

SUPPLEMENTAL DATA 1: Primers successfully used for amplification of the genome of the group D rotavirus 05V0049 (Ch-49).

Segment number (encoded protein)	Designation	Sequence <sup>#</sup> (5'-3')
Segment 1 (VP1)	D-VP1-cms	CACGAATGAATGCTAAAGTNAAGC
	D1-2800as	CTGATCTTGCAGCAGATTCTTCAATTTG
	D-VP1-2000as	CATCTCTAATCCTGTCTAGCAGT
	D-VP1-800s	GCAAATTAGTGTCATCACCWATGWC
	D-S1-800as	GAATACAAATCCAGCTTCGATGTTAG
	D-S1-230as	GACACTATTTTCATAGTCAAAGTTACA
	D-VP1-10s	GGCTATTAAAGCTRTACRATGGGGA
Segment 2 (VP2)	D-VP2-vorns	GTTAGATATACCATCTGTTTTCGCC
	D-VP2c-mas	TTGTGGCATTCCAAANGCTGGATA
	D-VP2-mitte- s	ATATCTCTACAGCTAGCAATTGT
	D-VP2-3end-as	ACTGCATTTATTGGSTCWACWGT
	D-S2-3end	GATCAGATAATTCATGCATCTGAT
Segment 3 (VP4)	D-S4-mas2	GCTTCCACTGGGGCAGCATGGTAGTGT
Segment 4 (VP3)	D-S4mas	GTAGTGTAATTTCTGTATCGTAG
	D-VP3-mas2	CTGGCTCTATATGTTAAATACCTCTCC
	D-VP3c-ms	CACTTATGACTGTGAGCATAAATAATAC
	D-S3-200s	ATTTGCTGTGTGGACACTAGAGGT
	D-3-1400as	AGTGTCTGACTAGACGATCACACCATTC
Segment 5 (NSP1)	D-NSP1-5end-s	TTGTCTTACGTGTGGATGCTTTCACA
	NSP-600s	TTCTTATCTTTGGACATTATGAACCA
	NSP1-1150as	ATGTCCTGCAAATTGTCCARCACATC
	NSP1-1000s	GAAATGTTTCATTGCAAGATTAGTGAA
	D-NSP1-1700s	GATACGTAACATGTGTAATTGGTCCA
Segment 7 (NSP3)	D-Sx-as	CTTAGTTCGGCTGATATGTCTCTA
	D-NSP3-s	GAACTAAGTGATGCAGCATCACA
	D-NSP3-as	CTTCATTGAAATGTCATGCAA
Segment 10 (NSP4)	D-S10s	ATTAGTTGAATCCATCGAGARG
	D-S10as	TAGTTTCCACGCACAGGTAAC

<sup>#</sup> N=A+C+G+T, R=A+G, S=G+C, W=A+T

SUPPLEMENTAL DATA 2: GenBank accession numbers of nucleotide sequences used for primer design and phylogenetic analysis of deduced amino acid sequences. The data of the group D rotavirus 05V0049, which have been generated in this study, are printed in italics.

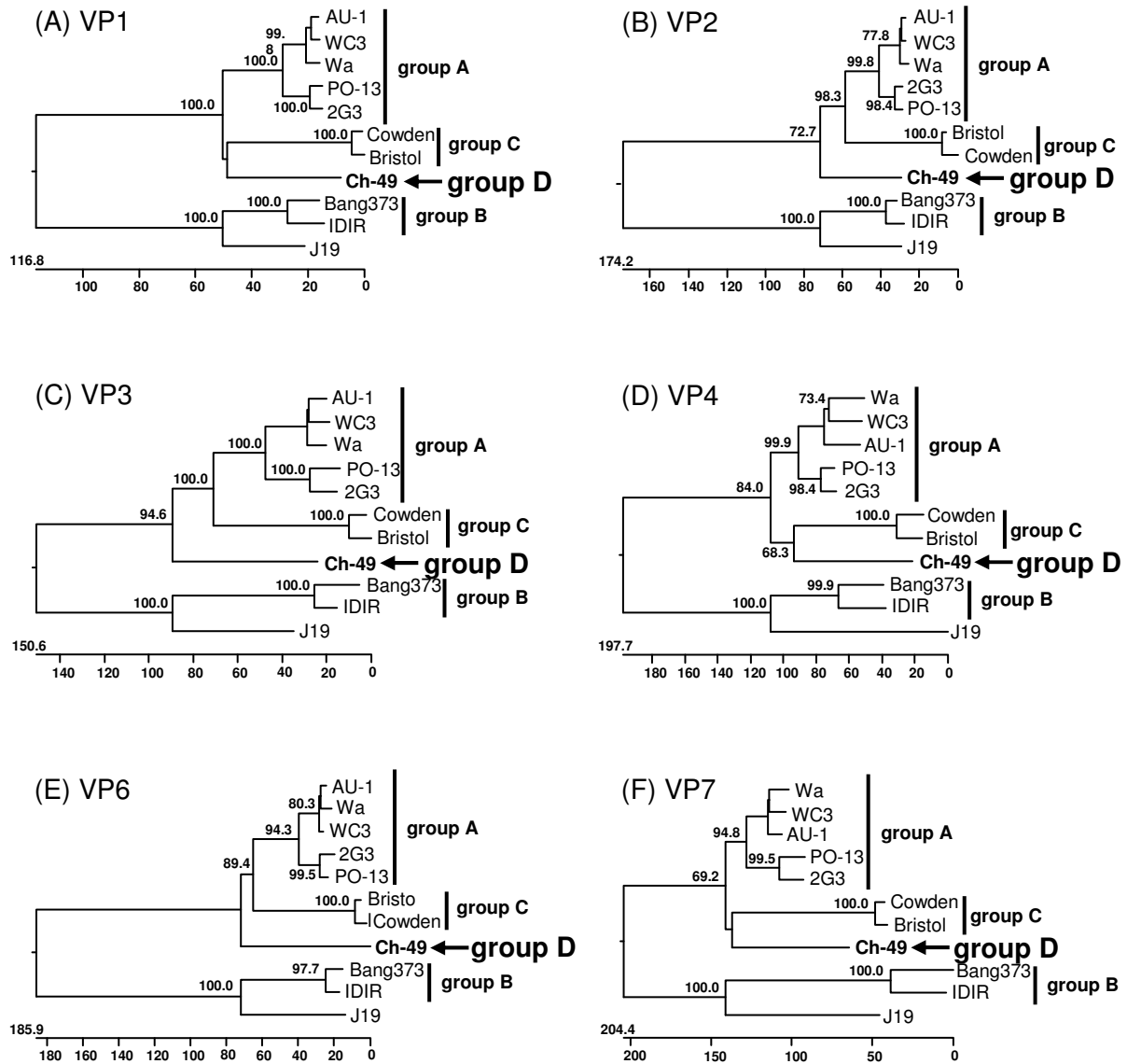
Strain designation	Rotavirus group	Host species	Gene	Accession number
AU-1	A	Human	VP1	DQ490533
Bang 373	B	Human	VP1	ACD39821
Bristol	C	Human	VP1	AJ304859
Cowden	C	Porcine	VP1	P26190
IDIR	B	Rat	VP1	P35942
J19		Human	VP1	YP_392490
PO-13	A	Pigeon	VP1	AB009629
Wa	A	Human	VP1	DQ490539
WC3	A	Cattle	VP1	F560615
02V0002G3	A	Chicken	VP1	FJ169853
<i>05V0049</i>	<i>D</i>	<i>Chicken</i>	<i>VP1</i>	<i>GU733443</i>
AU-1	A	Human	VP2	DQ490536
Bang 373	B	Human	VP2	AAQ18654
Bristol	C	Human	VP2	AJ303139
Cowden	C	Porcine	VP2	P26191
IDIR	B	Rat	VP2	Q86108
J19		Human	VP2	YP_392491
PO-13	A	Pigeon	VP2	AB009630
Wa	A	Human	VP2	X14942
WC3	A	Cattle	VP2	EF560616
02V0002G3	A	Chicken	VP2	FJ169854
<i>05V0049</i>	<i>D</i>	<i>Chicken</i>	<i>VP2</i>	<i>GU733444</i>
AU-1	A	Human	VP3	DQ490537
Bang 373	B	Human	VP3	ACD39824
Bristol	C	Human	VP3	X96697
Cowden	C	Porcine	VP3	P26192
IDIR	B	Rat	VP3	U03556
J19		Human	VP3	YP_392493
PO-13	A	Pigeon	VP3	AB009631
Wa	A	Human	VP3	AY267335
WC3	A	Cattle	VP3	EF560617
02V0002G3	A	Chicken	VP3	FJ169855
<i>05V0049</i>	<i>D</i>	<i>Chicken</i>	<i>VP3</i>	<i>GU733446</i>
AU-1	A	Human	VP4	D10970
Bang 373	B	Human	VP4	AAQ18652
Bristol	C	Human	VP4	X79442
Cowden	C	Porcine	VP4	P26193
IDIR	B	Rat	VP4	P15155
J19		Human	VP4	YP_392492
PO-13	A	Pigeon	VP4	D16329
Wa	A	Human	VP4	L34161
WC3	A	Cattle	VP4	AY050271
02V0002G3	A	Chicken	VP4	FJ169856
<i>05V0049</i>	<i>D</i>	<i>Chicken</i>	<i>VP4</i>	<i>GU733445</i>

