

# Influenza A (H1pdm) HA1 amino acid comparison

H1pdm_HA-consensus (n=232)	1	MKAILVLLYTFATANADTLCIGYHANNSTDTVDTVLEKNVTVTHSVNLLEDKHNGKLCK	60
A/CHIBA/17/2010	1	.....	60
A/FUKUSHIMA/138/2010	1	.....	60
A/Gyeongnam/3110/2010	1	.....	60
A/YAMAGUCHI/34/2010	1	.....	60
A/Gyeonggi/2623/2010	1	.....	60
A/HIROSHIMA/1/2011	1	...R.....	60
A/GUNMA/30/2010	1	.....	60
A/KANAGAWA/90/2010	1	.....	60
A/SAITAMA-C/174/2009	1	.....	60
A/SAKAI/47/2010	1	.....	60
A/Taiwan/151/2010	1	.....	60
A/WAKAYAMA/49/2010	1	.....	60
A/CHIBA/23/2010	1	.....	60
A/Laos/I969/2010	1	.....	60
A/SAGA/85/2010	1	.....	60
A/SAGA/90/2010	1	.....	60
California/07/09E.CDC	1	.....	60
Christchurch/16/10E.Aus	1	.....H.....	60
Utah/20/09.CDC	1	.E.....I.....	60
NARITA/1/09E	1	.....	60
YAMAGATA/752/09_DEC	1	.....	60
Brisbane/10/10E.Aus	1	.....	60
Wisconsin/08/10.CDC	1	.....R.....	60
H1_AG_site (Cal:7:09E)	1	-----	3
H1pdm_RB_site (Cal:7:09)	1	-----	1
10_AA	1	-----X-----X-----X-----X-----X-----X-----X	6
H1pdm_HA-consensus (n=232)	61	LRGVAPLHLGKCNIAGWILGNPECESLSTASSWSYIVETSSSDNGTCYPGDFIDYEELRE	120
A/CHIBA/17/2010	61	.....N.....	120
A/FUKUSHIMA/138/2010	61	.....	120
A/Gyeongnam/3110/2010	61	.....D.....	120
A/YAMAGUCHI/34/2010	61	.....	120
A/Gyeonggi/2623/2010	61	.....N.....	120
A/HIROSHIMA/1/2011	61	.....N.....	120
A/GUNMA/30/2010	61	.....	120
A/KANAGAWA/90/2010	61	.....	120
A/SAITAMA-C/174/2009	61	.....L.....	120
A/SAKAI/47/2010	61	.....	120
A/Taiwan/151/2010	61	.....	120
A/WAKAYAMA/49/2010	61	.....	120
A/CHIBA/23/2010	61	.....P.....	120
A/Laos/I969/2010	61	.....	120
A/SAGA/85/2010	61	.....	120
A/SAGA/90/2010	61	.....	120
California/07/09E.CDC	61	.....P.....	120
Christchurch/16/10E.Aus	61	.....N.....	120
Utah/20/09.CDC	61	.....	120
NARITA/1/09E	61	.....	120
YAMAGATA/752/09_DEC	61	.....	120
Brisbane/10/10E.Aus	61	.....	120
Wisconsin/08/10.CDC	61	.....	120
H1_AG_site (Cal:7:09E)	4	-----	11
H1pdm_RB_site (Cal:7:09)	1	-----	1
10_AA	7	-----X-----X-----X-----X-----X-----X-----X	12

# Influenza A (H1pdm) HA1 amino acid comparison

			170-174 (153-157)	
H1pdm_HA-consensus (n=232)	121	QLSSVSSFERFEIFPKTSSWPNHDSNKGVTAACPHAGAKSFYKNLIWL	VKKGNSYPKLSK	180
A/CHIBA/17/2010	121	.....	E.....	180
A/FUKUSHIMA/138/2010	121	.....	.X.....	180
A/Gyeongnam/3110/2010	121	.....G.....	.X.....	180
A/YAMAGUCHI/34/2010	121	.....	E.....	180
A/Gyeonggi/2623/2010	121	.....	X.....	180
A/HIROSHIMA/1/2011	121	.....	.....	180
A/GUNMA/30/2010	121	.....	.....	180
A/KANAGAWA/90/2010	121	.....G.....	.....	180
A/SAITAMA-C/174/2009	121	.....	.....	180
A/SAKAI/47/2010	121	.....D.....	.....	180
A/Taiwan/151/2010	121	.....D.....	.....	180
A/WAKAYAMA/49/2010	121	.....D.....	.....	180
A/CHIBA/23/2010	121	.....T.....	.....	180
A/Laos/I969/2010	121	.....T.....	.....	180
A/SAGA/85/2010	121	.....T.....	.....	180
A/SAGA/90/2010	121	.....X...T.....	.....	180
California/07/09E.CDC	121	.....	.....	180
Christchurch/16/10E.Aus	121	.....D.....	.....T.....	180
Utah/20/09.CDC	121	.....	.....D.....	180
NARITA/1/09E	121	.....	.....	180
YAMAGATA/752/09_DEC	121	.....	.....E.....	180
Brisbane/10/10E.Aus	121	.....D.E.....	.....	180
Wisconsin/08/10.CDC	121	.....T.....	.....	180
H1_AG_site(Cal:7:09E)	12	-----	-----	30
H1pdm_RB_site(Cal:7:09)	2	-----	-----	7
10_AA	13	-----X-----X-----X-----X-----	X-----X	18

H1pdm_HA-consensus (n=232)	181	SYINDKGKEVLVLWGIHHPSTSADQQSLYQNADAYVFGVTSRYSKFKPEIAIRPKVRDQ		240
A/CHIBA/17/2010	181	.....T.....	.....	240
A/FUKUSHIMA/138/2010	181	.....T.....	.....	240
A/Gyeongnam/3110/2010	181	.....T.....T.....	.....	240
A/YAMAGUCHI/34/2010	181	.....T.....T.....	.....	240
A/Gyeonggi/2623/2010	181	.....T.....	.....	240
A/HIROSHIMA/1/2011	181	.....T.....	.....	240
A/GUNMA/30/2010	181	.....T.....T.....	.....	240
A/KANAGAWA/90/2010	181	.....T...X...T.....	.....	240
A/SAKAI/47/2010	181	.....	.....	240
A/Taiwan/151/2010	181	.....R.....	.....	240
A/WAKAYAMA/49/2010	181	.....	.....	240
A/CHIBA/23/2010	181	.....P.....	.....	240
A/Laos/I969/2010	181	.....P.....	.....	240
A/SAGA/85/2010	181	.....P.....	.....	240
A/SAGA/90/2010	181	.....P.....	.....	240
A/SAITAMA-C/174/2009	181	.....	.....	240
California/07/09E.CDC	181	.....S.....	.....XX	240
Christchurch/16/10E.Aus	181	.....	.....N.....	240
Utah/20/09.CDC	181	.....S.....	.....	240
NARITA/1/09E	181	.....S.....	.....	240
YAMAGATA/752/09_DEC	181	.....R.....T.....	.....	240
Brisbane/10/10E.Aus	181	.....	.....	240
Wisconsin/08/10.CDC	181	.....P.....	.....	240
H1_AG_site(Cal:7:09E)	31	-----	-----	51
H1pdm_RB_site(Cal:7:09)	8	-----	-----XX	14
10_AA	19	-----X-----X-----X-----X-----	X-----X	24

