHVHALRRLIGEFTLPGDPLGNQPQEELNHALADATLLPPLIWDCDPILYRDGLA.ERLPELRVNG.AHF
HCMV   QLLFHYRNLVAVLRLVTRISALPGLNNGQLAEEPLSAYVNALHDHRLWPP......FVTHLPRNMEGVQVVADRQ....P
MCMV   AAYTHYRNLLSITRFVARTCELTGLN.GRLCDEPLLAYVSALHDPRLWPP......FVQALPRNANLVRVVADDV....P
EBV    EAYSMYRKIYGELIALEQALMRLAGS.DVVGDESVGQYVCALLDPNLLPPVAYTDIFTHLLTVSDRAPQIIIGNEVYADT
KSHV   EAHGHYRKILGELIALEQALLKLAGH.ETVGRTPITHLVSALLDPHLLPPFAYHDVFTDLMQKSSRPIIKIGDQNYDNP

VZV    QALHFVDMAGHNFQRRDNVLIHG.....RPVRGDTGQGIPITPHHDREWGILSKIYYYIVIPAFSRGSCCTMGVRYDRLY
HSV-1  VYAAACNVATADFNRNDGQLLHN.....TQARAAD..AADDRPHRGADWTVHHKIYYYVMVPAFSRGRCCTAGVRFDRVY
HSV-2  VYAAACNVATADFNRNDGRLLHN.....TQARAAD..AADDRPHRPADWTVHHKIYYYVLVPAFSRGRCCTAGVRFDRVY
PRV    QHILWVEMAQVNFRNVGGGLVHN.....RPVRNEN...QPLHPHHDAEWSVLSKIYYYAVVPAFSRGNCCTMGVRYDRVY
HCMV   LNPANIEARHHGVSDVPR..........LGAMDADEPLFVDDYRATDDEWTLQKVFYLCLIPAMTNNRACGLGLNLKTLL
MCMV   LDAAHIEERNPGTSDVAR..........MIAMDQAEPLFVDARRTSDEEMVAQKVYYLCLVPAVLNNHACGAGLNLKHLL
EBV    LAAPQFIERVGNMDEMAAQFVALYGYRVNGDHDHDFRLHLGPYVDEGHADVLEKIFYYVFLPTCTNAHMCGLGVDFQHVA
KSHV   QNRATFINLRGRMEDLVNNLVNIYQTRVNEDHDERHVLDVAPLDENDYNPVLEKLFYYVLMPVCSNGHMCGMGVDYQNVA

VZV    PALQAVIVPEIPADEEAPTTPE..............DPRHPLHAHQLVPNSLNVYFHNAHLTVDGDALLTLQELMGDMAE
HSV-1  ATLQNMVVPEITPGEDCPSDPVT.............DPAHPLHPANLVANTVNAMFHNGRVVVDGPAMLTLQVLAHNMAE
HSV-2  ATLQNMVVPEIAPGEECPSDPVT.............DPAHPLHPANLVANTVNAMFHNGRVVVDGPAMLTLQVLAHNMAE
PRV    QLVQTMVVPET..DEEVGTD................DPRHPLHPRNLVPNSLNVLFHNACVAVDADAMLILQETVTNMAE
HCMV   VDLFYRPAFLLMPAATAVSTSGTTSKESTSGVTPEDSVAAQRQAVGEMLTELVEDVATDAHTPLLQACRELFLAVQFVGE
MCMV   VKLFYTKFFLTADPDSLTAG..............EEALTNN.....PLLAALVRDVATDENVTANQAAEELFHLVAHVPE
EBV    QTLAYNGPAFSHHFT..................RDEDILDNLEN.....GTLRDLLEISDLRPTVGMIRDLSASFMTCPT
KSHV   LTLTYNGPVFADVVN..................AQDDILLHLEN.....GTLKDILQAGDIRPTVDMIRVLCTSFLTCPF

VZV    RTTAILVSSAPDAGAATATTRNMRIYDGALYHGLIMMAYQAYDETIATGTFFYPVPVNPLFACPEHLASLRGMTNARR..