AU-1	A	Human	VP6	DQ4900538
Bang 373	B	Human	VP6	AAQ18653
Bristol	C	Human	VP6	X59843
Cowden	C	Porcine	VP6	P14162
IDIR	B	Rat	VP6	Q01754
J19		Human	VP6	YP_392495
PO-13	A	Pigeon	VP6	AB009632
Wa	A	Human	VP6	K02086
WC3	A	Cattle	VP6	AF411322
02V0002G3	A	Chicken	VP6	FJ169858
05V0049	D	Chicken	VP6	GU733448
AU-1	A	Human	VP7	D86271
Bang 373	B	Human	VP7	AAQ18649
Bristol	C	Human	VP7	X77257
Cowden	C	Porcine	VP7	P30217
IDIR	B	Rat	VP7	P30889
J19		Human	VP7	YP_392498
PO-13	A	Pigeon	VP7	D82979
Wa	A	Human	VP7	M21843
WC3	A	Cattle	VP7	AY050272
02V0002G3	A	Chicken	VP7	FJ169861
05V0049	D	Chicken	VP7	GU733451
AU-1	A	Human	NSP1	D45244
Bang 373	B	Human	NSP1	AAQ18656
Bristol	C	Human	NSP1	AJ132204
Cowden	C	Porcine	NSP1	Q00033
IDIR	B	Rat	NSP1	Q86517
J19		Human	NSP1	YP_392494
PO-13	A	Pigeon	NSP1	AB009633
Wa	A	Human	NSP1	L18943
WC3	A	Cattle	NSP1	EF990699
02V0002G3	A	Chicken	NSP1	FJ169857
05V0049	D	Chicken	NSP1	GU733447
AU-1	A	Human	NSP2	DQ490534
Bang 373	B	Human	NSP2	AAQ18659
Bristol	C	Human	NSP2	AJ132205
Cowden	C	Porcine	NSP2	Q86484
IDIR	B	Rat	NSP2	U03558
J19		Human	NSP2	YP_392496
PO-13	A	Pigeon	NSP2	AB009625
Wa	A	Human	NSP2	L04534
WC3	A	Cattle	NSP2	EF990700
02V0002G3	A	Chicken	NSP2	FJ169860
05V0049	D	Chicken	NSP2	GU733450
AU-1	A	Human	NSP3	DQ490535
Bang 373	B	Human	NSP3	AAQ18658
Bristol	C	Human	NSP3	AJ132203
Cowden	C	Porcine	NSP3	P27586
IDIR	B	Rat	NSP3	L09722
J19		Human	NSP3	YP_392497
PO-13	A	Pigeon	NSP3	AB009626
Wa	A	Human	NSP3	X81434
WC3	A	Cattle	NSP3	EF990701
02V0002G3	A	Chicken	NSP3	FJ169859
05V0049	D	Chicken	NSP3	GU733449

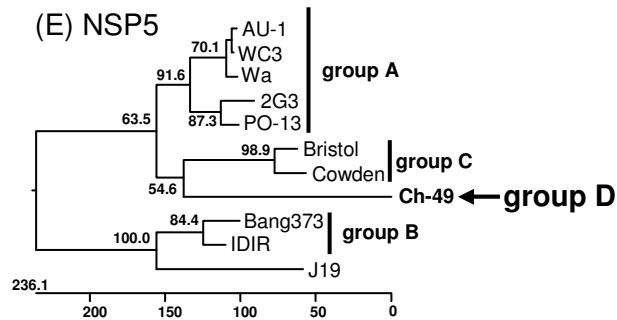
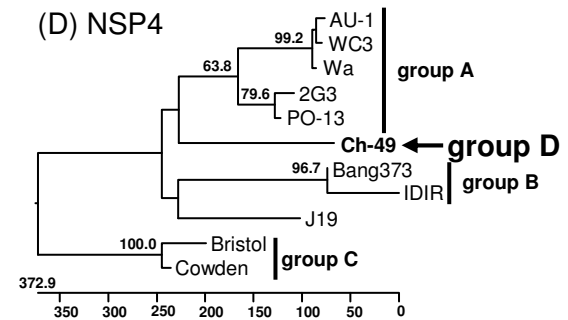
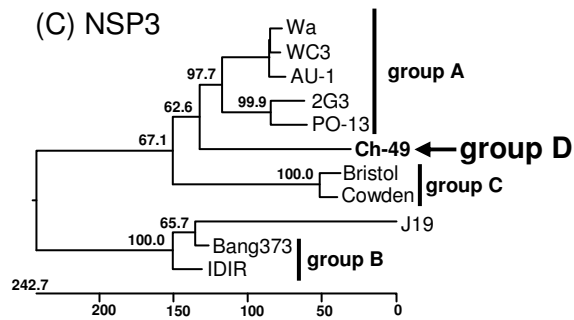
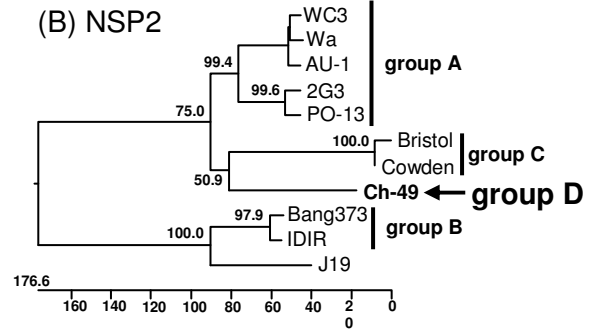
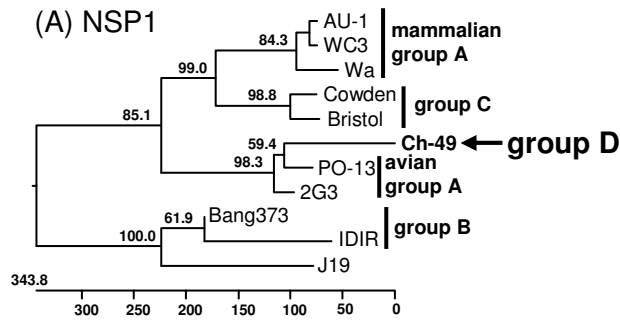
AU-1	A	Human	NSP4 D89873
Bang 373	B	Human	NSP4 AAQ18648
Bristol	C	Human	NSP4 X83967
Cowden	C	Porcine	NSP4 Q9YS17
IDIR	B	Rat	NSP4 U03557
J19		Human	NSP4 YP_392499
PO-13	A	Pigeon	NSP4 AB009627
Wa	A	Human	NSP4 AF200224
WC3	A	Cattle	NSP4 AY050273
02V0002G3	A	Chicken	NSP4 FJ169862
05V0049	D	<i>Chicken</i>	NSP4 GU733452

AU-1	A	Human	NSP5 AB008656
Bang 373	B	Human	NSP5 AAQ18660
Bristol	C	Human	NSP5 M81388
Cowden	C	Porcine	NSP5 P36358
IDIR	B	Rat	NSP5 P30890
J19		Human	NSP5 YP_392500
PO-13	A	Pigeon	NSP5 AB009628
Wa	A	Human	NSP5 AF306494
WC3	A	Cattle	NSP5 EF990702
02V0002G3	A	Chicken	NSP5 FJ169863
05V0049	D	<i>Chicken</i>	NSP5 GU733453

---



SUPPLEMENTAL DATA 3: : Phylogenetic relationship of group A, B, C and D rotaviruses based on the deduced amino acid sequences of the structural proteins VP1 (A), VP2 (B), VP3 (C), VP4 (D), VP6 (E) and VP7 (F). The branches are labelled with the strain abbreviations and their rotavirus group is indicated. The specific hosts of the strains and their GenBank accession numbers are listed in Supplemental Data 2. The trees are scaled in amino acid substitution units and were constructed using MEGALIGN software (CLUSTAL W method, Identity residue weight table, 1000 trials and 111 random seeds in bootstrap analysis, bootstrap values of >50% are indicated at the knots of the branches).



SUPPLEMENTAL DATA 4: Phylogenetic relationship of group A, B, C and D rotaviruses based on the deduced amino acid sequences of the non-structural proteins NSP1 (A), NSP2 (B), NSP3 (C), NSP4 (D) and NSP5 (E). Labelling and construction parameters of the trees are as in Supplemental Data 3.

SUPPLEMENTAL DATA 5: Alignment of the amino acid sequences encoded by the group A, C and D rotavirus genome segments. The sequences were retrieved from the group A rotavirus (RVA) strain Wa, the group C rotavirus (RVC) strain Bristol and the group D rotavirus (RVD) strain 05V0049. The amino acid numbering is indicated left. Amino acid positions, which are identical in all groups are indicated in bold face above the sequences.

5A: Alignment of the VP1 sequences. The motifs A, B, C, D and F are boxed. Amino acid residues, which are involved in recognition of the 3'-terminal genome segment sequence UGUGACC in the group A rotavirus are shaded in grey.

5B: Alignment of the VP2 sequences.