## Influenza A (H1pdm) HA1 amino acid comparison

H1pdm_HA-consensus (n=232)	241	EGRMNYWTLVEPGDKITFEATGNLVVPRYAFAMERNAGSGIIISDTPVHDCNTTCQTPK	300
A/CHIBA/17/2010	241	.....	300
A/FUKUSHIMA/138/2010	241	.....	300
A/Gyeongnam/3110/2010	241	.....	300
A/YAMAGUCHI/34/2010	241	.....	300
A/Gyeonggi/2623/2010	241	.....	300
A/HIROSHIMA/1/2011	241	.....	300
A/GUNMA/30/2010	241	.....	300
A/KANAGAWA/90/2010	241	.....	300
A/SAITAMA-C/174/2009	241	.....N.....	300
A/SAKAI/47/2010	241	.....	300
A/Taiwan/151/2010	241	.....	300
A/WAKAYAMA/49/2010	241	.....T.....	300
A/CHIBA/23/2010	241	.....X.....	300
A/Laos/I969/2010	241	.....	300
A/SAGA/85/2010	241	.....	300
A/SAGA/90/2010	241	.....	300
California/07/09E.CDC	241	.....	300
Christchurch/16/10E.Aus	241	.....A.....	300
Utah/20/09.CDC	241	.....	300
NARITA/1/09E	241	.....	300
YAMAGATA/752/09_DEC	241	.....	300
Brisbane/10/10E.Aus	241	.....	300
Wisconsin/08/10.CDC	241	.....	300
H1_AG_site (Cal:7:09E)	52	-----	55
H1pdm_RB_site (Cal:7:09)	15	-----	17
10_AA	25	-----X-----X-----X-----X-----X-----X-----X	30

H1pdm_HA-consensus (n=232)	301	GAINSTSLPFQNIHPITIGKCPKYVKSTKLRLATGLRNVPSIQSR	344
A/CHIBA/17/2010	301	.....	344
A/FUKUSHIMA/138/2010	301	.....	344
A/Gyeongnam/3110/2010	301	.....	344
A/YAMAGUCHI/34/2010	301	.....	344
A/Gyeonggi/2623/2010	301	.....	344
A/HIROSHIMA/1/2011	301	.....	344
A/GUNMA/30/2010	301	.....	344
A/KANAGAWA/90/2010	301	.....	344
A/SAITAMA-C/174/2009	301	.....	344
A/SAKAI/47/2010	301	.....	344
A/Taiwan/151/2010	301	.....	344
A/WAKAYAMA/49/2010	301	.....	344
A/CHIBA/23/2010	301	.....	344
A/Laos/I969/2010	301	.....	344
A/SAGA/85/2010	301	.....	344
A/SAGA/90/2010	301	.....	344
California/07/09E.CDC	301	.....I.....	343
Christchurch/16/10E.Aus	301	.....	343
Utah/20/09.CDC	301	.....H.....	343
NARITA/1/09E	301	.....	343
YAMAGATA/752/09_DEC	301	.....	343
Brisbane/10/10E.Aus	301	.....	343
Wisconsin/08/10.CDC	301	.....	343
H1_AG_site (Cal:7:09E)	56	-----	55
H1pdm_RB_site (Cal:7:09)	18	-----	17
10_AA	31	-----X-----X-----X-----X-----	35

# Influenza A/H3N2 Viruses

### Influenza A/H3 isolates characterized by NIID

	Japan	China	Taiwan	South Korea	Mongolia	Laos	Myanmar	Singapore	Total	
March 2010 - August 2010									n	%
A/Perth/16/2009 -like	32	3	2	0	0	2	0	0	39	83.0
A/Perth/16/2009 -like*	5	1	2	0	0	0	0	0	8	17.0
A/Perth/16/2009 (Low)**	0	0	0	0	0	0	0	0	0	0.0
Total	37	4	4	0	0	2	0	0	47	
A/Niigata/403/2009 -like	23	3	2	0	0	2	0	0	30	63.8
A/Niigata/403/2009 -like*	11	1	1	0	0	0	0	0	13	27.7
A/Niigata/403/2009 (Low)**	3	0	1	0	0	0	0	0	4	8.5
Total	37	4	4	0	0	2	0	0	47	
A/Victoria/210/2009 -like	28	3	2	0	0	2	0	0	35	77.8
A/Victoria/210/2009 -like*	6	1	2	0	0	0	0	0	9	20.0
A/Victoria/210/2009 (Low)**	1	0	0	0	0	0	0	0	1	2.2
Total	35	4	4	0	0	2	0	0	45	

	Japan	China	Taiwan	South Korea	Mongolia	Laos	Myanmar	Singapore	Total	
September 2010 - February 2011									n	%
A/Perth/16/2009 -like	24	24	2	0	7	0	0	0	57	81.4
A/Perth/16/2009 -like*	5	6	2	0	0	0	0	0	13	18.6
A/Perth/16/2009 (Low)**	0	0	0	0	0	0	0	0	0	0.0
Total	29	30	4	0	7	0	0	0	70	
A/Victoria/210/2009 -like	24	25	4	0	7	0	0	0	60	85.7
A/Victoria/210/2009 -like*	5	5	0	0	0	0	0	0	10	14.3
A/Victoria/210/2009 (Low)**	0	0	0	0	0	0	0	0	0	0.0
Total	29	30	4	0	7	0	0	0	70	

\* 4-fold low to homologous titer

\*\* 8-fold or greater low to homologous titer

## Hemagglutination inhibition tests of influenza A/H3 viruses-1%Guinea Pig RBCs

TC (2)

HI test date:2011/1/20

Strains	Passage History	Sample date	Brisbane-lineage	Perth16 group				Victoria208 group			HK2000 group	Remarks		
			Uruguay/ 716/07 Egg No.2	Victoria/ 210/09 Egg No.1	Victoria/ 210/09 (X-187) Egg No.1	Perth/ 16/09 Egg No.2	Niigata/ 403/09 Cell No.1	Brisbane/ 11/10 Egg No.1	Brisbane/ 11/10 (X-197) Egg No.1	Shizuoka/ 736/09 Cell No.2	Hunan-beihu/ 1313/09 Cell No.1	HA	NA 151	
REF.Ag														
A/Uruguay/716/2007	SpfCk1E3 +2	2007/06/21	1280	80	40	40	40	160	160	160	320			D
A/Victoria/210/2009	E2 +2	2009/06/02	10	640	640	160	320	160	160	160	40	P*, I260M		D
A/Victoria/210/2009 (X-187)	E7/E2+1		20	1280	2560	640	640	320	320	320	40	P*, I260M		D
A/Perth/16/2009	E3 +2		10	640	80	320	320	160	160	160	20	P*		D
A/NIIGATA/403/2009	MDCK 2 +2	2009/03/12	40	1280	160	320	320	320	320	320	160	P*		D
A/Brisbane/11/2010	E4 +2		20	320	80	160	160	640	640	320	80	V*, N312S		D
A/Brisbane/11/2010 (X-197)	E7 +2		20	320	160	160	320	640	1280	320	80	V*, N312S		D
A/SHIZUOKA/736/2009	MDCK 1 +3	2009/05/23	80	1280	160	320	320	320	160	320	320	V*		D
A/Hunan-beihu/1313/2009	C 3 +1	2009/05/07	160	40	20	20	40	40	40	20	640	HK/2000 CL		
TEST.Ag														
A/Dornogobi/3875/2010	MDCK 1 +1	2010/12/06	80	2560	640	640	1280	1280	1280	1280	320	V*, (1)*		
A/Uvurkhagai/3970/2010	MDCK 1 +1	2010/12/09	40	1280	640	640	1280	1280	1280	1280	160	V*, (1)*		
A/Taiwan/861/2010	E1 +1/MDCK1	2010/09/28	20	1280	640	640	1280	640	640	640	80	P*, I260M, P162S		
A/Ulaanbaatar/3920/2010	MDCK 1 +1	2010/12/10	40	1280	640	320	1280	1280	1280	1280	160	V*, (1)*		
A/Ulaanbaatar/3887/2010	MDCK 1 +1	2010/12/09	80	1280	320	640	1280	640	640	1280	160	V*, (1)*		D
A/SHIMANE/57/2010	MDCK 2 +1	2010/11/15	10	1280	320	640	1280	320	640	640	20	P*, I260M, P162S		D
A/Dornogobi/4064/2010	MDCK 1 +1	2010/12/15	40	1280	320	320	640	640	640	640	160	V*, (1)*		
A/Dornogobi/4067/2010	MDCK 1 +1	2010/12/13	40	1280	320	320	640	640	640	640	160	V*, (1)*		D
A/Taiwan/851/2010	E2 +1/MDCK1	2010/09/15	20	640	160	320	320	160	160	160	40	P*, I260M, P162S		
A/NIIGATA/1250/2010	MDCK 2 +1	2010/09/07	40	640	160	160	320	320	320	320	160	ND		
A/KUMAMOTO/34/2010	MDCK 2 +1	2010/11/29	40	640	160	160	320	320	320	160	160	V*, T48A, K92R		D/N
A/Ulaanbaatar/3893/2010	MDCK 1 +1	2010/12/08	40	640	160	160	320	320	320	320	160	V*, (1)*		D
A/TOKYO/51033/2010	MDCK 2 +1	2010/11/29	40	640	160	160	160	320	320	160	80	V*, (1)*		D/N
A/Cape Town/62/2010	MDCK2/SIAT		40	640	80	160	160	320	320	160	160	V*, S45N		D
A/HYOGO/4004/2010	MDCK 2 +1	2010/12/14	10	640	80	160	160	160	160	80	40	P*, I260M, P162S		D
A/HIROSHIMA/54/2010	MDCK 1 +1	2010/12/15	20	640	80	160	320	160	160	160	80	P*, I260M, P162S		D/G
A/KOCHI/59/2010	MDCK 1 +1	2010/10/20	40	320	80	160	160	160	160	80	80	V*, (1)*		D/N
A/KITAKYUSYU/8/2010	MDCK 2 +1	2010/12/02	40	320	40	80	80	160	80	40	80	V*, (1)*, A280T		D
A/Tianjin-Hexi/1399/2010	C 3 +1	2010/10/07	20	160	80	80	80	80	160	80	40	P*, I260M, P162S, L194L/P**	D/G/N/S	
A/Tianjin-Hexi/1404/2010	C 2 +1	2010/10/10	40	160	40	80	80	80	80	40	160	V*, (1)*		D/G/N/S
A/KANAGAWA/79/2010	MDCK 2 +1	2010/11/17	20	160	40	80	80	80	80	40	40	P*, V213A, K207R**		D/G

