

Supplementary Tables

Supplementary data

Supplementary table 1. H1N1 Influenza A virus sequence data (accession number_year)

Avian		Human		Swine	
HA	NA	HA	NA	HA	NA
D10477_1976	AF250362_1976	AF117241_1918	AF250356_1918	X57492_1930	AF250364_1930
AF091313_1977	AY207534_1977	CY009604_1933	L25815_1933	CY045740_1931	CY045742_1931
CY179395_1979	CY179397_1979	CY019955_1935	CY019957_1935	CY027291_1935	CY027293_1935
L25071_1980	EU742638_1980	CY020445_1936	CY020447_1936	CY026427_1942	CY026429_1942
AF091310_1981	CY005868_1981	CY013271_1940	CY013273_1940	CY026283_1957	CY026285_1957
GU066779_1983	GU066780_1983	CY009276_1942	CY009278_1942	AF091307_1961	CY032215_1961
CY179203_1984	CY179205_1984	CY009452_1943	AF250365_1943	CY026299_1966	CY026301_1966
AF091311_1985	KF424148_1985	CY021709_1945	CY021711_1945	CY026291_1967	CY026293_1967
EU743306_1986	AF250358_1986	U02085_1947	AF250357_1947	EU139825_1968	EU139835_1968
GU050711_1987	AJ416626_1987	CY019947_1948	CY019949_1948	CY022437_1970	CY022439_1970
EU735786_1988	EU735788_1988	CY019971_1949	CY019973_1949	CY022413_1971	CY022415_1971
CY136745_1990	EU743153_1990	CY077719_1950	CY009334_1950	EU139826_1973	EU139836_1973
EU735794_1991	AY207541_1991	CY077768_1951	CY021823_1951	CY022341_1975	CY022343_1975
EU743159_1992	EU743161_1992	CY077748_1953	AB745480_1953	K00992_1976	AF250363_1976
EU735802_1993	AF250361_1993	M38312_1954	M38309_1954	CY009916_1977	CY022271_1977
EU026102_1994	EF607903_1994	CY008988_1957	CY008990_1957	CY022405_1978	CY022407_1978
EU026110_1995	EF607902_1995	CY178719_1976	M27970_1976	CY022365_1979	CY022367_1979
AB271115_1996	EF607904_1996	CY010372_1977	K02018_1977	CY022421_1980	CY022423_1980
AY633212_1998	EU743177_1998	CY010868_1978	CY010870_1978	CY022381_1981	U86144_1981
HE802061_1999	CY091594_1999	M38353_1979	M38335_1979	CY116348_1982	AJ412692_1982
AY180460_2000	AY180836_2000	CY010908_1980	CY010910_1980	AF091316_1983	GU236519_1983
CY139649_2001	AJ697876_2001	CY021029_1981	CY021031_1981	AF091317_1985	CY022319_1985
EU182325_2002	EF607906_2002	CY009620_1982	CY010366_1982	U72666_1986	CY028790_1986
GQ257448_2003	EU980510_2003	CY010916_1983	CY010918_1983	AF091315_1987	CY022471_1987
CY137602_2004	CY137604_2004	CY021725_1984	CY021727_1984	M81707_1988	GU052269_1988
AB670330_2005	CY029843_2005	CY019101_1986	D31948_1986	CY035070_1990	CY035072_1990
FJ432770_2006	CY043906_2006	CY019771_1987	CY019773_1987	CY022477_1991	CY022479_1991
FN386463_2007	KF424124_2007	Z54287_1988	D31944_1988	L09063_1992	KP788774_1992
AB546153_2008	CY140047_2008	D13573_1989	D31950_1989	U72668_1993	KR701559_1993
CY190971_2009	CY190973_2009	L24362_1991	CY009318_1991	CY098500_1994	KR700455_1994
KJ764764_2010	CY097764_2010	JX477159_1993	CY125046_1993	AM920728_1995	AM920729_1995
CY133685_2011	CY132836_2011	U53162_1994	U53166_1994	CY116252_1996	CY115890_1996
CY134343_2012	CY134353_2012	AF386773_1995	AJ518097_1995	AF222026_1997	DQ280259_1997
KP658026_2014	CY191301_2014	AY282756_1996	AY904335_1996	AF222034_1998	FJ805963_1998
LC121396_2015	LC121398_2015	JX477162_1997	EF584334_1997	EU139827_1999	EU139837_1999
KX232477_2016	KX232479_2016	AF386775_1998	AJ518098_1998	CY098476_2000	CY098478_2000
		DQ415318_1999	DQ249252_1999	CY115919_2001	CY115921_2001
		D13574_2000	AJ518093_2000	EU139829_2002	GU135877_2002
		DQ397950_2001	EU097709_2001	CY040545_2003	CY040546_2003
		DQ249260_2002	AY297140_2002	CY040543_2004	EU409956_2004
		CY019341_2003	CY019343_2003	CY098509_2005	FJ638300_2005
		EU097943_2004	EU097720_2004	CY157975_2006	EU409961_2006
		EU097944_2005	EU097718_2005	EU604689_2007	KR859539_2007
		EU097955_2006	EU100639_2006	HQ833574_2008	HM461780_2008
		EU516142_2007	EU516129_2007	CY116338_2009	CY158363_2009
		FJ264940_2008	FJ403565_2008	CY159966_2010	CY159968_2010
		GQ290059_2009	GQ475905_2009	JQ809724_2011	JN162018_2011
		KC781201_2010	KC781200_2010	JX092558_2012	JX092590_2012
		CY121816_2011	KC524475_2011	KC759326_2013	KC592045_2013
		KM437698_2012	KM437700_2012	KJ437583_2014	KJ437561_2014
		KM409057_2013	KT734960_2013	KP759771_2015	KR074128_2015
		KT836515_2014	KM409206_2014	KU565146_2016	KU954069_2016
		KU589419_2015	KU589421_2015		
		KX006213_2016	KX408581_2016		