HSV-1  RTTALLCSAAPDAGANTASTTNMRIFDGALHAGILLMAPQHLDHTIQNGDYFYPLPVHALFAGADHVANAPNFPPALR..
HSV-2  RTTALLCSAAPDAGANTASTANMRIFDGALHAGVLLMAPQHLDHTIQNGEYFYVLPVHALFAGADHVANAPNFPPALR..
PRV    RTTPLLASVAPDAGMATVATRDMRTHDGSLHHGLLMMAYQPNDATLLEGAFFYPAPVNALFACADHLGAMRDVGAEVR..
HCMV   HVKVLEVRAPLDHAQRQGLP..DFISRQHVLYNGCCVVTAP....KTLIEYSLPVPFHRFYSNPTICAALSDDIKRYVTE
MCMV   NAQMLEIRAALDPAQRHGAPSAGFESLQHVLYNGFCMTTVP....KLLQEYLTVIPFHRFYSDPGLAATANHDIRVFLND
EBV    FTRAVRVSVDNDVTQQLAPNPADKRTEQTVLVNGLVAFAFSERTRAVTQCLFHAIPFHMFYGDPRVAATMHQDVATFVMR
KSHV   VTQAARVITKRDPAQSFATHEYGKDVAQTVLVNGFGAFAVADRSREAAETMFYPVPFNKLYADPLVAATLHPLLANYVTR

VZV    ....VLAKMVPPIPPFLGANHHATIRQPVAYHVTHSKSDFNTLTYSLLGGYFKFTPISLTHQLRTGFHPGIAFTVVRQDR
HSV-1  ....DLSRQVPLVPPALGANYFSSIRQPVVQHVRESAAGENALTYALMAGYFKISPVALHHQLKTGLHPGFGFTVVRQDR
HSV-2  ....DLARHVPLVPPALGANYFSSIRQPVVQHARESAAGENALTYALMAGYFKMSPVALYHQLKTGLHPGFGFTVVRQDR
PRV    ....AAAQHVPCVPHFLGANYYATVRQPVAQHAAQSRADENTLSYALMAGYFKMSPVAFTHQLRRQLHPGFALTVVRQDR
HCMV   FPHYHRHDGGFPLPTAFAHEYHNWLRSPFSRYSATCPNVLHSVM.TLAAMLYKISPVSLVLQTKAHIHPGFALTAVRTDT
MCMV   FPQYQRCDGGFPLSPIFAHEYHHWHRTPFSCYSAACAHTLESVL.TLAIMHHKMSPVSIAALSRMGLHPGFALTVVRTDT
EBV    NPQ.QRAVEAFNRPEQLFAEYREWHRSPMGKYAAECLPSLVSIS.GMTAMHIKMSPMAYIAQAKLKIHPGVAMTVVRTDE
KSHV   LPN.QRNAVVFNVPSNLMAEYEEWHKSPVAAYAASCQATPGAIS.AMVSMHQKLSAPSFICQAKHRMHPGFAMTVVRTDE
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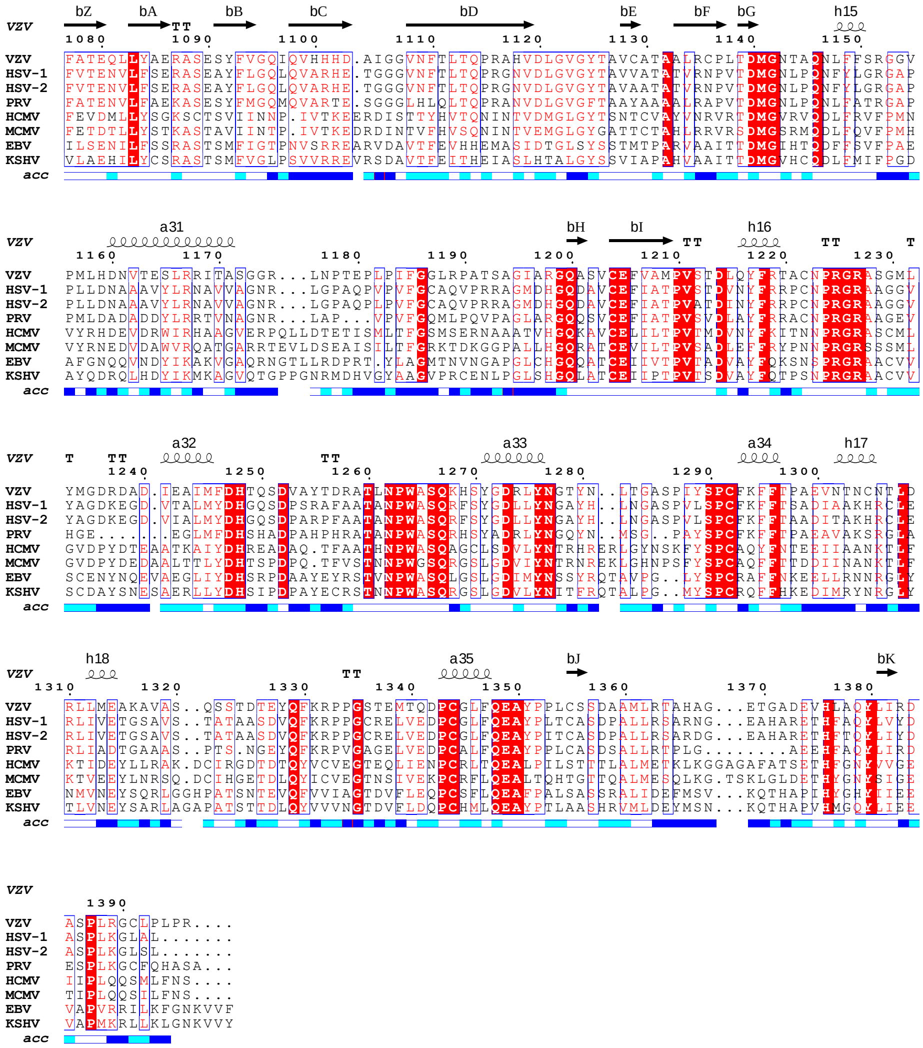

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VZV    FATEQLLYAERASESYFVGQIQVHHHD.AIGGVNFTLTQPRAHVDLGVGYTAVCATAALRCPLTDMGNTAQNLFFSRGGV