\* P: Perth/16 CL, V: Vic/208 CL, (1): D53N, H94Y, I230V, E280A

\*\* : Antigenic site

# Phylogenetic analysis of influenza H3N2 HA genes (HA1)

10/11 Japanese vaccine strain

HI reference strains in Red

September 2010 in Blue

October 2010 in Green

November 2010 in Orange

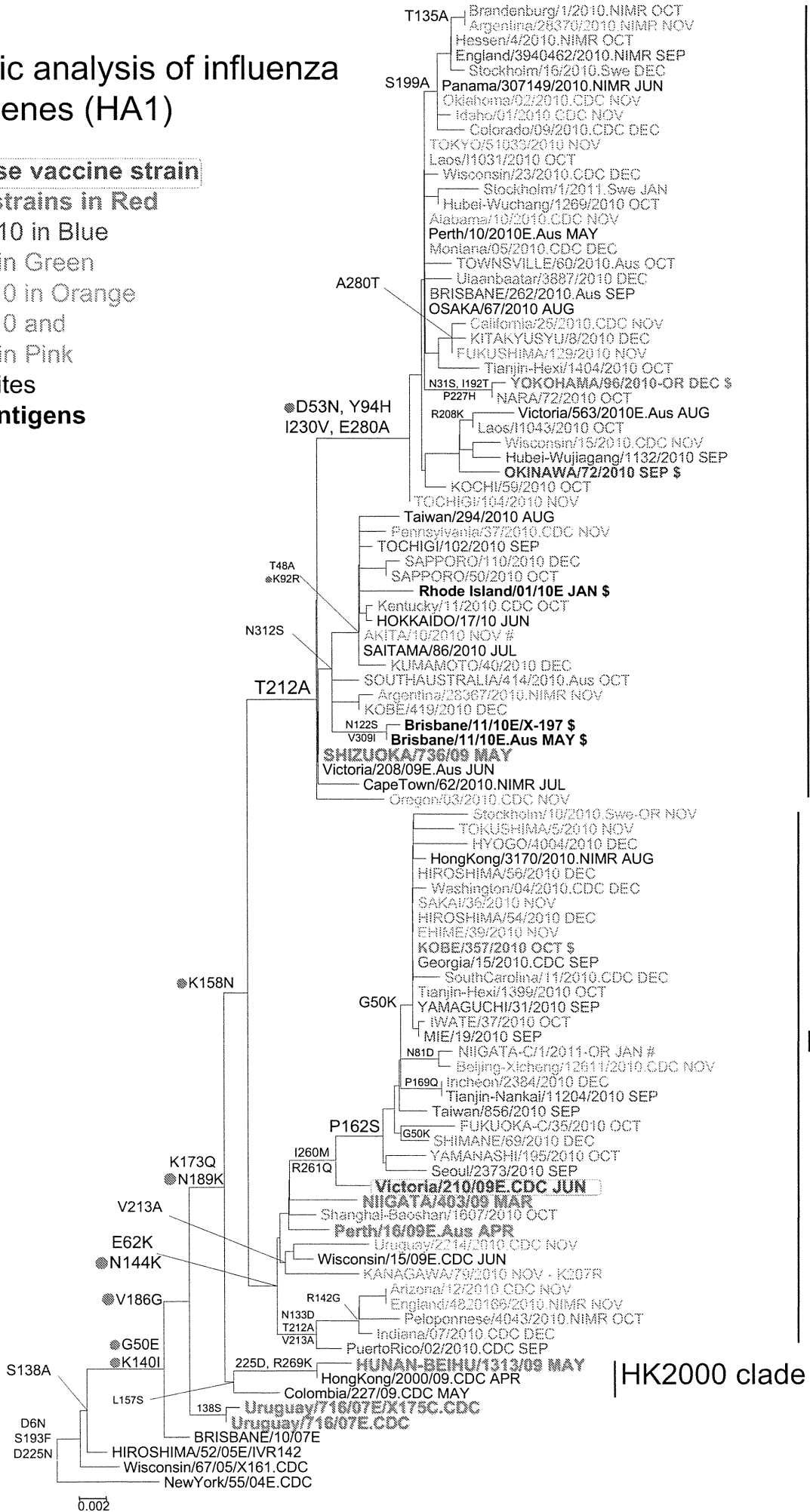
December 2010 and

January 2011 in Pink

●: Antigenic sites

⌘: Serology antigens

#: Fatal case



Vic208 clade

Perth16 clade

HK2000 clade

# Phylogenetic analysis of influenza H3N2 NA genes

**10/11 Japanese vaccine strain**

HI reference strains in Red

September 2010 in Blue

October 2010 in Green

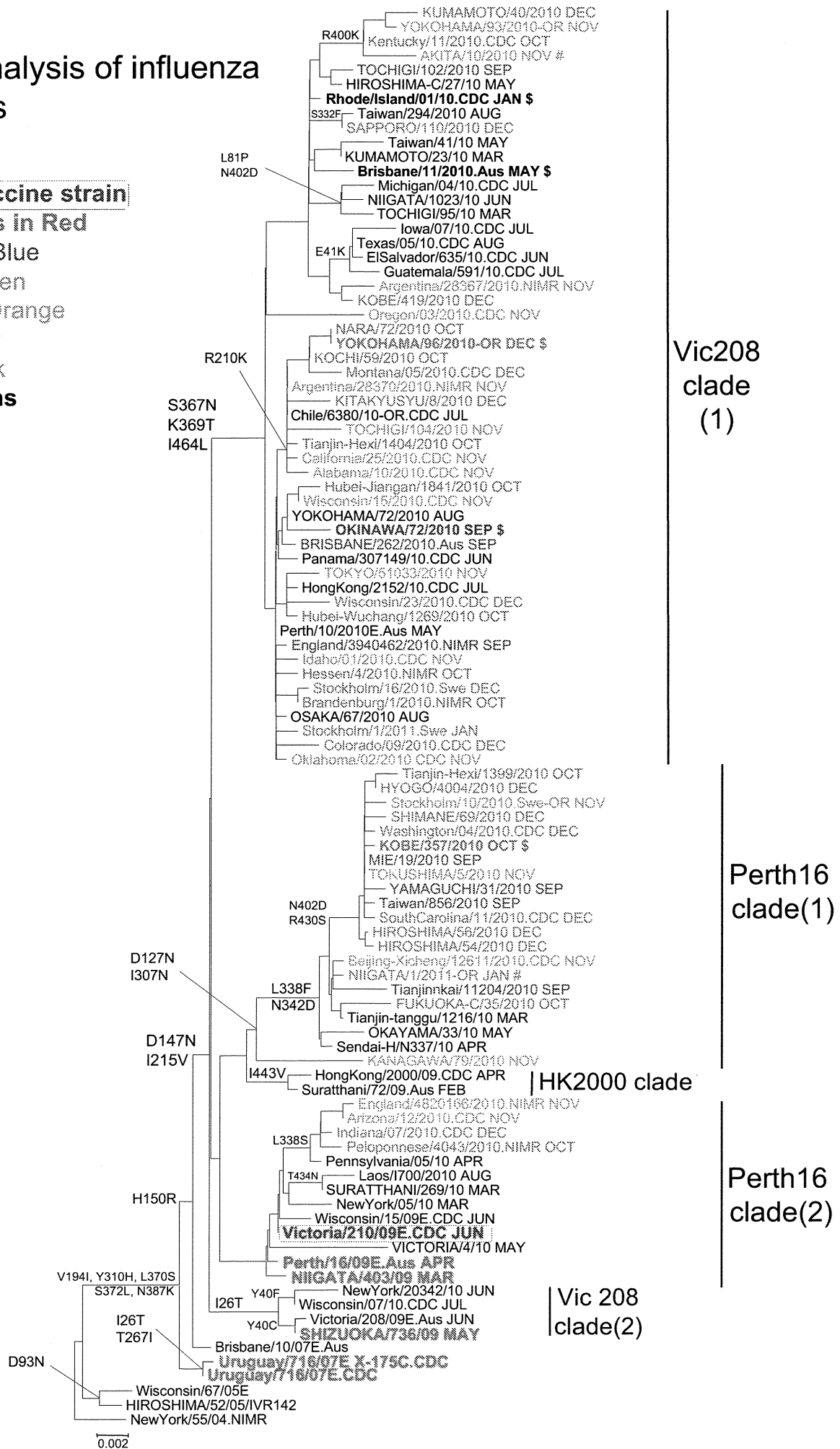
November 2010 in Orange

December 2010 and

January 2011 in Pink

**\$: Serology antigens**

**#: Fatal case**





## Influenza A (H3) HA1 amino acid comparison

H3_HA_consensus_AA (n=229)	1 QKLPGNDNSTATLCLGHHAVPNGTIVKTTITNDQIEVTNATELVQSSSTGEICNSPHQILD	60
KANAGAWA/79/2010	1 .....D.....	60
Tianjin-Hexi/1399/2010	1 .....K..D.....	60
Tianjin-Hexi/1404/2010	1 .....K..D.....	60
HYOGO/4004/2010	1 .....K..D.....	60
SHIMANE/57/2010	1 .....K..D.....	60
KUMAMOTO/34/2010	1 .....M.....A.....D.....	60
KITAKYUSYU/8/2010	1 .....E.....	60
KOCHI/59/2010	1 .....E.....	60
TOKYO/51033/2010	1 .....E.....	60
Ulaanbaatar/3887/2010	1 .....E.....	60
Victoria/210/09E.CDC	1 .....N.....D.....	60
Rhode_Island/01/10E	1 .....A.....D.....	60
Brisbane/11/10E.Aus	1 .....D.....	60
KOBE/357/2010	1 .....K..D.....	60
OKINAWA/72/2010	1 .....E.....	60
YOKOHAMA/96/2010	1 .....S.....	60
NIIGATA/403/09	1 .....D.....	60
SHIZUOKA/736/09	1 .....D.....	60
Victoria/208/09E.Aus	1 .....D.....	60
Uruguay/716/07E/X175C.CDC	1 .....D.....	60
H3_AG_site (Bris10/07E)	1 -----D-----	4
H3_RB_sites (Bris10/07E)	1 -----	1
10_AA	1 -----X-----X-----X-----X-----X-----X-----	6

H3_HA_consensus_AA (n=229)	61 GENCTLIDALLGDPQCDGFQNKWDLFVERSKAHSNCYPYDVPDYASLRSLVASSGTLEF	120