5C: Alignment of the VP3 sequences. The KXTAMD and KX[P/N]G motifs are boxed.

5D: Alignment of the VP4 sequences. The region of trypsin cleavage of VP4 into VP8\* and VP5\* in group A rotaviruses is boxed and amino acids potentially serving as cleavage sites are shaded grey.

5E: Alignment of the VP6 sequences. The histidine residue at position 153, which is involved in zinc binding in group A rotaviruses, is shaded grey. The group-specific antigenic regions identified in group A rotaviruses are boxed.

5F: Alignment of the VP7 sequences. Regions A, B and C implicated in neutralization of group A rotaviruses are boxed. The glycosylation site NST present in group A and C rotaviruses is shaded grey. Conserved cysteine residues are marked with an asterisk.

5G: Alignment of the NSP1 sequences. The NSP1 sequence of the avian group A rotavirus strain 02V0002G3 is included and identical amino acids in this sequence and the group D rotavirus NSP1 sequence are marked with an asterisk. The region with limited sequence identity to TFA-1 in the avian rotavirus NSP1 is boxed. Conserved amino acid residues of the RING finger domain are shaded grey.

5H: Alignment of the NSP2 sequences. The NTPase domain is boxed and functionally important conserved amino acid residues are shaded grey. The proposed catalytically active histidine residue is marked with an arrow.

5I: Alignment of the NSP3 sequences. The RNA-binding domain is boxed. The amino acid residues proposed to be involved in group-specific recognition of the mRNA 3'-terminal ends in group A and C rotaviruses are marked with an asterisk.

5K: Alignment of the NSP4 sequences. Potential glycosylation sites in group A and D are shaded grey. The NSP4 sequence of the group B rotavirus strain Bang373 is included and identical amino acids in this sequence and the group D rotavirus NSP4 sequence are marked with an asterisk.

5L: Alignment of the NSP5 sequences. Serine residues, which are phosphorylated in group A rotavirus NSP5, are shaded grey.

SUPPLEMENTAL DATA 5A – Alignment VP1 (see page 7 for Legend).

.....G.Y.....YL...Y.....I....K.....K.....  
1 -----MGKYNLILSEYLSFVYNSQSAVQIPIYYSS--NSELEKRCIEFHAKCVDSSKKGLSLKPLFEE RVA-Wa-VP1  
1 MAQSIIVVDGDYDALASRYLKFVYDFENVTYQNNYFAT----DKFKKDI EQYLKSIHDGK-ITQSKID EK RVC-Bristol-VP1  
1 -----MGTYNLLQKYLRWLYG-KDATVIPIFITNDQNNQELINSIVDYAKQLAIDDK-YDYKLIEDK RVD-05V0049-VP1

.....S.....K...VE.KL...Y.....L.....YENN.IT.....Y  
62 YKDVDID----NATLLSILSYSDKYNAVERKLVNYA-KGKPLEADLTANEIDYENNKITSELFQSAEEY RVA-Wa-VP1  
66 EKILLDRVPAEERCLISKLVFAYGKGHNVENKLVKYG-VKDALSHAPQKDAKPYENNIITSEIFKEKSEY RVC-Bristol-VP1  
62 LSKCNF----DYEIVSFFTYSDQKYDNVEQKLLKYVNNKVVADLTRNKLYENNYITKDLTYT-EDDY RVD-05V0049-VP1

TD..MDP.I.TS..SN..A.MF.....K..R...LF...A.T...YG.P.HN..YRY....  
126 TDSLMDPAITLSLSSNLAVMFWLERHSNDVADANKIYKRRDLFTIVASTINKYGVPRHNEKYRYEYEV RVA-Wa-VP1  
135 TDIMYDPSINTSCQSNQAMMFTISEMK---LNNIKNAARLEKLFIIAATINKYGMPRHNTRYRYEWET RVC-Bristol-VP1  
126 TDTLMDPSINTSLRSNLNAAMFVIEN----IEDKKIQSRYRHLFEYVASTVSHYGIPVHNQKYRYDYKE RVD-05V0049-VP1

M..KPY.L.W.NSSIEM...V.H.Y.A.ELI..S..NR..LAKL.SSPM..L.....T.E  
196 MKDKPYYLVTWANSSIEMLSVFSHEDYLIKELIILSYSNRSTLAKLVSSPMSILVALIDINGTFITNE RVA-Wa-VP1  
202 MKNKPYHLAAWINSSIEMIACVVDHHTYMIARELIVKSFNTRTSLAKLVSSPMTVLTAMLPIRGTFITTE RVC-Bristol-VP1  
191 MYNKPYYLVPWANSSIEMIFAVSSHELIVLVAEELIINSFSNRSTLAKLTSSPMTTLTSKLDLYSCYMTTE RVD-05V0049-VP1

.LELE.S.K.....I...R.....W.....F....IYS.SFHVG.R  
266 ELELEFSDKYVKAIVPDQIFDELQEMIDNMRKAGLVDIPRMIQEWLVDCSLEKFTLMSKIYSWSFHVGFR RVA-Wa-VP1  
272 NLELEYSNKSINYLISKEMAEDFMAIKQLRDEGLEYPDYEKWFKSPDPLTFPNIALIYSFSFHVGGR RVC-Bristol-VP1  
261 DLELEYSDKIVKSYITDEAQLLEDEQIAELRKEKMTKTADIIDEWQRNPSIDTFPLMAQIYSFSFHVGGR RVD-05V0049-VP1

KQ...DA..DQ...Y.....MY..Y...I...I...L.....D..L...E...LLSMSSASNG..  
336 KQKMIDAALDQLKTEYTEDVDGEMYNETMLIRDEIVKMLEVPVKHDDHLLRDELGLLSMSSASNGES RVA-Wa-VP1  
342 KQALSDAVYDQITVTYSDNVNMEMYKEYSERIENEIFTILKDKIIEHDKRLEEYELSALLSMSSASNGIL RVC-Bristol-VP1  
331 KQMLLDAVTDQLSIEYSDTFDKDMYNNMTNNI IKIIDDMLRDHIKKEDKMLLNAEIALGLSMSSASNGES RVD-05V0049-VP1

R...FG...STKKNMHV.DDI...Y.....P.V...PIPLGRRDVPGRTR.IFILPY.YFIAQH.  
406 RQLKFGKRTIFSTKKNMHVMDDIAHGRTYTPGVIIPVNVDRPIPLGRRDVPGRTRIIIFILPYEYFIAQHA RVA-Wa-VP1  
412 FAEIMLNKAKREYSEFYQSANQLVSYGDVTRYLDSNSILCFDVSQWDASQHNTKVLRRSIIIRAMKRL RVC-Bristol-VP1  
401 RVIKFGRRTRVSTKKNMHVMDDIFNKQYDL-DVPDVNENNP IPLGRRDVPGRTRVIFILPYPYFIAQHS RVD-05V0049-VP1

..E..L...K...E.EFYSQ..Q.LSYGD..R.L.....DVSQWD.S.HNT...R..I.....L  
476 VVEKMLSAYAKHTRREYAEFYQSQNQLLSYGDVTRFLSSNSMVLVYTDVSSQWDSSQHNTQPFKGIIMGLDML RVA-Wa-VP1  
481 FAEIMLNKAKREYSEFYQSANQLVSYGDVTRYLDSNSILCFDVSQWDASQHNTKVLRRSIIIRAMKRL RVC-Bristol-VP1  
470 VVELYLRESKHIKEFSEFYQSQSLLSYGDTNRYLNQSTIIVYADVSQWDSSKHNTTPLRNAILKAIEQL RVD-05V0049-VP1

...T.....N.Y...Q..L.S.V.I.....K...OYGA.ASGEKQTK..NSIAN.ALI.TV...  
546 SNMTNDPKVQVTLNLYKQTQINLMDSYVQIPDGNVIKIOYGAVASGEKQTKAANSIANLALIKTVLSRI RVA-Wa-VP1  
551 KQLTHNINIHKAINIYIQSQENLENSYVLIDK---KAIYOYGATASGEKQTKIMNSIANKALIQTVLGKL RVC-Bristol-VP1  
540 KSYTTEKIVITALNNYALTQMKLNKNSFVTIGN---KVLVOYGAVASGEKQTKLMNSIANLALITTVINYL RVD-05V0049-VP1

.....K.IRVGDGDDNY...F.....Y...M..KVKAL...G.E.AKRY..AGG  
616 ANKYSFIIKIIIRVDGDDNYAVLQFNITDVTQKMQVDVSNVRYIYSRMMNAKVKALVSTVGIKRYIAGG RVA-Wa-VP1  
617 MTDYTFDVKMIRVDGDDNYAIVRFPFIAITEKLLSEFTSKLRSYSEMMNVKVKALASLTGCEIAKRYVAGG RVC-Bristol-VP1  
606 NVGESYRIKIIIRVDGDDNYFIMEFDRKVKDKQLVTVVSNVAVKDTYGRMDVKVKALTATTGLEMAKRYIAGG RVD-05V0049-VP1