HSV-1  FVTENVLFSERASEAYFLGQLQVARHE.TGGGVNFTLTQPRGNVDLGVGYTAVVATATVRNPVTDMGNLPQNFYLGRGAP
HSV-2  FVTENVLFSERASEAYFLGQLQVARHE.TGGGVNFTLTQPRGNVDLGVGYTAVAATATVRNPVTDMGNLPQNFYLGRGAP
PRV    FATENVLFAEKASESYFMGQMQVARTE.SGGGLHLQLTQPRANVDLGVGFTAAYAAAALRAPVTDMGNLPQNLFATRGAP
HCMV   FEVDMLLYSGKSCTSVIINNP.IVTKEERDISTTYHVTQNINTVDMGLGYTSNTCVAYVNRVRTDMGVRVQDLFRVFPMN
MCMV   FETDTLLYSTKASTAVIINTP.IVTKEDRDINTVFHVSQNINTVEMGLGYGATTCTAHLRRVRSDMGSRMQDLFQVFPMH
EBV    ILSENILFSSRASTSMFIGTPNVSRREARVDAVTFEVHHEMASIDTGLSYSSTMTPARVAAITTDMGIHTQDFFSVFPAE
KSHV   VLAEHILYCSRASTSMFVGLPSVVRREVRSDAVTFEITHEIASLHTALGYSSVIAPAHVAAITTDMGVHCQDLFMIFPGD
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VZV    PMLHDNVTESLRRITASGGR...LNPTEPLPIFGGLRPATSAGIARGQASVCEFVAMPVSTDLQYFRTACNPRGRASGML
HSV-1  PLLDNAAAVYLRNAVVAGNR...LGPAQPVPVFGCAQVPRRAGMDHGQDAVCEFIATPVSTDVNYFRRPCNPRGRAAGGV
HSV-2  PLLDNAAAVYLRNAVVAGNR...LGPAQPLPVFGCAQVPRRAGMDHGQDAVCEFIATPVATDINYFRRPCNPRGRAAGGV
PRV    PMLDADADDYLRRTVNAGNR...LAP...VPVFGQMLPQVPAGLARGQQSVCEFIATPVSVDLAYFRRACNPRGRAAGEV
HCMV   VYRHDEVDRWIRHAAGVERPQLLDTETISMLTFGSMSERNAAATVHGQKAVCELILTPVTMDVNYFKITNNPRGRASCML
MCMV   VYRNEDVDAWVRQATGARRTEVLDSEAISILTFGRKTDKGGPALLHGQRATCEVILTPVSADLEFFRYPNNPRGRSSSML
EBV    AFGNQQVNDYIKAKVGAQRNGTLLRDPRT.YLAGMTNVNGAPGLCHGQQATCEIIVTPVTADVAYFQKSNSPRGRAACVV
KSHV   AYQDRQLHDYIKMKAGVQTGPPGNRMDHVGYAAGVPRCENLPGLSHGQLATCEIIPTPVTSDVAYFQTPSNPRGRAACVV
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VZV    YMGDRDAD.IEAIMFDHTQSDVAYTDRATLNPWASQKHSYGDRLYNGTYN..LTGASPIYSPCFKFFTPAEVNTNCNTLD