Supplementary table 2. H1N2 Influenza A virus sequence data (accession number_year)

Avian		Human		Swine	
HA	NA	HA	NA	HA	NA
CY178919_1976	CY178921_1976	FJ231786_2002	AJ457943_2002	AB434408_1980	D00713_1980
CY014901_1982	CY014903_1982	EU097959_2003	EU103974_2003	AF085414_1994	AJ412697_1994
CY136806_1994	CY136808_1994	JQ340003_2009	JQ340004_2009	CY116410_1997	CY116412_1997
AY038014_1999	AY038015_1999	KJ620415_2012	KJ635918_2012	HQ709201_1998	AJ412704_1998
AY233393_2001	AY233391_2001			AF250124_1999	AY590829_1999
CY060268_2002	CY060270_2002			AM920737_2000	AY590826_2000
FJ536843_2005	FJ985238_2005			AY060048_2001	AY590828_2001
KJ764772_2007	KJ764773_2007			CY116372_2002	CY116374_2002
AB546162_2008	AB546164_2008			AB294217_2003	AB270752_2003
JX566015_2009	JX566199_2009			DQ447187_2004	DQ447184_2004
CY133801_2010	CY133803_2010			EF556201_2005	EF556202_2005
KP658032_2011	KP658017_2011			HQ658487_2006	DQ666943_2006
KP658027_2012	KP658012_2012			EU98788_2007	KR859426_2007
LC121276_2015	LC121278_2015			AB514929_2008	AB514932_2008
				HQ660237_2009	HQ658488_2009
				KF305984_2010	HE600192_2010
				KF305991_2011	KR700044_2011
				KC295233_2012	KR066624_2012
				AB921004_2013	KC534989_2013
				KT827987_2014	KT827864_2014
				KP710948_2015	KP710950_2015
				KU565155_2016	KU598279_2016