KANAGAWA/79/2010	61 .K.....Y.....	120
Tianjin-Hexi/1399/2010	61 .K.....Y.....	120
Tianjin-Hexi/1404/2010	61 .....I.....Y.....	120
HYOGO/4004/2010	61 .K.....I.....Y.....	120
SHIMANE/57/2010	61 .K.....Y.....	120
KUMAMOTO/34/2010	61 .....R.Y.....	120
KITAKYUSYU/8/2010	61 .....R.Y.....	120
KOCHI/59/2010	61 .....R.Y.....	120
TOKYO/51033/2010	61 .....R.Y.....	120
Ulaanbaatar/3887/2010	61 .....R.Y.....	120
Victoria/210/09E.CDC	61 .K.....Y.....	120
Rhode_Island/01/10E	61 .....R.Y.....	120
Brisbane/11/10E.Aus	61 .....Y.....	120
KOBE/357/2010	61 .K.....Y.....	120
OKINAWA/72/2010	61 .....Y.....	120
YOKOHAMA/96/2010	61 .....Y.....	120
NIIGATA/403/09	61 .K.....N.....Y.....	120
SHIZUOKA/736/09	61 .....Y.....	120
Victoria/208/09E.Aus	61 .....Y.....	120
Uruguay/716/07E/X175C.CDC	61 .....Y.....	120
H3_AG_site (Bris10/07E)	5 -----	10
H3_RB_sites (Bris10/07E)	1 -----	1
10_AA	7 -----X-----X-----X-----X-----X-----X-----	12

## Influenza A (H3) HA1 amino acid comparison

H3_HA_consensus_AA (n=229)	121	NNESFNWGTQNGTSSACIRRSNNSFFSRLNWLTHLNFKYPALNVTMPNNEQFDKLYIW	180
KANAGAWA/79/2010	121	.....K.....	180
Tianjin-Hexi/1399/2010	121	.....K.....S.....	180
Tianjin-Hexi/1404/2010	121	.....	180
HYOGO/4004/2010	121	.....K.....S.....	180
SHIMANE/57/2010	121	.....K.....S.....	180
KUMAMOTO/34/2010	121	.....	180
KITAKYUSYU/8/2010	121	.....	180
KOCHI/59/2010	121	.....	180
TOKYO/51033/2010	121	.....	180
Ulaanbaatar/3887/2010	121	.....	180
Victoria/210/09E.CDC	121	.....K.....	180
Rhode_Island/01/10E	121	.....	180
Brisbane/11/10E.Aus	121	.S.....	180
KOBE/357/2010	121	.....K.....S.....	180
OKINAWA/72/2010	121	.....	180
YOKOHAMA/96/2010	121	.....	180
NIIGATA/403/09	121	.....K.....	180
SHIZUOKA/736/09	121	.....	180
Victoria/208/09E.Aus	121	.....	180
Uruguay/716/07E/X175C.CDC	121	.....S..G.....K.....K.....	180
H3_AG_site (Bris10/07E)	11	-----K-----	30
H3_RB_sites (Bris10/07E)	2	-----	8
10_AA	13	-----X-----X-----X-----X-----X-----X-----	18