HSV-1  YAGDKEGD.VTALMYDHGQSDPSRAFAATANPWASQRFSYGDLLYNGAYH..LNGASPVLSPCFKFFTSADIAAKHRCLE
HSV-2  YAGDKEGD.VIALMYDHGQSDPARPFAATANPWASQRFSYGDLLYNGAYH..LNGASPVLSPCFKFFTAADITAKHRCLE
PRV    HGE.......EGLMFDHSHADPAHPHRATANPWASQRHSYADRLYNGQYN..MSG..PAYSPCFKFFTPAEAVAKSRGLA
HCMV   GVDPYDTEAATKAIYDHREADAQ.TFAATHNPWASQAGCLSDVLYNTRHRERLGYNSKFYSPCAQYFNTEEIIAANKTLF
MCMV   GVDPYDEDAALTTLYDHTSPDPQ.TFVSTNNPWGSQRGSLGDVIYNTRNREKLGHNPSFYSPCAQFFTTDDIINANKTLF
EBV    SCENYNQEVAEGLIYDHSRPDAAYEYRSTVNPWASQLGSLGDIMYNSSYRQTAVPG..LYSPCRAFFNKEELLRNNRGLY
KSHV   SCDAYSNESAERLLYDHSIPDPAYECRSTNNPWASQRGSLGDVLYNITFRQTALPG..MYSPCRQFFHKEDIMRYNRGLY
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VZV    RLLMEAKAVAS..QSSTDTEYQFKRPPGSTEMTQDPCGLFQEAYPPLCSSDAAMLRTAHAG...ETGADEVHLAQYLIRD
HSV-1  RLIVETGSAVS..TATAASDVQFKRPPGCRELVEDPCGLFQEAYPLTCASDPALLRSARNG...EAHARETHFAQYLVYD
HSV-2  RLIVETGSAVS..TATAASDVQFKRPPGCRELVEDPCGLFQEAYPITCASDPALLRSARDG...EAHARETHFTQYLIYD
PRV    RLIADTGAAAS..PTS.NGEYQFKRPVGAGELVEDPCALFQEAYPPLCASDSALLRTPLG........AEEHFAQYLIRD
HCMV   KTIDEYLLRAK.DCIRGDTDTQYVCVEGTEQLIENPCRLTQEALPILSTTTLALMETKLKGGAGAFATSETHFGNYVVGE
MCMV   KTVEEYLNRSQ.DCIHGETDLQYICVEGTNSIVEKPCRFLQEALTQHTGTTQALMESQLKG.TSKLGLDETHYGNYSIGE
EBV    NMVNEYSQRLGGHPATSNTEVQFVVIAGTDVFLEQPCSFLQEAFPALSASSRALIDEFMSV...KQTHAPIHYGHYIIEE
KSHV   TLVNEYSARLAGAPATSTTDLQYVVVNGTDVFLDQPCHMLQEAYPTLAASHRVMLDEYMSN...KQTHAPVHMGQYLIEE
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VZV    ASPLRGCLPLPR....