Supplementary table 3. H2N2 Influenza A virus sequence data (accession number_year)

Avian		Human	
HA	NA	HA	NA
L11128_1978	CY005540_1978	L20406_1957	J02156_1957
L11139_1983	CY067274_1983	CY020317_1958	AY209900_1958
L11127_1984	CY116957_1984	L11134_1959	AY209901_1959
CY116907_1990	CY116909_1990	CY021933_1960	CY125904_1960
L11131_1991	AB745485_1991	CY125854_1961	AY209904_1961
CY042257_1994	CY116973_1994	KP098440_1962	AY209906_1962
CY042265_1995	CY014823_1995	CY035078_1963	AY209910_1963
AY684893_1999	CY121961_1999	L11126_1964	AB101672_1964
AB276115_2001	AB276116_2001	D13580_1965	AY209914_1965
CY036573_2004	EU735812_2004	KP412318_1966	AY209918_1966
AB669133_2006	CY121969_2006	CY020389_1967	K01393_1967
CY041234_2007	CY121977_2007	L11125_1968	AB101673_1968
CY141168_2008	CY141170_2008		
CY133448_2010	CY133450_2010		
CY205019_2011	CY205021_2011		
CY191259_2012	CY191013_2012		
KM100132_2013	KM100134_2013		

Supplementary table 4. H3N2 Influenza A virus sequence data (accession number_year)

Avian		Human		Swine	
HA	NA	HA	NA	HA	NA
AY531037_1969	AJ574904_1969	V01085_1968	J02136_1968	CY009300_1977	CY009302_1977
CY181037_1974	CY181039_1974	CY006299_1969	AY210119_1969	CY009308_1980	CY009310_1980
CY006026_1975	CY005554_1975	CY021085_1970	AY210124_1970	AJ252132_1982	EF409252_1982
CY178978_1976	CY178980_1976	J02132_1971	AB101675_1971	M73775_1984	AJ293934_1984
AB277754_1977	AB277755_1977	M54895_1972	J02168_1972	CY077919_1985	CY077921_1985
M73776_1978	EU742654_1978	CY009348_1973	AB124660_1973	EF409246_1987	AJ293935_1987
CY180259_1979	CY180261_1979	CY003496_1974	CY003498_1974	EF409247_1992	AJ311455_1992
CY178382_1980	CY178384_1980	V01086_1975	CY003730_1975	CY116095_1993	EF409255_1993
CY178663_1981	CY178665_1981	CY006723_1976	AB124661_1976	KR701354_1994	D86470_1994
CY177926_1983	CY177928_1983	X05907_1977	AB124662_1977	AM920723_1995	AM920724_1995
CY177990_1984	CY177992_1984	CY006707_1978	CY006709_1978	EF409248_1996	AJ293936_1996

