Supplementary Table 1. Nucleotide substitutions in CIV sequences that are either CIV associated or CIV specific, comparing the variant positions in the EIV and CIV sequences. Full-line shading is of nonsynonymous substitutions that were conserved in nearly all (up to three) EIV isolates for which there are sequences available, but which differed among some of the CIV isolates. Half-line shading is of synonymous substitutions.

HA

Amino acid site	nucleotide site	equine references	canine 2003-05	canine 2006-09	NY 2008-09	Amino acids
7^	20	158 G; 47 A	A and G	G	G	D/N/G to G
29^	87	all A	A and G	G	G	I/L to M
54*	162	196 C; 9 T	A	A	A	N to K
58	172	132 G; 73 A	all A	A and G	G	I/V to V
75	225	177 C; 28 T	all C	all C	G	H to Q
78*	233	157 T; 28 C's; 20 A's	C	C	C	V/D/A to A
79*	235	all T	all T except C in Iowa05	T	T	F except L in Iowa05
83^	248	200 A; 5 G's	G	G	G	N/K/S to S
92^	275	199 G; 6 A	G except A in Flor04	A	A	S/N to N
107*	319	204 T; 1 C	T except C in Jacks05	T	T	S except P in Jacks05
118^	352	all T	G and T	G	G	L to V
159*	476	170 A, 35 G	G	G	G	N/S to S
216	646	all A	all A	C and A	C	N to H
218*	653	all G	G except A in Iowa05	G	G	G except E in Iowa05
222^	665	200 G; 5 T	T	T	T	W/L/G to L
223	667	199 G; 6 A	all G	A and G	A	V/I to I
258	774	177 T; 28 C	all T	C and T	C	syn
261*	783	197 A; 8 G	C and A	C	C	K/R/G to N
262	784	201 A; 4 G	all A	A and C	C	T/A to P
263	789	185 G; 20 A	all G	A and G	A	syn
323	968	all A	A	A and G	G	syn
328^	982	all T	C	C	C	I to T
333	998	107 A; 3 G	A	A and G	G	syn
334	1001	all A	A	A and G	G	syn
383	1148	all A	A	A	G	syn
427	1278	all T	T	T	C	syn
464	1390	98 G; 12 A	G	A and G	A	G/N/D to G/D to D
472	1415	all A	A	A	G	syn
479^	1435	100 G; 10 A	G and A	A	A	G/E to E
479^	1436	all A	A	A and G	G	syn
483^	1447	all A	C	C	C	N to T
484	1451	106 G; 4 A	G	A	A	syn

492*	1474	108 G; 2 A	G and A	G except A in Vir09	G	R/K to R
541^	1621	all A	A except G in Fl04	A	A	all K except R in Fl04

NA

Amino acid site	nucleotide site	equine references	canine 2003-05	canine 2006-09	NY 2008-09	Amino acids
9^	25	73 G; 18 A	A and G	G	G	A/T to A
12^	35	76 C; 15 T	T	C	C	S/F to S
20^	58	62 C; 29 A	A	A	A	L/I to I
40^	118	83 G; 8 A	A	A	A	R/E/G to R
42^	125	83 G; 8 A	A	A	A	D/G to D
46^	138	58 C; 27 A; 6 T	A	A	A	N/K to K
52^	154	all G	G except A in Flor04	G	G	all E except Flor 04 is K
61^	182	68 G; 23 A	A	A	A	R/K to K
62	184	88 A; 3 G	A	C	C	I/V to L
68	203	all C	C	C	T and C (B)	T to I/T (B)
69^	206	47 G; 44 A	G	G	G	N/S to S
72^	214	70 G; 21 A	A	A	A	E/K to K
81	243	89 C; 2 T	C	T	T	syn
147	439	85 G; 6 A	G and A	A	A	V/I/M to I
156	466	all T	T	C	C	syn
171	512	90 G; 1 A	G	A	A	R to K
171	513	90 G; 1 A	A and G	A	A	same codon as 513
201^	601	60 G; 31 A	A	A	A	V/I to I
214	642	89 T; 2 C	T	C	C	syn
250	750	all A	A	T	T	Q/K to N
261^	781	68 A; 23 G	G	G	G	V/I to V
291	873	89 G; 2 A	G	G	A and G (B)	syn
301^	901	86 A; 5 G	A and G	A	A	V/I to I
346	1038	82 A, 9 G	A	C	C	syn
383	1149	all C	C	T	T	syn
396^	1186	68 A; 23 G	G	G	G	N/D to D
397^	1190	58 T; 33 C	C	C	C	L/P to P
412	1234	90 C; 1 T	C	T	T	syn
415	1245	51 G; 40 A	G	G	G and A	syn