..FFRAG.N.L..EKR.....D.AA..Y.NY.VN..RG...R.FIL.KI.QM.TS..ITG..RLFP..  
686 KIFFRAGINLNLNNEKRGQSTQWDQAAILYSNYIVNKLRFETDREFILTKIIQMTSVAITGSLRFP SER RVA-Wa-VP1  
687 MLFFRAGVNLHHEKRNQDSAYDMAATLYANYIVNALRGLTMSRTFILTQICQMTSIIKITGTLRFPMS RVC-Bristol-VP1  
676 RLFFRAGVNLNNEKRTHHTTYDQAIIYANYLVNKMRYGYNMERIFILCKIMQMTSVKITGSLRFPASL RVD-05V0049-VP1

.L..NS..KVFD..D...Y.....Q...S...KS..AD.IA.S..F..YV..L...L...N.  
756 VLTTNSTFKVFDSEDFIIEYGTNDDEVYIQRAFMSLSQKSGIADIEASSQTFKNYVNLKSDQLLISKNV RVA-Wa-VP1  
757 ILALNSAFKVFDEVDYINYPISNLFQLQRKLSIK-AKSKADIANSKSPQFKSYVELLNKSLTTDENP RVC-Bristol-VP1  
746 MLTTNSPKYKVFDDVDFVQTYNSSTIAIHLQKMLISVSQVKSNLADDIKSEKFTNYVQFLTKKLLVHNNK RVD-05V0049-VP1

IV..GI..TEKAKLNSY.P...EKR..Q.....LQ.P...S...TIND...I.....  
826 IVSKGIAVTEKAKLNSYAPVYLEKRRQISALLTMLQKPVSFKSN-KITINDILRDIKPFITSEANLPI RVA-Wa-VP1  
826 IVSDGIRLTEKAKLNSYAPIALEKRRDQFSIMVSFLQNPFTFKSETVVTINDVLYFISGFIKIDSSTVLP RVC-Bristol-VP1  
816 IVEMGIARTEKAKLNSYPIIANEKRNQLKTLMTFLQPTPKMST-DVTINDMMKIIINEYNTYTIITDKY RVD-05V0049-VP1

.....MP.LP.....G.R.....S..SK.I..Y.VY.P...ELY.....Y..  
895 QYR-KFMPPLPNNVQYVICIGSRTYQIEDSGSKSSISKLISKYSVYKPSIEELYKVISLREQEIQLYLV RVA-Wa-VP1  
896 KEENNTMPLLPKAIKRTLSYFGLRTHDYDIKGSSTVSKI IKQYSVYTPGIEELYEIVNKSVDITIRGYFA RVC-Bristol-VP1  
885 GIQPNPMLLPENIQFAMSHVGARVYQIEESAARSAISKLISNYTVYKPSVDELYKVINSNERILFEYVT RVD-05V0049-VP1

S..VP..D...Y...Y..D...IL..Y.Y...S.NY..YQL...NS.....K.P...F..  
964 SLGVPVVDAGTVGSRYSQDKYKILESYYVNLNLSINYGQYQLFNFNPDLEKLRIRIPFKGKIPAVTFIL RVA-Wa-VP1  
966 SFNVPKADVDTYISTQMYKHDFKILQAYIYNLLSVNYGMYQLVDLNSARFFDHVIHTPKMAKTPAVFMI RVC-Bristol-VP1  
955 SFGVPTRDVTAYLSAKLYKDRNLILLESYIYQIMSVNAYQLFNLNSELFDKYINIVTYMKIPSVNFI RVD-05V0049-VP1

.....L.I.N.....K....LW...N....SPY.....F..  
1034 HLYAKLEIINYAIKNGAWISLFCNYPKSEMILKWKMMWNITALRSPYTSANFFQD RVA-Wa-VP1  
1036 DLALRLKIINHCIKGEIITVSVHANKTDYKLRMLWNVKTMSYKSNMFDE RVC-Bristol-VP1  
1025 FTYLKLVLNKMQLQERKLYKAYCQIPKHLHLWKSINLATISSPYTIANFFQE RVD-05V0049-VP1



SUPPLEMENTAL DATA 5B – Alignment VP2 (see page 7 for Legend).

```

.....R.....E.....K.....
1  -----MAYRKRGA KRENLPQQNER-----LQEKEIEKDV DV-----TMENKNNNRKQQ----- RVA-WA-VP2
1  -----MISRRRRNNQKNIEKEK-----QLET I INKEVK-----ENKDSMKEDK----- RVC-Bristol-VP2
1  MRKNKLIQDKEREKSKS KDETRTERGKTRNTNSLKNGVETDCNDGNCVDNVNVD SKNDKKEERTKDY RVD-05V0049-VP2

.....S.....K.....L.T.....K.....EI.K.IP.....I.
44 LSDKVL SQKEEII TDAQDDIKIAGEIKKSSKEESKQLLEILKTKEDHQKEIQYEILQKTIPTFESKESIL RVA-WA-VP2
41 LVVTEES-NGDVTTAKEQSNINLQKNLDLVKEVMNIQNQLNTVVTENKVEIEEIVKKYIPSYNTDSLIV RVC-Bristol-VP2
71 IKSEKSDGASDTKEKENGSKDKVVSNEENKKEKELAEILKTKEEVTKDL DKEIFKYIPTFDVNIDIV RVD-05V0049-VP2

KK...I...K...LFR.F.....Y.....L..RW.WKL.KD.LP...Y.VR..F..LY..L.
114 KKLEDIRPEQAKKQMKLFRIFEPKQLPIYRANGEKELRNRWYWKLLKDDTL PDGDYDVREYFLNLYDQILI RVA-WA-VP2
110 KKLTEIQESSAKTYNTLFR LFTPVKSYLYDINGEKKLSTRWYWKLLKDDLPAGDYSVRQFFLSLYLNVL RVC-Bristol-VP2
141 KKMLDIPSVSPKDEKTLFRLFDLKNLPLDYTSAVRTLETRVWVKLLKDDLPDDSYSVREYFQGLYEHILS RVD-05V0049-VP2

..PDY..L..MAV.N..S...GK.VD.....I.....D.....R.....N...YP.I.
184 EMPDYLLLKDMAVENKNSRDAGKVVDSETANICDAIFQDEETE GVVRRFIADMRQQVQADRNIVNYP SIL RVA-WA-VP2
180 EMPDYIMLRDMAVDNPNYSAEAGKIVDGKSKEILIELYQDMTEGYIRRYMSELRHKISGETNTAKYPAIL RVC-Bristol-VP2
211 IIPDYIMLRMAVDNTRSRYNGKIVDKESLDIVNKL FVDDQIDNQIRLYISDMNHHTIARTNTIIPAIM RVD-05V0049-VP2

.P.D...N.YFL..QL...L...I...IP....D.NY.....R....L.QDR...H....
254 HPIDHAFNEYFLNHQLVEPLNNEIFNYIPERIRNDVNYILNMDMNL P STARYIRPNLLQDRNLNLDHDFE RVA-WA-VP2
250 HPVDNELNQYFLEHQLIQPLTTRNIAELIPTQLYHDPN YFNIDA AFLTNSRFVPPYLTQDRIGLHDGFE RVC-Bristol-VP2
281 NPIDHEFNEYFLNAQLIEELNTGVIMMIPRQLRADSNYNFALENSFNHTARYLPQLLMQDR IAIHE-IS RVD-05V0049-VP2

S.WD..T...Y..AR...PDL...L.....QI..M...L.LEA.T.Q.E...L.GI...AN..FK..I
324 SLWDTITTSNYILARSVVDLKEKELVSTEAQIQKMSQDLQLEAL TIQSETQFLAGINSQAANDCFKTLI RVA-WA-VP2
320 SIWDSKTHADYVSARRFPDLT--ELVDAEKQIKEMAAHLQLEAITVQVESQFLAGISAAAANEAFKFII RVC-Bristol-VP2
350 SLWDSMTTANYVLARSVIPDLK--DLLPADVQITEMAANLNLEALTTQVETAYLSGITTESANE CFKII RVD-05V0049-VP2

...LS.RT.....NY.SL.S.M.L...P...LRES.....LAI.N...YPA.G....Y.....
394 AAMLSQRTMSLDFVT TNMYSLSIGMWLLTVIPNDMFLRESLVACELAIINTIVYPAFGMQRMHYRNGDPQ RVA-WA-VP2
388 GSVLSTRITAVEFITSNYMSLASCMYLMTIPMSEIFLRESLVAMQLAIINTLIYPALGLAQMHYQAGEVR RVC-Bristol-VP2
418 ASLLSTRITISMSYSGNNYVSLFSGMYLLSIIPFNSMLRESVISLQLAIVNSILYPAFGLPQLTYTYLDQD RVD-05V0049-VP2

TPF..A....N...WL...N..F.....G.....I..G...N.....L..Q.F.T...
464 TPFQIAEQIQNFQVANWLHF INNNRFRQVVIDGVLNQITLNDNIRNGQVINQLMEALMQLSRQQFPTMPV RVA-WA-VP2
458 TPFELAEMQVANRSIRQWLHHCNTLQFGRQITTEGIHLRF TNDIMTGRIVNLFSTMLVALSSQPFATYPL RVC-Bristol-VP2
488 TPFMIAQQTISNRRVREWLQHVNNFDFPRVNRDGVFVYVTPDRIRYGNIVNLFSETVTELANQQFRTYTL RVD-05V0049-VP2

.Y.R...R...L...R..Q..DLTRL..YNY..L....M.....TLT.E...T..TSL..LI.N..V
534 DYKRSIQRGILLSNRLGQLVDLTRLVSYNYETLMACV TMMNQHVQTLTTEKQLT SVTSLCMLIGNTTV RVA-WA-VP2
528 DYKRSVQRALQLLSNRTAQIADLTRLIVNYTTLSACIVMMNHVGLT LVERIQATSLTSLMMLISNKTV RVC-Bristol-VP2
558 EYQRAIKRAIQLFVRRVQILD LTRLMFYNYEVLLRMI VMSQQRMITLTTEKLDLTRVTSLLFLISNTVV RVD-05V0049-VP2

.P.P..L..Y...N.NF..NYNE.I...VA...A..RLNLY..K...V..F...L.IF...P.DQMY
604 IPSPQTLFHYININNVN FHSNYNERINDAVAIITAANRLNLYQKKMKSIVEDFLKRLQIFDVPRVPPDDQMY RVA-WA-VP2
598 IPEPSSLFSYFSSNINFLTNYNEQIDNVVAEIMAA YRLNLYQQKMLMLVTRFVSKLYIFDAPKIPPDQMY RVC-Bristol-VP2
628 FDPDPQSLMRYYSANRNF LNNYNERIDDTVARLYASNRLNLYRKKVLSIVTDFVRNLYIFEATKVPADQMY RVD-05V0049-VP2

.LR.RLR..P.E.RR..F....N...I...S..I.GV.....L...E..G..N.....
674 RLRDRRLRLPVERRRRLDIFNLIILMNMEQIERASDKIAQGV I IAYRDMQLERDEMYGYVNIARNLDGYQQI RVA-WA-VP2
668 RLRNRLRNIPVERRRADVFRIIMNRLDIEKTSERICQGVLLSYTPMP LTYVEDVGLTNVINDTNSFQII RVC-Bristol-VP2
698 NLRDRRLRRLPLENRRQRVFDIMMNNQDQI IHASDKIAHG VVLFRRNERELINDEYEGLTNVVRNIDG-NAL RVD-05V0049-VP2

..EE...GDY.....LL.....L.G..P..T.....K.D...FA...K.R...LKP...IN
744 NLEELMRGTGDYGOITNMLLNNQPVALV GALPFVTDSSVISLIAKLDATVFAQIVKLRKVDTLKPILYKIN RVA-WA-VP2
738 NIEEIEKTGDYSAITNALLRDTPIILKGAIPYVTNSSVIDVLSKVD TTVFASIVKDRDISKLPKIFIIIN RVC-Bristol-VP2
767 SIEEIRNRGDYQPLIDSL LQTNSVALKGVIPFNTTHNPFELIAKVDVSI FAPVLKDRDINKLKPVKYAIN RVD-05V0049-VP2

SDS...Y.V.N..W.PT..T.VYK...FD...S...L.S.L.F.V..D.....TV.PI.AV..D.
814 SDSNDFYLVANYDWIPTSTTKVYKQVPQPFDFRASMHLT SNLFTVYSDLLSFVSADTVEPINAVAFDN RVA-WA-VP2
808 SDSSEYYLVHNNKWTPTTTTAVYKARSQQFDIQHSVSMLESNLFFV VYNDLFKYIKTTTVPINAVSYDG RVC-Bristol-VP2
837 SDSQSFYIVANNWKPSTSTAVYKLRQRFDFQTSLFQLT SRFFQVFKDPLTFLTIRTVDP I IAVASDN RVD-05V0049-VP2

.RI....
884 MRIMNEL RVA-WA-VP2
878 ARIMQET RVC-Bristol-VP2
907 RRIILSV RVD-05V0049-VP2