HSV-1  ASPLKGLAL.......
HSV-2  ASPLKGLSL.......
PRV    ESPLKGCFQHASA...
HCMV   IIPLQQSMLFNS....
MCMV   TIPLQQSILFNS....
EBV    VAPVRRILKFGNKVVF
KSHV   VAPMKRLLKLGNKVVY
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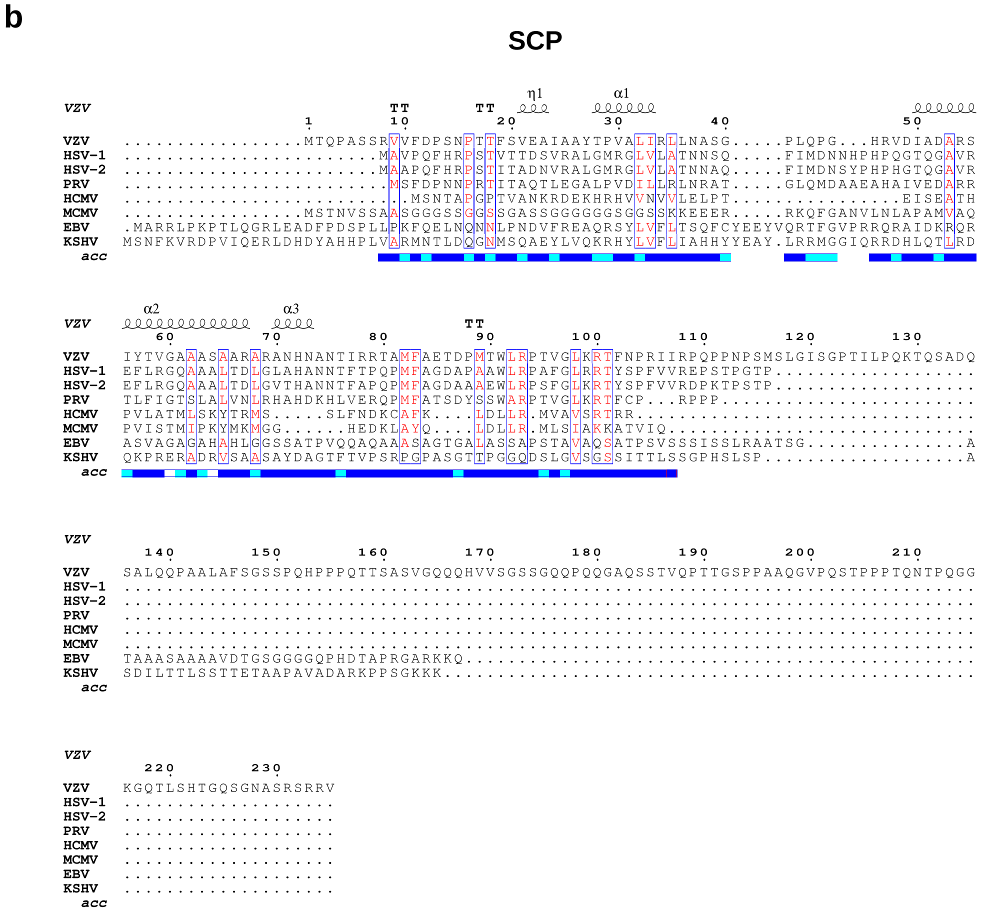

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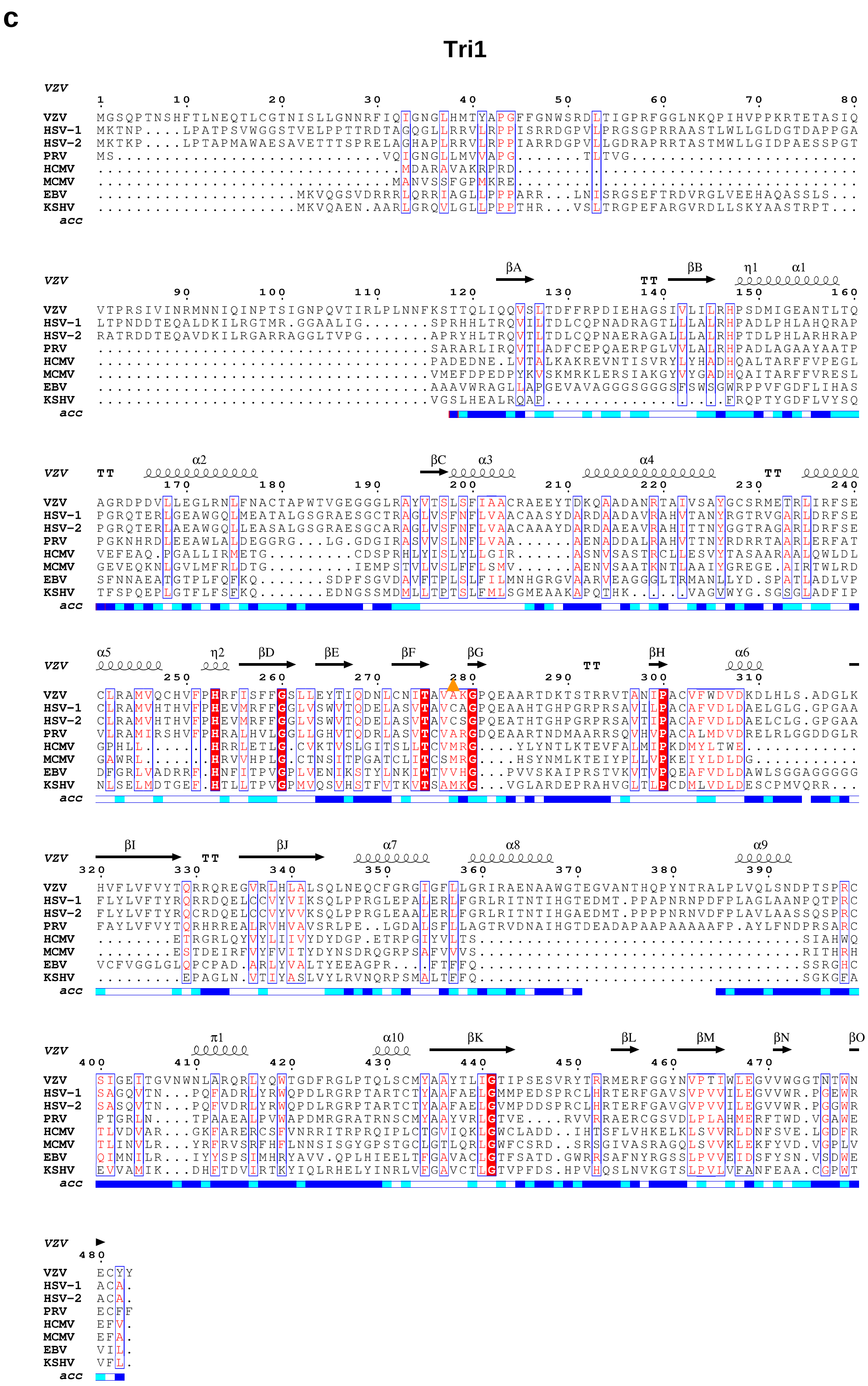

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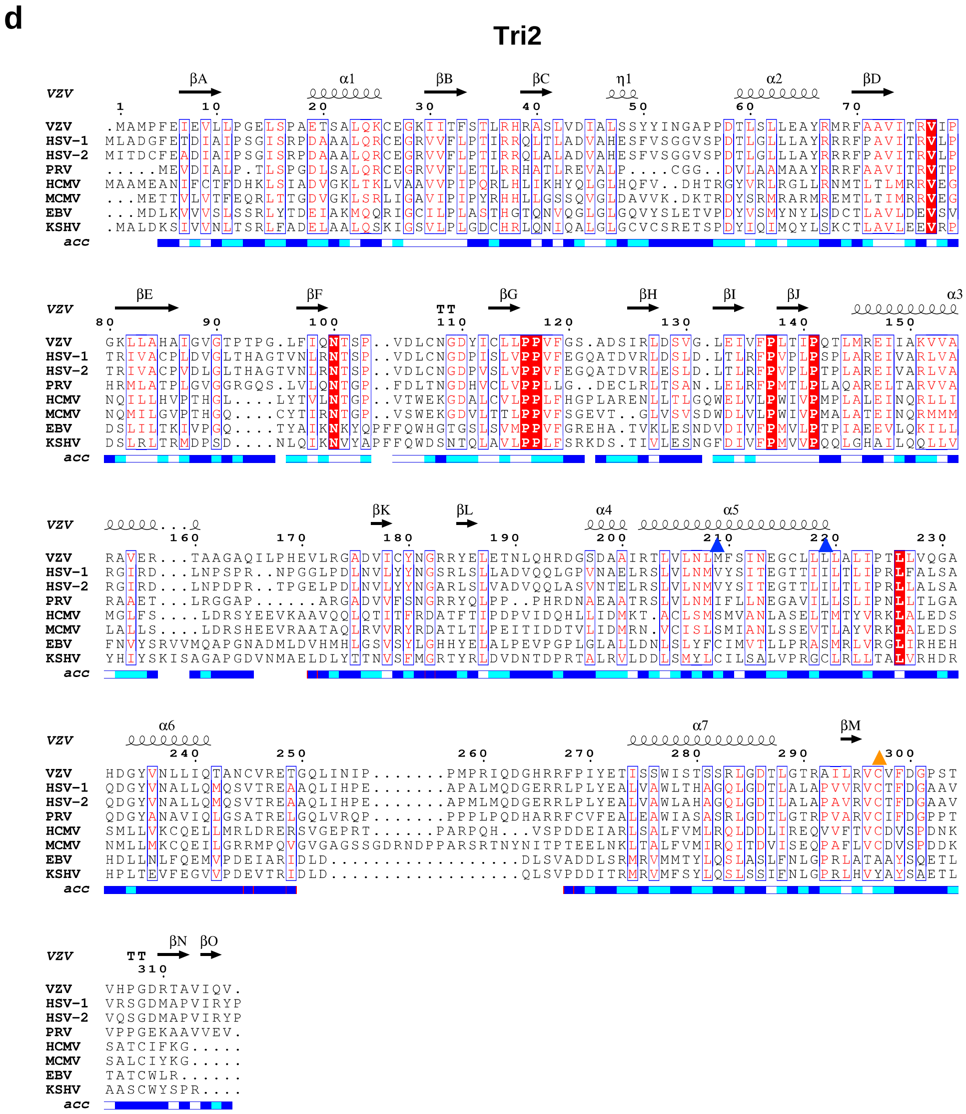

Supplementary Figure 1. Structure-based sequence alignment of representative herpesvirus capsid proteins MCP (a), SCP (b), Tri1 (c) and Tri2 (d).

Espript[1] representation of a structure-based sequence alignment of the capsid proteins MCP, SCP, Tri1 and Tri2 of VZV, HSV-1, HSV-2, PRV, HCMV, MCMV, EBV and KSHV (GenBank accession no. AB097933.1, JQ780693.1, JN561323.2, JF797219.1, GU937742.2, GU305914.1, V01555.2 and GQ994935.1, respectively). Secondary structure elements and relative accessibility are indicated above and below the sequences, respectively. Positions forming intermolecular disulfide bonds in HSV (Tri1 C266 and Tri2B C298) and KSHV (Tri2A C212 and Tri2B C222) are highlighted as orange and blue triangles, respectively.

Supplementary reference

1. Robert, X. & Gouet, P. Deciphering key features in protein structures with the new ENDscript server. *Nucleic Acids Res.* **42**, W320-324 (2014).