MP

Amino acid site	nucleotide site	equine references	canine 2003-05	canine 2006-09	NY 2008-09	Amino acids
6	18	all G	G	G	A (1 G)	syn
15	43	86 G; 14 A; 4 T	G	A and G	A	V/I/L to I
99	297	74 G; 30 A	G	G	A	syn
126	378	103 C; 1 T	C	C and T	T	syn
138	412	all G	G	A and G	A	V to I
161^	481	all T	T except G in Fl04	T	T	all S except A in Fl04

183	549	all T	T	C and T	C	syn
195	584	all C	C	C and A	C	all S except STOP in B/06 & NY/Dec06
198	594	all G	G	A and G	A	syn
208^	623	97 A; 7 G	G	G	G	Q/K/R to R

NS

Amino acid site	nucleotide site	equine references	canine 2003-05	canine 2006-09	NY 2008-09	Amino acids
21	62	all G	G	A and G	A	R to Q
44^	131	70 A; 26 G	G	G	G	R/K to R
59^	176	74 G; 22 A	A	A	A	R/H to H
71^	211	75 G; 21 A	A	A	A	E/K to K
77	230	95 T; 1 C	T	C and T	C	L/F/P to P
86^	256	75 G; 21 A	A and G	G	G	V/T/A to A
88^	263	all G	G except T in Fl04	G	G	R (Fl04 is L)
111	331	all G	G	G	G and A (B)	V to I (B)
140^	418	all A	A except G in Fl03 and 04	A	A (1 G)	R (G in Fl03, 04)
156	466	93 G; 3 A	G	G and A	A	V/I to I
185	553	95 C; 1 T	C	C and T	T	L/F to F
193	578	all G	G	G	A	R to K
214	640	all T	T	T	C	F to L
216^	646	75 C; 21 T	T	T	T	P/S to S
220	658	78 C; 18 T	C and T	C	C	R/Q/STOP to R
244	731	89 T; 7 C	T	T	C	I/T to T

NP

Amino acid site	nucleotide site	equine references	canine 2003-05	canine 2006-09	NY 2008-09	Amino acids
12	33	64 G; 16 A	A	n/a	A	syn
16^	47	40 G; 40 A	A	n/a	A	D/G to D
27	79	all G	G	n/a	A	A to T
37	111	78 C; 1 G; 1 T	A and C	n/a	A	syn
41	123	all T	C and T	n/a	C	syn
52	154	all C	C	n/a	T/C (B)	H to Y/H (B)
93	279	all A	A	n/a	G	syn
144	432	all T	T	n/a	C	syn
157^	469	49 A; 31 G	A	n/a	A	T/A to T
166	496	all C	C	n/a	T	syn
198	594	79 A; 1 G	G and A	n/a	G	syn
214^	641	75 G; 5 A	G and A	n/a	G	R/K to R
247	741	79 T; 1 C	C	n/a	C	syn
252	756	77 G; 3 A	G	n/a	A	syn
285^	853	all G	G, A, C	n/a	G	V (I & L in K9 refs)
286^	856	40 G; 40 A	A	n/a	A	A/T to T
325	975	all G	A and G	n/a	A	syn
327	981	all G	G	n/a	A	syn
359^	1075	75 G; 5 A	A	n/a	A	A/T to T
375^	1123	all G	A and G	n/a	A	D to N

384^	1151	56 G; 24 A	A	n/a	A	K/R to K
389	1167	all G	G	n/a	A/G (B)	syn
392	1176	76 T; 4 C	C	n/a	C	syn
452^	1355	45 G; 35 A	A	n/a	A	R/K to K

PA

Amino acid site	nucleotide site	equine references	canine 2003-05	canine 2006-09	NY 2008-09	Amino acids
27^	79	76 G; 1 A	A	n/a	A	D to N
30	90	59 T; 18 C	C	n/a	C	syn
54	162	73 T; 4 C	A and T	n/a	A	syn
62^	184	59 A; 18 G	G	n/a	G except 1 A	V/I to V
147	441	76 T; 1 C	T	n/a	C	syn
213^	638	61 G; 16 A	A	n/a	A	R/K to K
231	693	all C	C	n/a	T	syn
233	699	all G	A and G	n/a	A	syn
256	767	75 G; 2 A	A and G	n/a	A	R/K to K
293	879	all G	G	n/a	A	syn
300	900	all G	G	n/a	A	syn
301	903	all A	A and G	n/a	G	syn
319	957	all G	G	n/a	A	syn
327	979	all G	A and G	n/a	A	E to K
332	996	62 A; 15 G	G	n/a	G	syn
337^	1009	59 G; 18 A	A	n/a	A	T/A to T
343^	1028	62 C; 15 A	A	n/a	A	A/E to E
345^	1033	61 C; 15 A; 1 T	A	n/a	A	L/I to I
348	1042	73 C; 4 A	C	n/a	A	L/I to I
353^	1058	63 A; 14 G	G	n/a	A	K/R to K
356	1068	all G	G	n/a	A	syn
366	1098	all G	G	n/a	A	syn
392	1176	71 G; 6 A	A	n/a	A	syn
400	1198	72 A; 3 C; 2 G	G and A	n/a	G	T/P/A to A
413	1238	all A	A and G	G	G	syn
432	1295	62 T; 15 C	C	C	C	I/V to V
444	1329	all A	A	A and G	G	N to D
444	1331	all T	T	T	C	syn -same codon as 1329
450^	1347	59 G; 17 A; 1 T	A	A	A	V/I/F to I
460^	1379	all G	G except A in Fl04	G	G	M except I in Fl04
461	1382	62 G; 15 A	A	A	A	syn
551	1652	69 G; 8 A	A	A	A	syn
589	1766	59 G; 18 A	G	A and G	A	syn
611	1832	57 C; 20 T	T	T	T	syn
657	1970	75 G; 2 A	A and G	A	A	syn
673^	2018	all G	A and G	A	A	syn
675^	2022	all A	G	G	G	N to D
702	2105	60 C; 16 T; 1	T	T	T	syn