```

SUPPLEMENTAL DATA 5C – Alignment VP3 (see page 7 for Legend).

**M.....Y.....ENAF..N.....IL.....K.....GI..**  
1 MKVLALR-HSVAQVYADTQTYLHDDSKDEYENAF LISN-LTTHN ILYLN----YSLKTLKILNKSGIAA RVA-WA-VP3  
1 MRVLGLFERGNNLN FADTYVYTWNQQYSYHENAFLISNQVATTIILYLDGININEVNKAFELLNSNGIPA RVC-Bristol-VP3  
1 MRLVVCSDQSKTPLVNA TLRYRSNVHPAENAF LACN-QIAE IILVIN--CSNFDFKFSENVR SNGICC RVD-05V0049-VP3

**.....D.....V.....N.....**  
64 VEQSPDEL FALIRC NFYDYEDNIVYLHDYSYTTNNEIRTDQHWITKTDIIDYLLPGWKLYVGYNGKN RVA-WA-VP3  
71 LI IK-PDHIGIFTSSNF TYDWQYKIVYFHEYTYKNEFIVSDEFWLYTNINELLP--YKILYERGMRE RVC-Bristol-VP3  
67 VDTR-----GN-----DDL FKS VVSGNCLFNENEVITIDYGYRYKTLRMTFYIFSPKTEFKWES RVD-05V0049-VP3

**.....DDDI...Y.Y.....F.....R.....R**  
134 TRGHYNFSFICQNAATDDDIIIEYIYSN-----ELDFQNFLLRKIKERMTSLPIARLSNR RVA-WA-VP3  
138 LYAGR--EYTLNTATDDDILYKYIYEKDSIMNGTDYKLYD TNSVKNFVHFMRLLRMRFAVPPDQLSNR RVC-Bristol-VP3  
124 VPPSE-----LCNDDDILTNYLYRS D-----KSVKFE EF IQQKILERLSFALRHEKYESR RVD-05V0049-VP3

**..R.....I..G.RNES...L.....F..GQ.**  
190 VFRDKLFPSIVNIHKVINVGPRNESMFTFLNFPTIKQFSNGAYIVKHTIKLKQEKWLGKRVSQFDIGQY RVA-WA-VP3  
206 ITRSRVFS-----KSRIHIGLRNESIPQALDNIHSQWINYSANGIVISELKGLGSYSEKKISEFGIGQF RVC-Bristol-VP3  
174 LLRTKVYN--LYKNEKPIVIGPRNESMFELLS-INFTYYSANEFTVKDLSSLQSSRFREITLNEFDVGGY RVD-05V0049-VP3

**KN..N.....Y..N.....G..P..W.....D.....**  
260 KNMLNVVTIYYYNLYYSKPIIYMLGSAPSYWIYDIKQYSD-PTFETWDP LDT-----PYSTH HKEL RVA-WA-VP3  
270 KNYMNF LTLMFYIKNMK-KPSC TII GAAPGYWISSMKKY---FTIVTYDNKE-----VDSTEHHNRY RVC-Bristol-VP3  
241 KNMLNFLSLYYYHVNHYGLPNRIVIGSYPSKWLILLRNSGLNCEIILYDVVKLDDSQKDIREFVFRNKFY RVD-05V0049-VP3

**..D.....N..Y.D.R.....RK..E..T.....**  
323 FFDKDVNKLKDN SVLYIDIRTD RGNMDWKEWRKIVEQQTVSNLNIAYKYLSTGKAKVCCV KLTAMDLELP RVA-WA-VP3  
329 FTDDD IVNVKTN-GVYIDVRSEFKTNDWRQRRLIEEETIKWLEISYKLEENKRVEAILLKMTAMDGEIP RVC-Bristol-VP3  
311 TFDDSYTDI IDNSIYLDARIEYSR DSEIDRRKIELDTKIYFEWCDRLVRHFNKVTIMCKY TAMNGNLY RVD-05V0049-VP3

**.....T...SE.Y.....K...K..Y..I.....NVFI.....T...A**  
393 ITAKLLHHP TTEVRSEFYAILDVWDIIITIKRFIPKGVYAFINNVTTENVF IQPPFKLKTS--PTDYIVA RVA-WA-VP3  
398 -DGYCVHSPTTYRKSEY YLLIDKHI IKRQKIKVTKSLMYNAINTIYSDNVFISGKYS LRG---KTEG VLA RVC-Bristol-VP3  
381 KNIKLVNHIRT SIRSEVYLLFNIDDSSEKVIYIDKGIYSFIQNHITDNVFIGTKFKVTKINKSTRPVVA RVD-05V0049-VP3

**LY.LSN..N.....N.....T.R..N.....D...L.....I.TS..G..**  
461 LYALSNDLNSRQDVINL INKQKQSLITVRINNTFKDEPKVNFKNIDWTF LPTDFELKD-SIITSYDGC L RVA-WA-VP3  
464 LYCLSNTINQKEKVIQYANSFSGTCMTVRLNNTYEVDKIIDFKTNSDHTFLPSDFTC SLNLTILTSYRGYA RVC-Bristol-VP3  
451 LYSLSNTLNDRKLCLSYINTTRGILT YRARNFTNEDLISYDFKDY SCLRTELKSSD NSIVTSLSGAL RVD-05V0049-VP3