CY020717_1986	CY020719_1986	DQ508825_1979	K01150_1979	EF409249_1997	EF409257_1997
CY017411_1988	CY017413_1988	CY007619_1980	CY007621_1980	KR701348_1998	AJ293937_1998
CY101856_1994	CY101858_1994	CY007627_1981	CY007629_1981	EF409250_1999	AJ412703_1999
GU186484_1998	EU743197_1998	CY077834_1982	AB124664_1982	DQ021911_2000	KR701539_2000
EU743501_1999	EU743510_1999	CY003720_1983	CY003722_1983	DQ021910_2001	EF217407_2001
GU051140_2000	AJ697881_2000	CY003744_1984	CY116580_1984	AM920742_2002	AM920743_2002
CY011048_2002	EU429701_2002	CY003504_1985	U42632_1985	AY852273_2003	EU296610_2003
AY779253_2003	EU429720_2003	CY002088_1986	CY116588_1986	AY852277_2004	KR859359_2004
EU301225_2004	EU429745_2004	CY003544_1987	U42633_1987	EU296613_2005	EU296612_2005
EU697204_2005	EU429781_2005	AJ252129_1988	CY116579_1988	KF007985_2006	KR859364_2006
FJ432762_2006	EU429742_2006	U97740_1989	CY116582_1989	EU982295_2007	KR859384_2007
CY043816_2007	JN087106_2007	CY003064_1990	CY003066_1990	AB762413_2008	KR859528_2008
FJ802401_2008	FJ802403_2008	CY113549_1991	CY116583_1991	KF007989_2009	CY045561_2009
AB545597_2009	AB545598_2009	U26830_1992	CY003714_1992	KF007981_2010	CY122343_2010
CY098262_2010	CY098272_2010	KM821285_1993	CY006349_1993	KF007984_2011	KF007993_2011
KU158891_2011	KU158905_2011	KM821286_1994	AJ457946_1994	KF007983_2012	KR701267_2012
LC028104_2012	LC028106_2012	AB019354_1995	U51246_1995	AB921006_2013	KC534986_2013
KM222572_2013	AB916645_2013	AF017270_1996	AJ457942_1996	KT827842_2014	KT828103_2014
KT022355_2014	KT022357_2014	AF363502_1997	AJ291403_1997	KP701520_2015	KP701521_2015
LC132912_2015	LC132914_2015	AB019355_1998	AJ316063_1998	KU565164_2016	KU565165_2016
		AY035588_1999	AF382329_1999		
		EU103638_2000	AJ307599_2000		
		KM821312_2001	AJ457960_2001		
		EF568928_2002	AY589662_2002		
		AY531039_2003	AY531006_2003		
		DQ249261_2004	DQ249255_2004		
		EU103645_2005	EU103854_2005		
		EU021278_2006	EU021279_2006		
		EU021270_2007	EU021271_2007		
		EU851997_2008	EU914858_2008		
		GQ385931_2009	GQ385930_2009		
		KC535393_2010	KC535392_2010		
		KM821347_2011	KJ942594_2011		
		KJ942608_2012	KJ942610_2012		
		KT734919_2013	KT734917_2013		
		KJ623709_2014	KJ623711_2014		
		KU591071_2015	KU591073_2015		
		KX416480_2016	KX416482_2016		

Supplementary table 5. H5N1 Influenza A virus sequence data (accession number_year)

Avian		Human		Swine	
HA	NA	HA	NA	HA	NA
CY015081_1959	AJ416625_1959	AF028709_1997	AF028708_1997	DQ432037_2001	DQ432038_2001
CY179411_1982	CY179413_1982	GU052089_2001	GU052091_2001	DQ432045_2003	DQ432046_2003
EU871820_1983	EU871822_1983	EF541401_2003	AB212056_2003	DQ997253_2004	DQ997254_2004
S68489_1991	GU052512_1991	AY577314_2004	AY679513_2004	HM440075_2005	HM440053_2005
AF148678_1996	AF144304_1996	AB239125_2005	DQ094290_2005	HM440139_2006	HM440085_2006
AF046099_1997	GU052122_1997	EF200513_2006	EU146890_2006	KC683522_2008	KC683526_2008
AY585363_1999	AY585408_1999	EF535817_2007	EU146921_2007	KC683523_2009	KC683527_2009
AY075030_2000	AY075031_2000	KC784946_2008	CY098690_2008	KM027999_2011	KM028001_2011
AY075027_2001	AY075028_2001	CY098716_2009	AB745469_2009	KX364460_2014	KX364459_2014
DQ023145_2002	DQ023147_2002	CY062464_2010	CY062465_2010		
DQ211922_2003	AM183681_2003	JN588805_2011	JN588856_2011		
AY639405_2004	AY649383_2004	JQ714246_2012	JQ714248_2012		
DQ407519_2005	DQ659324_2005	KF001372_2013	KF001374_2013		
DQ676830_2006	DQ676832_2006	KM392416_2014	KM392418_2014		
EF441277_2007	EF486240_2007				
AB435522_2008	AB435523_2008				
CY043374_2009	AB517664_2009				
KR732445_2010	HQ156767_2010				
KR732414_2011	AB760281_2011				
AB786676_2012	AB786678_2012				
KP035012_2013	KP035021_2013				
KP674455_2014	KR270334_2014				
KU143260_2015	KU143342_2015				
KY029054_2016	KX644143_2016				