		A				
711	2132	all T	C and T	C	C	syn
PB1						
Amino acid site	**nucleotide site**	**equine references**	**canine 2003-05**	**canine 2006-09**	**NY 2008-09**	**Amino acids**
8	24	61 C; 20 T	C and T	T	T	syn
46	138	all A	A	A and G	G	syn
52	156	72 G; 9 A	A	A	A	syn
56	167	all C	C	C	T and C (B)	T to I/T (B)
110	330	67 G; 14 A	G	A and G	A	syn
114^	340	60 G; 21 A	A	A	A	V/I to I
149	447	75 G; 6 A	A	A	A	syn
154^	461	62 A; 19 G	G	G	G	D/G to G
164	492	75 G; 6 A	G	G and A	A	M/I to I
200	598	all G	G and A	A	A	V to I
221^	661	60 G; 21 A	A	A	A	A/T to T
279	837	80 G; 1 A	G	A and G	A	syn
317^	951	58 G; 23 A	A	A	A	M/I to I
328	984	all C	C and T	T	T	syn
338	1013	all G	G	A and G	A	S to N
374	1122	all A	A	A and G	G	syn
378	1134	all G	A	A	A	syn
395	1185	all T	C and T	too short	C	syn
395	1186	all C	C	too short	T	syn
398	1192	79 G; 2 A	G	too short	A	D/N to N
431	1293	all C	C and T	T	T	syn
433	1299	all G	G	A and G	A	syn
459^	1375	all A	A except G in Fl04	A	A	I except V in Fl04
487	1461	75 C; 7 T	T	T	T	syn
529	1585	all G	G	A and G	A	V to I
579	1737	81 G; 1 A	G	T	T	syn
584	1751	76 G; 6 A	G	A	A	R/Q to Q
591	1771	all G	G	G and A	A	A/V to I
612	1836	all A	A	A	G	syn
682^	2044	81 A; 1 G	A except G in Fl04	A	A	I except 2 V
687	2061	81 G; 1 A	G	G and T	T	Q to H
701	2103	all C	C	A	A	syn
719	2157	all G	A and G	A	A	syn
754	2261	all G	G	A and G	A	R to K
PB2						
Amino acid site	**nucleotide site**	**equine references**	**canine 2003-05**	**canine 2006-09**	**NY 2008-09**	**Amino acids**
5^	13	all A	3 A; 1 G	n/a	n/a	K except E in Fl04
12^	35	T and C	all T	n/a	n/a	S/L to L
37^	110	all G	3 G; 1 A	n/a	n/a	G except E in Fl04
175^	524	all G	3 G; 1 T	n/a	n/a	R except I in Fl04
374^	1120	All C	All A	n/a	n/a	L to I

375^	1124	all G	G except A in Fl04	n/a	all G	R except K in Fl04
384	1150	81 T; 1 A	T	n/a	C	syn
388	1164	75 G; 7 A	G	n/a	A	syn
389	1166	all G	G	n/a	A	R to K
428	1284	all G	G	n/a	A	syn
447^	1341	62 G; 20 A	A except C in Fl04	n/a	A	Q except H in Fl04
471	1413	72 C; 10 T	C	n/a	T	syn
472	1416	all G	G	n/a	A	syn
559	1676	all T	T	n/a	A	I/F to N
581	1743	77 G; 5 A	A	n/a	A	syn
595	1785	all C	C	n/a	T	syn
642	1926	77 A; 5 T	T	n/a	T	syn
644	2010	all G	G	n/a	A	syn
713	2139	64 G; 18 A	T and A	n/a	T	syn
722	2166	62 T; 20 C	C	n/a	C	syn
724	2172	62 G; 20 A	A	n/a	A	syn
731	2191	81 G; 1 A	G except 1 R	n/a	A	V/I to I
731	2193	62 G; 20 A	A	n/a	A	syn

^ sites identified in Crawford et al. (2005)

* sites identified in Payungporn et al. (2008)