**G.FG.....K..GN.H...I.....D...H...SR.S...RF.E.AT..SGY.FRD.....**  
530 GIFGLSISLSSKPTGNNHLEIINGTDKYDKLDQYANHMGSRRSHQIRFSESATSYSGYIFRDLSNN--N RVA-WA-VP3  
534 GIFGYAITKDIKSNGNHIIYIIPNARDENNFDTFGSHLGLSRYSHSKRFSESAT TMSGYIFRDMVSG--K RVC-Bristol-VP3  
521 GVFGCQTTFNDKADGNVHFHVIKGIERTN-IDKYALHLQISRRSQFLRF TETATSLSGYLF RDLASEGFS RVD-05V0049-VP3

**.....T...N..SGHV.NA...R.....D...W...H.....Y..H...E...A...A...**  
598 FNLI GTNVENS VSGHVYNA LIYYRYNYAFDLKRWIYLHSIG-KVAVEGGRYE HAPIELIYACRS AKEFA RVA-WA-VP3  
602 ENMQD TDKDN YASGHVNAIAHYRFDYTYDIVGWLRLHKTG-QFKVKS DIYKEHTDSEIRNAIESAYVY RVC-Bristol-VP3  
590 NDLSETD SNNAASGHVYNA LIYFRYNWRFDLIYWMEKHINSNQVSGVTNYYKHSIREIVNAINA AKKYA RVD-05V0049-VP3

**..L..D.....Y.....**  
667 ILQDDLTVLR YANEIEGYINKVYSITYADDPNYF IGIKFNSIPYEYDVKIPHLTLGVLFISDNMIHDVIT RVA-WA-VP3  
671 LLDGDKVGEKYS-----KKMM RVC-Bristol-VP3  
660 ELQND ETLINYN-----TLI RVD-05V0049-VP3

**.....**  
737 VLKMKTELFKMEI STSYTYM LSDNTYVANASGV LSTYFKLYNMFYRNHITFGQSRMFI PHITLSFSNKQ RVA-WA-VP3  
687 EIWEVQV RVC-Bristol-VP3  
676 QLYPTNLLRR RVD-05V0049-VP3

**.....**  
807 TVRIESTKLRINSIYLRKIKGETVFD MSE RVA-WA-VP3  
694 RVC-Bristol-VP3  
686 RVD-05V0049-VP3

**KXTAMD**  
**K:TAM.....**

**KX[D/N]G**  
**K..GN.H...**

SUPPLEMENTAL DATA 5D – Alignment VP4 (see page 7 for Legend).

**MAS . . . . L . . . . . P . W . G . . . . S . . . . .**  
1 MASLIYRQLLTNSYSVDLHDEIEQIGSEKTON-VTINPSPFAQTRYAPVNWGHGEINDSTTVEPMLDGPY RVA-Wa-VP4  
1 MASSLYAQLISQNYYSLGNELSDQQTNKVVS-DYVDAGNYTYAQLPPTTWGSGSILKSAFSTPEITGPH RVC-Bristol-VP4  
1 MASSLWTSLNASLQDLDIYNRLDKKENHETKNQINVTMTLGTASLGPVKWSSGPTFNSSLTEGLMGPNS RVD-05V0049-VP4

**. . . . . N . . . . . G .**  
70 QPTTFTPNDYWILLINSNTNGVYESTNNSD-----FWTA-VVAIEPHVNPVDRQYT---IFGE RVA-Wa-VP4  
70 TNTVIEWSN----LINTNTWLLYQKPLNSVR-----LLKHGPDYNSNLAAAFELWYG---KSGT RVC-Bristol-VP4  
71 QQSMNTS QLVLQFSSYGSFFYVYFDYSNTSTNNLAHQLVRFQTLKNDQSTREEGIFLCEQCNGITFAGH RVD-05V0049-VP4

**. . . . . N . . . . .**  
125 SKQFNVSNDNSNKKWFLEMFRRSSSQNEFYNRRTLTSDTRFVGILKYGGRVWTFHGETPRATDSSSTANLN RVA-Wa-VP4  
122 TITSVYYNTINNQNKTHDANSCLILFWNEGSTQLEKQVVTFNWNVGGILIKP INSSMRICMSGMENFN RVC-Bristol-VP4  
141 TLNLTGTGTVKIVKVVENDTATALGSMYYNPAGYVLSASLKHETANNTITVKLYNPTARLYGDENVHQA RVD-05V0049-VP4

**. . . . . Y . . . . . P . . . . . VP8\*/VP5\***  
195 NISITIHSEFYIIPRSQ-----ESKNEYINNGLPPIQNTNRNVVPLPLSSRSIQYKRA RVA-Wa-VP4  
192 NDSFNWENWNHEFPFRSNPG---ININMYTEYFLASSDPYTYLKNLQOPTAKTVDMKMMKMNNDNSKLGDG RVC-Bristol-VP4  
211 GQQIFAITSAYVSVKVPDGLITTPASAPQLYAFEVEENLYNIVRQQPNCRSRKLNGLANINMQMTTYDA RVD-05V0049-VP4

**. . . . . SK . SLW . E . Y . DI . . . . . I . . . . G . GY . . . . . K . . . . Y . Y . R . E . V . A . T .**  
248 QVNEDIIVSKTSLWKEMQYNRDIIIRFKFGNSIVKMGGLGYKWEISYKAAANYQYNYLRDGEQVTAHTTC RVA-Wa-VP4  
259 PINVSNIISKDSLWQEVQYVRDITLQCKILSEIVKGGWGYDYSVTFKTVNHTYSYTRAGENVNAHVTI RVC-Bristol-VP4  
281 DVSVEEVISKESLWKEVRYANDIELKLVLSVITRASGLGYKFAVAFKPHSYDYNYMRGTERVNAVYVTS RVD-05V0049-VP4

**S . N . . . . . G . . . . . LPTDF . I . . . . . VY . DY . DDS . . F . NMVYVR . . . . . A . . . . . Y**  
318 SVNGVNFYSYNGGFLPTDFGISRYEVIKENSIVYVDYWDSDSKAFRNMVYVRSALANLNSVKCTGG---SY RVA-Wa-VP4  
329 SFNNVKERAYGG-SLPTDFKIGRFDILDTSYVYIDYWDSEIFKNMVYVRDVRADIGGFQYSYSSEMSY RVC-Bristol-VP4  
351 SVNNIFVTSENG-PLPTDFGIDELQYIGVDTLVLYDDYDSDNAFKNMVYVRSALDAQFNDILLRKPHTNGY RVD-05V0049-VP4

**. . . . . I . . . . . P . . . . . L . . . . . LS . Q . TD . . . . . NSLRF . F . . . . .**  
385 NFSIPVGAWP-----VMNGGAVSLHFAGVTLSTQFTDFVSLNSLRFVSLTVDEPPFSILRTRTVNLYG RVA-Wa-VP4  
398 YFQIPVGSYP-----GLHSSRLQLVYDRCLLSQOFTDYAALNSLRFVFRVSTSGWFITGDIINTRVA RVC-Bristol-VP4  
420 DTEITLPCPSGKHLYSNPRNLTSYQGVMLSTQYTDYAVNSLRFIFKCTAADR-AVFDVMVYNGIEA RVD-05V0049-VP4

**. . . . . G . S . I . L . P . N . . YQTP . I . S . TVR . DL . . . . . LR . FN . L . . . . . A . . . . .**  
449 LPAANPNNGNEYEISGRFSLIYLVPTNDYQTPIMNSVTVRQDLERQLTDLREEFNLSLQEIAMAQLID RVA-Wa-VP4  
462 SGTGFAYSDGHVANTVGTISFISLIPSNPNYQTP IASSSTVRMDLERKINDLRDDFNALASSVALSDILS RVC-Bristol-VP4  
489 SAITTLYMNSSGPTTTGRFSFISLIPSNDAYQTP IQSSVTVRQDLDKDI AKLREEFNALSQEIIVNQLIE RVD-05V0049-VP4

**. A . PL . . . . . V . K . F . . . . . A . . . . .**  
519 LALLPLDMFSMFSGIKSTIDLTKSMATSVMKKFRKSKLATSISEMTNSLSDAASSASRNVSIRSNSLISAIS RVA-Wa-VP4  
532 LAMSPLTFSNLLESVPAITSSVKDVAASVMKKFRS-----TKMKKAAKQNYREFVIGDLEDVT RVC-Bristol-VP4  
559 TAMLPLDMVMTSGAVASGASTIISTSIKNVSKQFSK-----SKASITLTSFKNLSDIVDSVP RVD-05V0049-VP4

**. . . . . N . . . . . DI . A . . . . .**  
589 NWTNVSNDVSNVNSLNDISTQSTISKFKRLKEMITQTEGMSFDDISA AVLKTKIDMSTQIGKNTLPDI RVA-Wa-VP4  
592 -----N-VARNNSLN-----YSDITSAMMVSTNRLQITDVFSEI RVC-Bristol-VP4  
615 -----TDQLAKNLNHVS-----KRSIGTQFEDITAAVVKKTMDKG--IGTDDMAEL RVD-05V0049-VP4

**. . . . . I . R . YR . . . . . V . E . . . . . Y . . . . . FD . KF . L . . SPVISAI . DF . T .**  
659 VTEASEKFI PKRSYRILK--DDEVMEINTEGKFFAYKINTFDEVFPDVNKF AELVTDSPVISAIIDFKTL RVA-Wa-VP4  
629 VRSADNFI SNRSYRMIE--NNTVHEITPT-RRFSYDIKTLQQRNFDIDKFSKLASQSPVISAIIVDFATI RVC-Bristol-VP4  
659 ITDIADSAIPVRAYRVIDKSENNAVYEVSSIGKAIKYDT-ELTQLPFDEIKFKKLISESPVISAIIDFQTL RVD-05V0049-VP4

**K . . . . . G . I . . . . . S . . . . . N . NP . I . RI . LI . QC . .**  
727 KNLNDNYG-ITRTEALNLIKSNPNMLRNF INQNNPIIRNRIEQLLIQCKL RVA-Wa-VP4  
696 KAIRDYTG-ISDDIIYKLVASDAPTILSF INQNNPLIRNRIITNLINQCKL RVC-Bristol-VP4  
728 KLYNQTFGKIDANVLNDFLASNPEILLKVMNEKNPIITDRIKTLIEQCRI RVD-05V0049-VP4

SUPPLEMENTAL DATA 5E – Alignment VP6 (see page 7 for Legend).