		194                      207	
H3_HA_consensus_AA (n=229)	181	GVHHPGTDKDKQIFLYAQASGRITVSTKRSQQAVIPNIGSRPRVRNIPSRVSIYWTIVKPG	240
KANAGAWA/79/2010	181	.....R.....TA.....I.....	240
Tianjin-Hexi/1399/2010	181	.....X.....T.....I.....	240
Tianjin-Hexi/1404/2010	181	.....X.....	240
HYOGO/4004/2010	181	.....X.....T.....I.....	240
SHIMANE/57/2010	181	.....T.....I.....	240
KUMAMOTO/34/2010	181	.....I.....	240
KITAKYUSYU/8/2010	181	.....	240
KOCHI/59/2010	181	.....	240
TOKYO/51033/2010	181	.....	240
Ulaanbaatar/3887/2010	181	.....	240
Victoria/210/09E.CDC	181	...V.....T.....X.....I.....	240
Rhode_Island/01/10E	181	..L...Y.....I.....	240
Brisbane/11/10E.Aus	181	.....P.....X.....I.....	240
KOBE/357/2010	181	.....T.....I.....	240
OKINAWA/72/2010	181	.....	240
YOKOHAMA/96/2010	181	.....T.....H.....	240
NIIGATA/403/09	181	.....N..T.....I.....	240
SHIZUOKA/736/09	181	.....I.....	240
Victoria/208/09E.Aus	181	.....I.....	240
Uruguay/716/07E/X175C.CDC	181	.....N..P.....T.....I.....	240
H3_AG_site (Bris10/07E)	31	---V..NN.....	50
H3_RB_sites (Bris10/07E)	9	---N---	18
10_AA	19	-----X-----X-----X-----X-----X-----X-----	24

# Influenza A (H3) HA1 amino acid comparison

278

H3_HA_consensus_AA (n=229)	241	DILLINSTGNLIAPRGYFKIRSGKSSIMRSDAPIGKCN	SACITPNGSIPNDKPFQNVNRI	300
KANAGAWA/79/2010	241	.....	E.....	300
Tianjin-Hexi/1399/2010	241	.....MQ.....	E.....	300
Tianjin-Hexi/1404/2010	241	.....K.....	Y.....	300
HYOGO/4004/2010	241	.....MQ.....	E.....	300
SHIMANE/57/2010	241	.....MQ.....	E.....	300
KUMAMOTO/34/2010	241	.....	E.....	300
KITAKYUSYU/8/2010	241	.....	T.....	300
KOCHI/59/2010	241	.....	.....	300
TOKYO/51033/2010	241	.....	.....	300
Ulaanbaatar/3887/2010	241	.....	.....	300
Victoria/210/09E.CDC	241	.....MQ.....	E.....	300
Rhode_Island/01/10E	241	.....	E.....	300
Brisbane/11/10E.Aus	241	.....	E.....	300
KOBE/357/2010	241	.....MQ.....	E.....	300
OKINAWA/72/2010	241	.....	K.....	300
YOKOHAMA/96/2010	241	.T.....	.....	300
NIIGATA/403/09	241	.....	E.....	300
SHIZUOKA/736/09	241	.....	E.....	300
Victoria/208/09E.Aus	241	.....	E.....	300
Uruguay/716/07E/X175C.CDC	241	.....	E.....	300
H3_AG_site (Bris10/07E)	51	-----	-----	54
H3_RB_sites (Bris10/07E)	19	-----	-----	18
10_AA	25	-----X-----X-----X-----	X-----X-----X	30

H3_HA_consensus_AA (n=229)	301	TYGACPRYVKQNTLKLATGMRNVPEKQTR		329
KANAGAWA/79/2010	301	.....		329
Tianjin-Hexi/1399/2010	301	.....		329
Tianjin-Hexi/1404/2010	301	.....		329
HYOGO/4004/2010	301	.....		329
SHIMANE/57/2010	301	.....		329
KUMAMOTO/34/2010	301	.....S.....		329
KITAKYUSYU/8/2010	301	.....		329
KOCHI/59/2010	301	.....		329
TOKYO/51033/2010	301	.....		329
Ulaanbaatar/3887/2010	301	.....		329
Victoria/210/09E.CDC	301	.....		329
Rhode_Island/01/10E	301	.....S.....		329
Brisbane/11/10E.Aus	301	.....I..S.....		329
KOBE/357/2010	301	.....		329
OKINAWA/72/2010	301	.....		329
YOKOHAMA/96/2010	301	.....K.....		329
NIIGATA/403/09	301	.....		329
SHIZUOKA/736/09	301	.....		329
Victoria/208/09E.Aus	301	.....		329
Uruguay/716/07E/X175C.CDC	301	.....		329
H3_AG_site (Bris10/07E)	55	-----		54
H3_RB_sites (Bris10/07E)	19	-----		18
10_AA	31	-----X-----X-----X		33

# Influenza B Viruses

Influenza B isolates characterized by NIID

2010.10.21-2011.1.27

	Japan	China	Taiwan	South Korea	Mongolia	Laos	Myanmar	Singapore	Total	
March 2010 - August 2010									n	%
B/Brisbane/60/2008 -like Egg	2	3	6	0	0	0	0	0	11	7.9
B/Brisbane/60/2008 -like* Egg	2	0	0	0	0	0	0	0	2	1.4
B/Brisbane/60/2008 (Low)** Egg	79	20	12	8	0	7	0	0	126	90.6
B/Brisbane/60/2008 -like Cell	82	23	18	8	0	7	0	0	138	99.3
B/Brisbane/60/2008 -like* Cell	0	0	0	0	0	0	0	0	0	0.0
B/Brisbane/60/2008 (Low)** Cell	1	0	0	0	0	0	0	0	1	0.7
B/Florida/04/2006 -like	0	0	0	0	0	0	0	0	0	0.0
B/Florida/04/2006 -like*	2	0	0	0	0	0	0	0	2	8.0
B/Florida/04/2006 - (Low)**	7	13	3	0	0	0	0	0	23	92.0
B/Bangladesh/3333/2007 -like	5	4	1	0	0	0	0	0	10	40.0
B/Bangladesh/3333/2007 -like*	4	8	2	0	0	0	0	0	14	56.0
B/Bangladesh/3333/2007 - (Low)**	0	1	0	0	0	0	0	0	1	4.0
Vic Total	83	23	18	8	0	7	0	0	139	84.8
Yam Total	9	13	3	0	0	0	0	0	25	15.2
Total	92	36	21	8	0	7	0	0	164	

	Japan	China	Taiwan	South Korea	Mongolia	Laos	Myanmar	Singapore	Total	
September 2010 - February 2011									n	%
B/Brisbane/60/2008 -like Cell	9	2	2	0	0	5	0	0	18	85.7
B/Brisbane/60/2008 -like* Cell	1	0	0	0	0	0	0	0	1	4.8
B/Brisbane/60/2008 (Low)** Cell	2	0	0	0	0	0	0	0	2	9.5
B/Wisconsin/1/2010 -like	0	7	0	0	0	0	0	0	7	58.3
B/Wisconsin/1/2010 -like*	0	2	0	0	0	0	0	0	2	16.7
B/Wisconsin/1/2010 - (Low)**	1	1	1	0	0	0	0	0	3	25.0
B/Bangladesh/3333/2007 -like	0	6	1	0	0	0	0	0	7	58.3
B/Bangladesh/3333/2007 -like*	1	1	0	0	0	0	0	0	2	16.7
B/Bangladesh/3333/2007 - (Low)**	0	3	0	0	0	0	0	0	3	25.0
Vic Total	12	2	2	0	0	5	0	0	21	63.6
Yam Total	1	10	1	0	0	0	0	0	12	36.4
Total	13	12	3	0	0	5	0	0	33	