		<b>32-64</b>	
	<b>M . L . S . . . . T . . . . . K . . . . G T . Y . N V . D . . . . .</b>	<b>Q Q . N . . . . . N G . . . . F . T G G . . . . P . . . W . F . . . .</b>	<b>L G T T L</b>
1	MEVLYSLSKTLKDKARDKIVEGTLYSNVSDLI	QQFNQMIVTMNGNDFQTGGIGNLPVRNWFDFGL	LGTTL RVA-Wa-VP6
1	MDVLFSAIAKTVSDLKKKVVVGTIYTINVEDVV	QQTNELIRTLNGNIFHTGGIGTQPQKEWNFQLP	LGTTL RVC-Bristol-VP6
1	MEALSSIALTVREAREKIINGTIYSNVSDVI	QQFNQMVRLNGSTFTTGGLATMPLREWTFDLP	LGTTL RVD-05V0049-VP6
		<b>132-142</b>	
	<b>LN . D . N Y V . . . . . F . . . V C . . E . . . . R N G . . P Q S . A L . . L . . K . . . . N . . . . S . . I . . W .</b>		
71	LNLDDANYVENARTIIIEYFIDFIDNVCMDEMARE	SQRNGVAPQSEALRKLAKIKFKRINFDN	SSEYIENWN RVA-Wa-VP6
71	LNLDDNYVQSTRGIIDFLSSFIEAVCDDEIVREAS	RNGMQPQSPALILLSSSKFKTINFNN	SSQSIKNWN RVC-Bristol-VP6
71	LNIDANYVESMPTLDMLTEFVIAVCETELLVDN	NNRNGAYPQSEALRLLSNNKYVFLNMDL	GSKYISEWH RVD-05V0049-VP6
		<b>155-167</b>	
	<b>. . . . . P . . F . Y . . . . . R . . . . . G . . . . . A . F D . . . . . P . N . . F . .</b>		
141	LQNRQRQTGFVFKPNIFPYSASFTLNRSQPMHD	NLMGMTMNLNAGSEIQVAGFDYSCAINAPANIQ	QFEH RVA-Wa-VP6
141	AQSRRENVPVYEKPMPLFEYKNSYILO	RANPQFGSVMGLRYYTTSNTCQIAAFDSTLAE	NAPNNTQRFVY RVC-Bristol-VP6
141	YRLSARDPMFMSNVVPIYIFPYDMAIAYD	RVTAAYDNVSGTRFASLNNAIHFAAFDQDFVR	GQPANARQFEY RVD-05V0049-VP6
		<b>208-274</b>	
	<b>. . . . L . . . . . S . P . . . . . W . N P . . . . . E F . . G Q . I . . . . G</b>		
211	IVQLRRALTTATITLLPDAERFSFPRVINSADG	ATTWFFNPVILR--PNNVEVEFLNGQIINTYQ	ARFG RVA-Wa-VP6
211	NGRLKRPISNVLMKIEAGAPNISNPTIILPDP	NNTTWLFPVQLM--NGFTTIEFYNNGQLIDM	VVRN-MG RVC-Bristol-VP6
211	LYNLRTPVSNATIVIHPISDILSVPSMIRNQA	AATHYWPYNPNIPTFRDDIRVEFQLAGQVIY	VAAAN-LG RVD-05V0049-VP6
		<b>279-288</b>	
	<b>. . . . . F D . . . . . R . . . . . F P . . P . . . . A . . . . . A . E . . . . .</b>		
279	TIIARNFDAIRLLFQLMRPPNMTPAVNALFPQ	AQP-FQHATVGLTLRIESAVCESVLADANETL	LAVNT RVA-Wa-VP6
278	IVTVRTFDSYRITIDMIRPAAMTQYVQRIFP	QGGP-YHFQATYMLTSLILDATTESVLCDSH	SVEYSIVA RVC-Bristol-VP6
280	MHTIPQFDAVNIILTMRRLP-LLADLQNI	FPAGNPSATHQAVISTKIEVLNATTETTVP	SINEHLYALIV RVD-05V0049-VP6
		<b>380-397</b>	
	<b>. . R . . . . . G . V F . P G . . W . . . . . Y . . . . . N . R . . . . . A S . . . . .</b>		
348	AVRQEYAIIPVGPVFPFGMNWTELITNYS	SPREDNLQRFVTVASIRSMLIK	RVA-Wa-VP6
347	NVRRDSAMPAGTVFQPGFPWEHTLSNYTVA	QEDNLERLLLIASVKRMVM	RVC-Bristol-VP6
349	GTRGRYQMAGPVPFPGMRWDDLNRYPARQ	ENMHRMNTASILDVSM	RVD-05V0049-VP6

SUPPLEMENTAL DATA 5F – Alignment VP7 (see page 7 for Legend).

```

.....V.....
1 MYGIEYTFILIFLISIILLNYYILKSVTRIMDYIIRFLLITVALFALTRAQNYGLNLPITGSMDAVYTNS RVA-Wa-VP7
1 ---MVCTTLYTVCAILFILFIYILLFRKMFHLITDTLIVILILSNCVEWSQG-QMFTDDIYYNGNVETII RVC-Bristol-VP7
1 -MTRCSLHMHNLYLVNSLICLILVLLIKRVVNWLFYMLKSLTMDLVIIALALS--LVAPTTYANDCVDDS- RVD-05V0049-VP7

.....C...P.....region A.....KG.P.GS.....Y.....
71 TQEEVFLTSTLCLYYPTEAST-----QINDGDWKDSLSQMFLTKGWPTGSVYFKEYSNIVDFSVDP RVA-Wa-VP7
67 NSTDPFNVESLCYIFPNAVVGSQGPGKSDGHLNDGNYAQTTATLFFETKGFPKGSIILKTYTQTSDFINSV RVC-Bristol-VP7
67 -LAD-YKYNTICMFHP-----DITESDWQNILNQLLLSKGIPLGSMIYVKYTSIEEIITGD RVD-05V0049-VP7
*

...C.YN.V.....region B.....C..M...Y.Y.Q.....W...G..C...VCPL
132 QLYCDYNLVLMK---YDQSLKLDMSELADLILNEWLCNPMDVTLYYYQSGESNKWISMGSSCTVKVCPL RVA-Wa-VP7
137 EMTCSYNIVLIP---DSPNDSEIEQIAEWILNVWRCDDMNLEIYYEQIGINNLWAAFGSDCDISVCPL RVC-Bristol-VP7
121 KFYCDYNIVLVDASSYTNDQYSNLDQVVDMLMYNYDCINMDVNLYYYSQQ-KDELWLLAGSG-SCEVKVCPL RVD-05V0049-VP7
* * *

.....GIGC.....region C.....V.....I...T..C....C.K...R.N.A.I.....
199 NTQTLGIGCOTTNVDSFEMIAEN-EKLAIVDVVDGINHKINLTTTCTIRNCKKLGPRENVAVIQVGGSN RVA-Wa-VP7
204 DTTSNGIGCSPASTETYEVVSND-TQLALINVVDNVRHRIQMNTAQCKLKNCIKGEARLNTALIRISTS RVC-Bristol-VP7
189 NQOTLGGIGNIADSSTYATLTTANDKFEIIDVINDINYKINITTSCSIKRCYQSERTNVAVIQIGGYN RVD-05V0049-VP7
* * *

...D...P.....R...N.KKWW..FY.I.D..N.I...M.....
268 VLDITADPTTNPQTERMRVRNWKKWQVFYTIVDYINQIVQVMSKRSRLNSAAFYYRV RVA-Wa-VP7
273 SFDNSLSPLNNQTTRSFKINAKKWTIFYTIIDYINTIVQAMPPRHRAIYPEGWMLRYA RVC-Bristol-VP7
259 VYDISESPVTYRSNRMLRVRNWKKWWAIFYQIVDFVNDILTTMVRQSHNNGIRVVRQ RVD-05V0049-VP7

```



SUPPLEMENTAL DATA 5H – Alignment NSP2 (see page 7 for Legend).