\* 4-fold low to homologous titer

\*\* 8-fold low to homologous titer

### Hemagglutination inhibition tests of influenza B viruses (Victoria lineage)-0.5%TRBCs

Strains	Passage History	Sample date	Rabbit serum									Remarks
			Malaysia/ 2506/04 Egg No.05-1	Brisbane/ 60/08 Cell NIID No.4	Brisbane/ 60/08 Egg No.2	Sakai/ 43/08 Cell No.2 Boosted	Brisbane/ 33/08 Cell No.2	Brisbane/ 33/08 Egg No.1	FujianGulou/ 1272/08 Egg No.1	Taiwan/55/09 Cell No.10281-2	Bangladesh/ 3333/07 Egg No.2	
REF.Ag												
B/Malaysia/2506/2004	E3/E1+2		640	<10	320	20	20	160	320	640	<10	
B/Brisbane/60/2008	MDCKx/1 +2	2008/08/04	<10	40	10	40	<10	10	<10	80	<10	Bri/60 CL, V146I
B/Brisbane/60/2008	E4 +1	2008/08/04	320	40	320	40	80	320	80	320	<10	Bri/60 CL, V146I
B/SAKAI/43/2008	MDCK 1 +2	2008/11/24	<10	80	20	160	<10	10	<10	80	<10	Bri/60 CL, V146I
B/Brisbane/33/2008	MDCKx/2 +3	2008/07/13	640	40	320	40	80	320	160	640	<10	Bri/60 CL, V146I
B/Brisbane/33/2008	E3 +1	2008/07/13	640	80	640	80	160	320	160	640	<10	Bri/60 CL, V146I
B/Fujian Gulou/1272/2008	E1/E2 +1	2008/03/13	640	10	320	20	40	160	320	1280	<10	FujianGulou/1262 CL
B/Taiwan/55/2009	MDCK 2 +2	2009/11/15	640	40	320	20	20	160	160	640	<10	Taiwan/55 CL
B/Bangladesh/3333/2007	E4 +2	2007/08/19	<10	<10	<10	<10	<10	<10	<10	<10	640	Yamagata-lineage
TEST.Ag												
B/HIROSHIMA/9/2010	E1 +1	2010/09/03	320	80	320	80	160	320	80	160	<10	Bris/60 CL, L58P, R279K
B/GUNMA/40/2010	MDCK 1 +1	2010/11/22	20	160	40	160	40	80	10	80	<10	Bris/60 CL, V146I
B/OSAKA/1/2010	MDCK 3 +1	2010/12/02	20	160	40	80	80	80	10	160	<10	Bris/60 CL
B/HIROSHIMA/10/2010	MDCK 1 +1	2010/11/26	10	160	20	160	20	40	10	80	<10	Bris/60 CL
B/KOBE/406/2010	MDCK 1 +1	2010/12/11	10	160	20	160	40	40	10	80	<10	Bris/60 CL
B/Shanghai-Hongkou/1598/2010	C 2 +1	2010/10/19	20	160	20	160	40	40	10	80	<10	Bris/60 CL, L58P
B/KANAGAWA/3/2010	MDCK 2 +1	2010/10/02	20	160	10	160	20	40	<10	80	<10	Bris/60 CL, L58P
B/SAITAMA/3/2010	MDCK 1 +1	2010/09/21	20	160	10	160	20	40	<10	80	<10	Bris/60 CL, L58P
B/Shanghai-Fengxian/1568/2010	C 3 +1	2010/09/19	20	160	10	160	40	40	10	80	<10	Bris/60 CL, L58P
B/Taiwan/646/2010	MDCK 3 +1	2010/08/06	20	160	10	160	40	40	<10	80	<10	Bris/60 CL, L58P
B/Taiwan/689/2010	MDCK 2 +1	2010/07/30	20	160	10	160	20	40	<10	80	<10	Bris/60 CL, L58P
B/Taiwan/737/2010	MDCK 2 +1	2010/09/18	20	160	10	80	20	40	10	80	<10	Bris/60 CL, L58P
B/Taiwan/728/2010	MDCK 3 +1	2010/09/04	20	40	10	80	10	10	<10	80	<10	Bris/60 CL, L58P, D164G/D*
B/CHIBA-C/52/2010	CaCo-2 2 +1	2010/09/15	20	10	<10	<10	<10	<10	<10	80	<10	Bris/60 CL, K165N*
B/YOKOHAMA/5/2010	MDCK 2 +1	2010/11/16	20	<10	<10	<10	<10	<10	10	80	<10	Taiwan/55 CL

\*Antigenic site

### Hemagglutination inhibition tests of influenza B viruses (Victoria lineage)-0.5%TRBCs

TC (1)

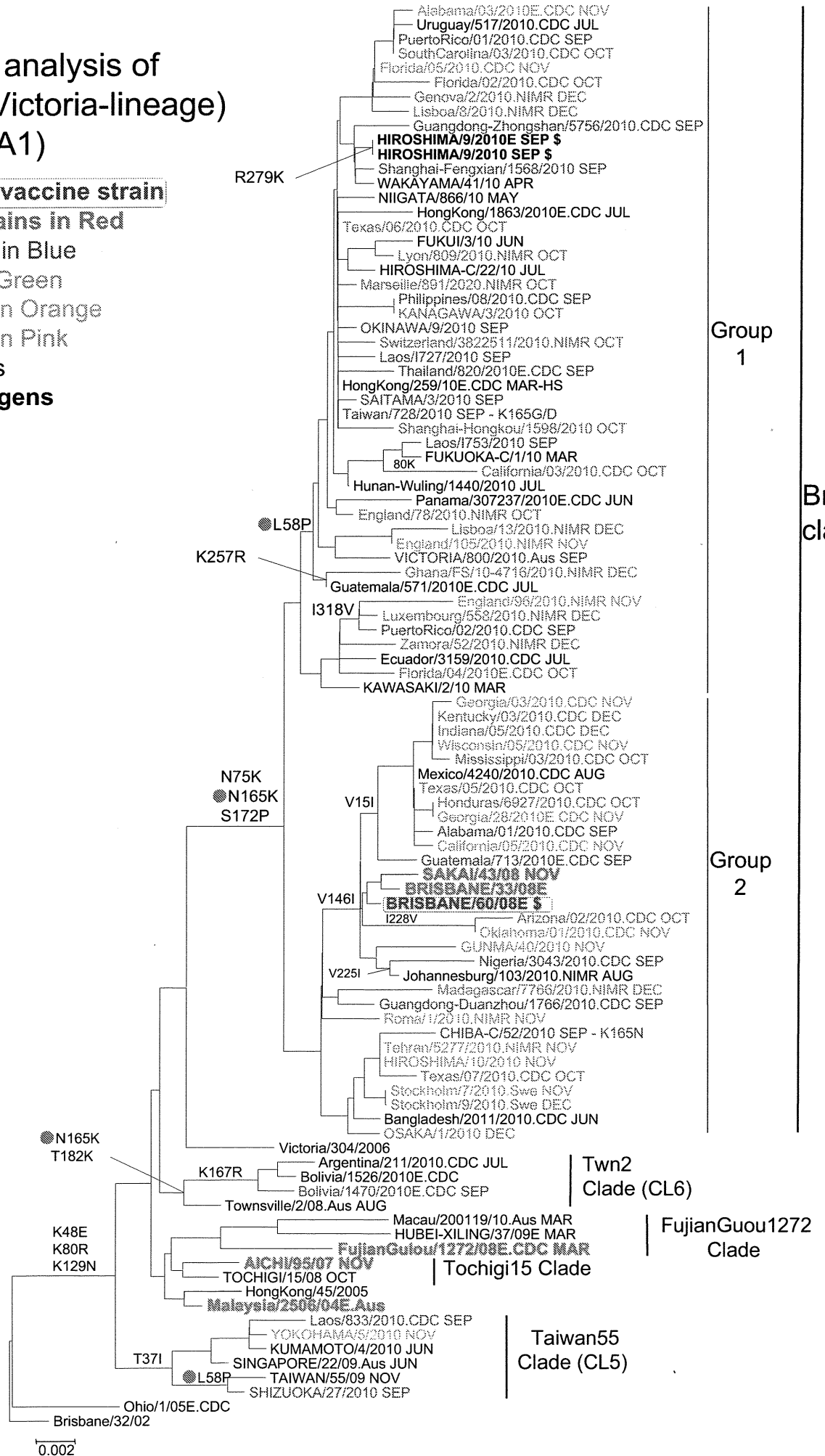
Strains	Passage History	Sample date	Rabbit serum									Remarks
			Malaysia/ 2506/04 Egg No.05-1	Brisbane/ 60/08 Cell NIID No.4	Brisbane/ 60/08 Egg No.2	Sakai/43/08 Cell No.2 Boosted	Brisbane/ 33/08 Egg No.1	Brisbane/ 33/08 Cell No.2	FujianGulou/1 272/08 Egg No.1	Taiwan/55/09 Cell No.10281-2	Bangladesh /3333/07 Egg No.2	
REF.Ag												
B/Malaysia/2506/2004	E3/E1+2		1280	< 10	320	20	160	40	160	640	< 10	
B/Brisbane/60/2008	MDCKx/1 +2	2008/08/04	20	40	20	80	20	20	10	80	< 10	Bri/60 CL, V146I
B/Brisbane/60/2008	E4 +1	2008/08/04	640	80	320	80	320	160	160	640	< 10	Bri/60 CL, V146I
B/SAKAI/43/2008	MDCK 1 +2	2008/11/24	20	80	20	160	20	20	10	80	< 10	Bri/60 CL, V146I
B/Brisbane/33/2008	E3 +1	2008/07/13	640	80	640	80	320	160	160	640	< 10	Bri/60 CL, V146I
B/Brisbane/33/2008	MDCKx/2 +3	2008/07/13	320	20	320	40	320	80	80	640	< 10	Bri/60 CL, V146I
B/Fujian Gulou/1272/2008	E1/E2 +1	2008/03/13	640	10	320	20	160	40	320	1280	< 10	FujianGulou/1262 CL
B/Taiwan/55/2009	MDCK 2 +2	2009/11/15	640	< 10	160	20	160	20	160	640	< 10	Taiwan/55 CL
B/Bangladesh/3333/2007	E4 +2	2007/08/19	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	Yamagata-lineage
TEST.Ag												
B/Laos/1724/2010	MDCK 1 +1	2010/09/02	20	160	20	160	40	40	10	160	< 10	Bri/60 CL, L58P
B/Laos/1733/2010	MDCK 1 +1	2010/09/02	20	160	20	160	40	40	10	160	< 10	Bri/60 CL, L58P
B/Laos/1763/2010	MDCK 1 +1	2010/09/07	20	160	20	160	20	20	< 10	160	< 10	Bri/60 CL, L58P
B/OKINAWA/9/2010	MDCK 1 +1	2010/09/01	20	160	20	80	20	40	< 10	160	< 10	Bri/60 CL, L58P
B/Laos/1727/2010	MDCK 1 +1	2010/09/02	10	80	20	80	40	20	< 10	80	< 10	Bri/60 CL, L58P
B/HIROSHIMA/9/2010	MDCK 1 +1	2010/09/03	20	80	10	80	20	20	< 10	160	< 10	Bri/60 CL, L58P, R279K
B/Laos/1753/2010	MDCK 1 +1	2010/09/06	20	80	10	80	20	20	< 10	320	< 10	Bri/60 CL, L58P
B/SHIZUOKA/27/2010	MDCK 1 +1	2010/09/02	40	< 10	< 10	< 10	< 10	< 10	10	160	< 10	Taiwan/55 CL