**MAEL.CF.....P...A...L..K.....I.YG..P.P...R.....G.**  
 1 MAELACFCYPHLENDYSYKIFPFNNLAIKMLTAKVEKKDQDKFYNSIVYGIAPPPQFKKRYNTSDNSRGM RVA-Wa-NSP2  
 1 MAELACFVVSFLTEDKVVVWYPINKKAVQTMCAKVEKDQRSNYDITILYGVAPPEFRNRFKTN-ERYGL RVC-Bristol-NSP2  
 1 MAELGCFVNVVESDSTFTFPIPKSKAINILLTTKN---DDDNPIDTIIYGLTPVPKYKRRFASDMSPSGI RVD-05V0049-NSP2  
  
**.Y.....LN.....V..VRHLE.L..R....D.....L..K.V..**  
 71 NYETIMFNKVAVLICEALNS--IKITQSDVANVLSRVVSVRHLENLVLVRKENHQDVLVHFSKELLKLSVLI RVA-Wa-NSP2  
 70 DYESDQYTELVNLLADTLNM-VSMPTEKFQFDIVKTVVQVRHLENLLCRKIDVNDILNANVKLRVKAVMI RVC-Bristol-NSP2  
 68 NYDNELFDKVAIKLAEILNFGVKKMSVQQAMMLTRVFSVRHLESLYYRMMDEDDIIHDNIDLQFKSVMV RVD-05V0049-NSP2  
  
**.....E.T...E.....L.Y...KL.P.....EYKIT.N.....D.....A.**  
 139 AIGQSKEIETTATAEGGEIVFQNAAFMTMWKLTLDHKLMPILDQNFIEYKITLNEDKPISDVCIKELVAE RVA-Wa-NSP2  
 139 ACNLVNETETTPLETESNDIVYQDSYFTITKLDYSNHKLLPLM---ADEYKITINTKTDIPDRNQTAFAAY RVC-Bristol-NSP2  
 138 MLKLTKSFELTLTAEGGKLLYVDKTYALWELDYRKYKLMFVK---AVEYKITLNSATEDADS-ERKMAAY RVD-05V0049-NSP2  
  
**.....N.FA.I.HG..H.R.V.....HA.R.....K.....W.....**  
 209 LRWQYNRFAVITHGKGYRVMVKYSSVANHADRVFATYKNSAKSGNVIDFNLLDQRIIWQNWYAFTSSMKQ RVA-Wa-NSP2  
 206 IRYNFNKFAAISHGKRHWRLVLHSQLMSHAERLDRKIKSDKKHGRQFSYDDGDMAFVHPGWKTCIGQLCG RVC-Bristol-NSP2  
 204 VKYHYNRFAVISHGFGHYRLVYPYQVNLNHAERTFATYNAIKKTKSDHSFVRLSKTLLNTNWQDFMNAVEY RVD-05V0049-NSP2  
  
**G.....L.....D..S.V..**  
 279 GNTLDVCKKLLFQKMKQEKNPFGKGLSTDRKMDEVSHVGI RVA-Wa-NSP2  
 276 GTTFEVAKTSLSYIKP--SKTVRTATNKIESDLISMVGN RVC-Bristol-NSP2  
 274 GKSMSECRNELFKSSK-TSNPVKKHVNIQLDEMSTVN RVD-05V0049-NSP2

SUPPLEMENTAL DATA 5I – Alignment NSP3 (see page 7 for Legend).

```

M.....V..I.....
1 ML---KMESTQQMVSSIINTSF----- RVA-Wa-NSP3
1 M-----ATQASVEWIFNVAG----- RVC-Bristol-NSP3
1 MVQPRKVVNILCFVLLIFDTSAPFLQERKNNNQKI IYKTVLYLKKRQNI ESSYYLFDASNYEKVDQDYLC RVD-05V0049-NSP3

.....
20 -----E-----AAVVAATSTLELM RVA-Wa-NSP3
16 -----S-----AASSSLDKAIKDA RVC-Bristol-NSP3
71 FGNDTVIHEIEIRQKDIFSYRNSELREIKTSQLCQYDFKFKDGN SGI SGNLEALMFHGAICGRKILRGO RVD-05V0049-NSP3

.....
RNA-binding
G.....KF.....SGV.N...G.A.T...A.N...A.N...T...T...L..
34 GIQYDYNEVFTRVKSDFDY---VMDDSGVKNNLLGKAITIAQALNGKFGSAIRNRNWM TDSKTVAKLDE RVA-Wa-NSP3
30 GGSENFSSK---YVITKFDYDNYKDCIDDSGVYNACIGRAKTIDKALN-DPKVAERNEE WYTNVATISRLDL RVC-Bristol-NSP3
141 GFTPDVKS LHDDIAMKFES---MLEESGVKNSVFGRAKTVDEAINGKFFSAQKNRRYMTT IETVKNLES RVD-05V0049-NSP3

.....
RNA-binding
.....L...I...RVL...F...G.S...I...E.G.....
100 DVSKLRMTLSSKGDQKMRVLNACFSVKRIPGKSSSIKCTRLMKDKIEGGEVEVDDSY----- RVA-Wa-NSP3
96 ELAELKMLSLNLGIKREERVLNSMFSVREKGRSSNVIMMQNAVKMIEEGKLIKVERNETYTESLKNK RVC-Bristol-NSP3
207 DLYRMRMMLNMDIKRDARVLSL FQIEKKTGKSGSVILADASVYDKLEKGEIVR----- RVD-05V0049-NSP3
* *

.....
159 -----VDEKMEIDTIDWKSRYDQLEKRFEALKQRVNEKYNTWVQKAKKVNENMYSLQNVIS RVA-Wa-NSP3
166 IEELECIIDAFEKGDITIDLDAMNGEVKLDGNSCSYNS TAALVSTILGTP IKMYNESGQPLFDVGNMYN RVC-Bristol-NSP3
262 -----VDMGKIESENSCKLRQIID RVD-05V0049-NSP3

.....
215 QQNQISDLQQYCNKLEADLQGFSS-----LVSSVEWYLR S----- RVA-Wa-NSP3
236 PKNIEKMI ELEIPIFKSDYRNNE SPDFDSWNERSNLKI VSVNDCHAICIFKPFENNWCFDDGRLKKNHG RVC-Bristol-NSP3
281 QKDELISKLN EITILRATRFDDVDG-----LKF GFRYQSKN----- RVD-05V0049-NSP3

.....
.....D.....C.....
252 ----MELPDDVKNDIEQQNLNSIDA INPINAIDDI ESLIRNLIQDYDRTF LMLKG----LLKQCNYEYAY RVA-Wa-NSP3
306 AGYPLIVANSKFQIDKILISGDIELNPGPDILVTLNDYITKYQLKLECTFDIFLEDDGSITYTCYMKLES RVC-Bristol-NSP3
318 ----RDISAELS-DAASQTDTLSTIK-EDTVSELEERVENLEK-----I IAG----LASRCGLTVEY RVD-05V0049-NSP3

.....
313 E RVA-Wa-NSP3
376 AEATGSGRSKKEAKRIAAYDILDQLGI RVC-Bristol-NSP3
370 V RVD-05V0049-NSP3

```





SUPPLEMENTAL DATA 5L – Alignment NSP5 (see page 7 for Legend).

```

.....S.....S.....
1  MSLSIDVTSLPSISSSIFKNESSTTSTLSGKSIGRNEQYVSSDIEAFNKYMLSKSPEDIGPSDSASNNP  RVA-Wa-NSP5
1  --MSDFGINLDAICDNVKKGQTESRTGSQLSNRSSRRMDFVDD--EELSTYFNSKAS--VTQSDSCSNDL  RVC-Bristol-NSP5
1  -MMDLDFNFESNLPEIS--LISSRAGTTYTKIDYDEDMLLDD--ITPDSASSQDTNQRTFREKSFKSS  RVD-05V0049-NSP5

.....G.....E..
71  LTSFSIRSNVKTNADAGVSMDSSTQ---SRPSSNVGCDQMDFLTKGINVSASLDSCVSISTNHKKEKS  RVA-Wa-NSP5
65  EIKHSIITEAVVCDSESAHVSADAIQEKDETVPQMDHRIMKWLDSHDGVS LNNGGINFTKAKSKLKETENE  RVC-Bristol-NSP5
66  SMVQCEDEDDIASQEMN--KLETIVNSACADEQQNIDDWNEYLEENSGIKIMEGKVSTNEVDLNGVFESK  RVD-05V0049-NSP5

.....D.....NC...K...LR..M..
138  KKDKSRKHY-PRIEADSDYEDYV-----LDDSDSDDGKCKNCKYKKKYFALRMRMKQ  RVA-Wa-NSP5
135  ITEMKSKTN-LLVNASVGINSNVGFANPINQTIKTEAVSDMFEDEDIEGCICKNCPYREKYRKLRSKMKN  RVC-Bristol-NSP5
134  ILNRNSIINKDNIDS AVKKKANINKMN-----MHDTSDEECNRNCKCKKLRKLRKRMSI  RVD-05V0049-NSP5

.....
189  VAMQLIEDL  RVA-Wa-NSP5
204  VLIDMINEM  RVC-Bristol-NSP5
190  LIAESY  RVD-05V0049-NSP5

```