# Phylogenetic analysis of influenza B (Victoria-lineage) HA genes (HA1)

**10/11 Japanese vaccine strain**

HI reference strains in Red  
 September 2010 in Blue  
 October 2010 in Green  
 November 2010 in Orange  
 December 2010 in Pink

●: Antigenic sites  
 \$: Serology antigens





# Phylogenetic analysis of influenza B (Victoria-lineage) NA genes

10/11 Japanese vaccine strain

HI reference strains in Red

September 2010 in Blue

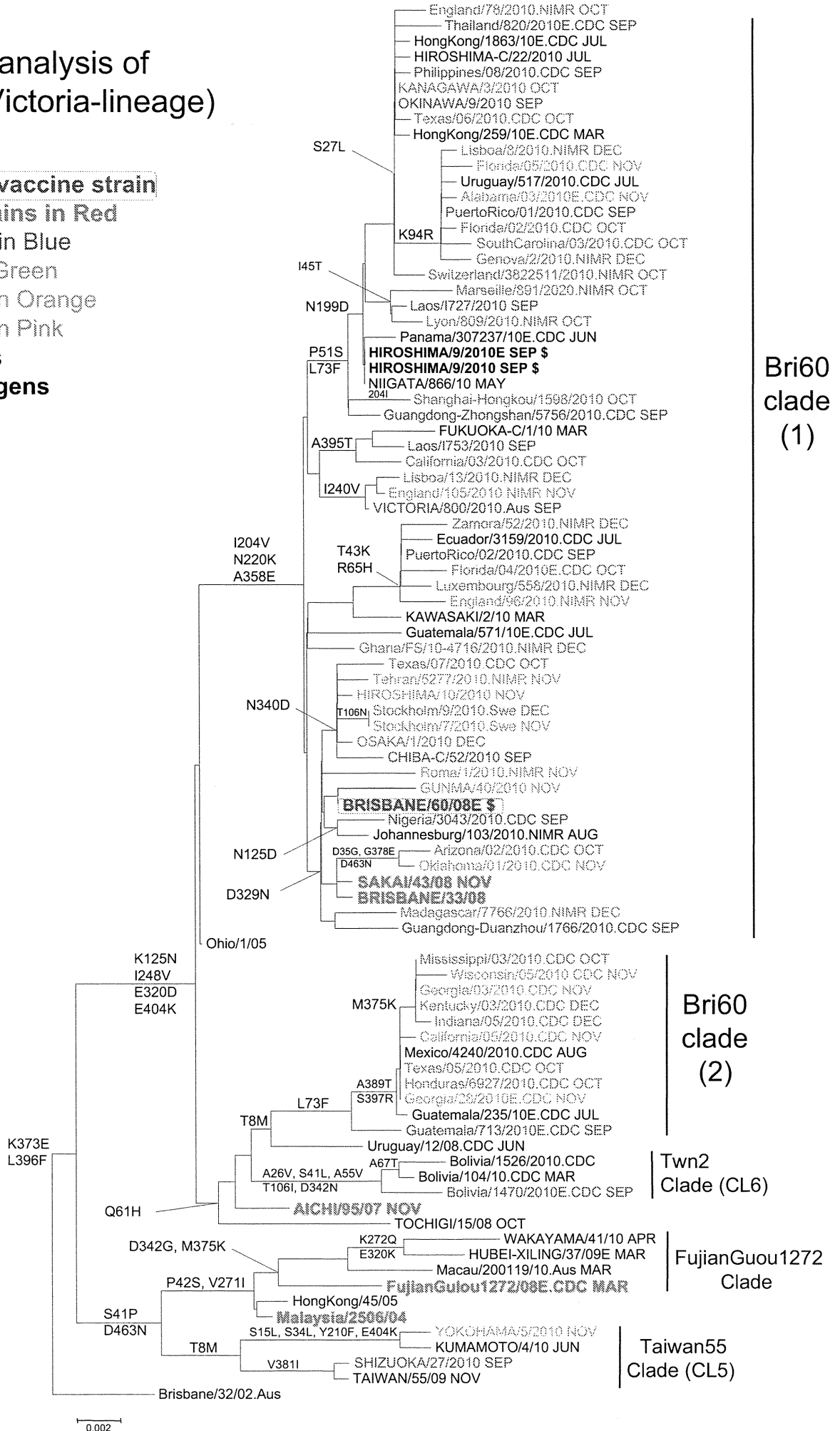
October 2010 in Green

November 2010 in Orange

December 2010 in Pink

●: Antigenic sites

⌘: Serology antigens



# Influenza B (Victoria-lineage) HA1 amino acid comparison

B_Vic_consensus_AA (n=110)	1	DRICTGITSSNSPHVVKTATQGEVNVTVGVIPLTPTTKSHFANLKGTTETRGKLCPKCLNC	60
CHIBA-C/52/2010	1	.....	60
GUNMA/40/2010	1	.....	60
KOBE/406/2010	1	.....	60
Taiwan/728/2010	1	.....P..	60
Taiwan/737/2010	1	.....P..	60
Laos/I753/2010	1	.....P..	60
Laos/I327/2010	1	.....P..	60
Chongqing-Yuzhong/1362/2010E	1	.....P..	60
KANAGAWA/3/2010	1	.....P..	60
OKINAWA/9/2010	1	.....P..	60
Shanghai-Hongkou/1471/2010	1	.....P..	60
YOKOHAMA/5/2010	1	.....I.....	60
SHIZUOKA/27/2010	1	.....I.....P..	60
BRISBANE/60/08E	1	.....	60
HIROSHIMA/9/2010	1	.....P..	60
HIROSHIMA/9/2010E	1	.....P..	60
BRISBANE/33/08E	1	.....	60
SAKAI/43/08_NOV	1	.....	60
TAIWAN/55/09_NOV	1	.....I.....P..	60
FujianGulou/1272/08E.CDC	1	.....	60
B-Vic_AG_site (Bri33E)	1	-----	1
10_AA	1	-----X-----X-----X-----X-----X-----X	6

B_Vic_consensus_AA (n=110)	61	TDLVALGRPKCTGKIPSARVSILHEVRPVTSGCFPIMHDRTKIRQLPNLLRGYEHIRLS	120
CHIBA-C/52/2010	61	.....	120
GUNMA/40/2010	61	.....	120
KOBE/406/2010	61	.....	120
Taiwan/728/2010	61	.....	120
Taiwan/737/2010	61	.....	120
Laos/I753/2010	61	.....	120
Laos/I327/2010	61	.....	120
Chongqing-Yuzhong/1362/2010E	61	.....	120
KANAGAWA/3/2010	61	.....	120
OKINAWA/9/2010	61	.....	120
Shanghai-Hongkou/1471/2010	61	.....	120
YOKOHAMA/5/2010	61	.....N.....	120
SHIZUOKA/27/2010	61	.....N.....	120
BRISBANE/60/08E	61	.....	120
HIROSHIMA/9/2010	61	.....	120
HIROSHIMA/9/2010E	61	.....X	120
BRISBANE/33/08E	61	.....	120
SAKAI/43/08_NOV	61	.....	120
TAIWAN/55/09_NOV	61	.....N.....	120
FujianGulou/1272/08E.CDC	61	.....N.....	120
B-Vic_AG_site (Bri33E)	1	-----	1
10_AA	7	-----X-----X-----X-----X-----X-----X	12

# Influenza B (Victoria-lineage) HA1 amino acid comparison

		165	
B_Vic_consensus_AA (n=110)	121	THNVINAENAPGGPYKIGTSGSCPNTVINGNGFFATMAWAVPKNDKNTATNPLTIEVPYI	180
CHIBA-C/52/2010	121	.....N.....	180
GUNMA/40/2010	121	.....I.....	180
KOBE/406/2010	121	.....	180
Taiwan/728/2010	121	.....X.....	180
Taiwan/737/2010	121	.....	180
Laos/I753/2010	121	.....	180
Laos/I327/2010	121	.....	180
Chongqing-Yuzhong/1362/2010E	121	.....	180
KANAGAWA/3/2010	121	.....	180
OKINAWA/9/2010	121	.....	180
Shanghai-Hongkou/1471/2010	121	.....	180
YOKOHAMA/5/2010	121	.....N.....S.....	180
SHIZUOKA/27/2010	121	.....N.....S.....	180
BRISBANE/60/08E	121	.....I.....	180
HIROSHIMA/9/2010	121	.....	180
HIROSHIMA/9/2010E	121	.....	180
BRISBANE/33/08E	121	.....I.....	180
SAKAI/43/08_NOV	121	.....T.....I.....	180
TAIWAN/55/09_NOV	121	.....N.....S.....	180
FujianGulou/1272/08E.CDC	121	A.....N.....S.....	180
B-Vic_AG_site(Bri33E)	2	-----	16
10_AA	13	-----X-----X-----X-----X-----X-----X-----X	18

		197 199	
B_Vic_consensus_AA (n=110)	181	CTEGEDQITVWGFHSDNETQMAKLYGDSKPKFTSSANGVTHYVSQIGGFNPQTEDGGL	240
CHIBA-C/52/2010	181	.....S.....	240
GUNMA/40/2010	181	.....	240
KOBE/406/2010	181	.....	240
Taiwan/728/2010	181	.....	240
Taiwan/737/2010	181	.....	240
Laos/I753/2010	181	.....	240
Laos/I327/2010	181	.....	240
Chongqing-Yuzhong/1362/2010E	181	.....D.....	240
KANAGAWA/3/2010	181	.....	240
OKINAWA/9/2010	181	.....D.....	240
Shanghai-Hongkou/1471/2010	181	.....	240
YOKOHAMA/5/2010	181	.....T.....	240
SHIZUOKA/27/2010	181	.....	240
BRISBANE/60/08E	181	.....X.X.....	240
HIROSHIMA/9/2010	181	.....	240
HIROSHIMA/9/2010E	181	.....X.X.....	240
BRISBANE/33/08E	181	.....S.....	240
SAKAI/43/08_NOV	181	.....	240
TAIWAN/55/09_NOV	181	.....	240
FujianGulou/1272/08E.CDC	181	.....K.....	240
B-Vic_AG_site(Bri33E)	17	-----S-----	33
10_AA	19	-----X-----X-----X-----X-----X-----X-----X	24

# Influenza B (Victoria-lineage) HA1 amino acid comparison

B_Vic_consensus_AA(n=110)	241	PQSGRIVVDYMVQKSGKTGTITYQRGILLPQKVWCASGRSKVIKGSPLIGEADCLHEKY	300
CHIBA-C/52/2010	241	.....	300
GUNMA/40/2010	241	.....	300
KOBE/406/2010	241	.....	300
Taiwan/728/2010	241	.....	300
Taiwan/737/2010	241	.....	300
Laos/I753/2010	241	.....	300
Laos/I327/2010	241	.....	300
Chongqing-Yuzhong/1362/2010E	241	..... R.....	300
KANAGAWA/3/2010	241	.....	300
OKINAWA/9/2010	241	.....	300
Shanghai-Hongkou/1471/2010	241	.....	300
YOKOHAMA/5/2010	241	.....	300
SHIZUOKA/27/2010	241	.....	300
BRISBANE/60/08E	241	.....	300
HIROSHIMA/9/2010	241	..... K.....	300
HIROSHIMA/9/2010E	241	..... K.....	300
BRISBANE/33/08E	241	.....	300
SAKAI/43/08_NOV	241	.....	300
TAIWAN/55/09_NOV	241	.....	300
FujianGulou/1272/08E.CDC	241	.....	300
B-Vic_AG_site(Bri33E)	34	-----	36
10_AA	25	-----X-----X-----X-----X-----X-----X	30

B_Vic_consensus_AA(n=110)	301	GGLNKSPPYYTGEHAKAIGNCPIWVKTPCLKLANGTKYRPPAKLLKER	347
CHIBA-C/52/2010	301	.....	347
GUNMA/40/2010	301	.....	347
KOBE/406/2010	301	.....	347
Taiwan/728/2010	301	.....	347
Taiwan/737/2010	301	..... X.....	347
Laos/I753/2010	301	.....	347
Laos/I327/2010	301	.....	347
Chongqing-Yuzhong/1362/2010E	301	.....	347
KANAGAWA/3/2010	301	.....	347
OKINAWA/9/2010	301	.....	347
Shanghai-Hongkou/1471/2010	301	.....	347
YOKOHAMA/5/2010	301	.....	347
SHIZUOKA/27/2010	301	.....	347
BRISBANE/60/08E	301	.....	347
HIROSHIMA/9/2010	301	.....	347
HIROSHIMA/9/2010E	301	.....	347
BRISBANE/33/08E	301	.....	347
SAKAI/43/08_NOV	301	.....	347
TAIWAN/55/09_NOV	301	.....	347
FujianGulou/1272/08E.CDC	301	.....	347
B-Vic_AG_site(Bri33E)	37	-----	36
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