Supplementary table 6. H7N2 Influenza A virus sequence data (accession number_year)

Avian	
HA	NA
U20461_1978	CY005620_1978
AF072386_1994	AY254117_1994
AF072388_1995	AY254120_1995
AF072393_1996	AY254125_1996
AF072395_1997	AY254128_1997
AY240893_1998	AY254114_1998
AY240887_1999	AY254119_1999
AY240878_2000	AY254106_2000
AY240890_2001	AY254108_2001
AY240885_2002	AY254110_2002
FJ750874_2003	CY021511_2003
AY831668_2004	AY831671_2004
CY028507_2005	CY028509_2005
DQ873807_2006	CY028574_2006
CY033161_2007	CY033163_2007
KF573735_2008	HM193634_2008
KP636486_2009	KP636488_2009
KF259039_2013	KF259567_2013
KM054796_2014	KM054798_2014

Supplementary table 7. H7N7 Influenza A virus sequence data (accession number_year)

Avian	
HA	NA
GU186777_1902	GU186779_1902
Z12617_1927	CY014993_1927
L37794_1934	M38330_1934
CY061602_1976	CY024788_1976
AF202247_1977	KJ889441_1977
U20459_1979	CY015041_1979
M17735_1985	CY015021_1985
U20465_1986	CY178913_1986
CY005980_1988	CY005073_1988
AB297923_1993	AB297924_1993
CY185821_1994	CY185823_1994
AB269695_1999	AB450450_1999
AY999978_2002	KF695356_2002
AY338458_2003	AY340077_2003
JN674638_2004	JN674639_2004
FJ803182_2005	AM933237_2005
AB558256_2006	AM933236_2006
AB558257_2007	AM933238_2007
AB558264_2008	AB472060_2008
AB558265_2009	KF259624_2009
KF258979_2010	KF259627_2010
AB813067_2011	KF259636_2011
AB813068_2012	KF259620_2012
KF259047_2013	KF259673_2013
KM593186_2014	KM593188_2014
KX979185_2015	KX978353_2015

Supplementary table 8. H7N9 Influenza A virus sequence data (accession number_year)

Avian	
HA	NA
CY014786_1988	CY014788_1988
CY127253_1995	CY127255_1995
EU684261_2000	CY186012_2000
AY999981_2002	KF695256_2002
KX827377_2004	KX827373_2004
CY024818_2006	CY024820_2006
AB481212_2008	AB481213_2008
KF258951_2009	KF259688_2009
AB828686_2010	KC609799_2010
AB813056_2011	CY133651_2011
KF297293_2013	KF259734_2013
KU318989_2014	KU318991_2014
KU143284_2015	KU143378_2015

Supplementary table 9. H7N10 Influenza A virus sequence data (accession number_year)

Avian	
HA	NA
M21647_1949	AB292667_1949
KF435049_1953	KF435051_1953
CY005993_1977	CY005182_1977
GU186624_1979	GU186626_1979
CY178254_1981	CY178256_1981
CY179235_1983	CY179237_1983
CY136379_1986	CY136381_1986
CY136349_1987	CY136351_1987
EU743314_1988	EU743316_1988
CY017781_1989	CY017783_1989
CY136737_1990	CY136739_1990
AB450431_1991	AB450432_1991
CY101840_1993	CY101842_1993
GU186493_1995	GU186495_1995
EU747329_1996	EU747330_1996
AB296078_1997	AB296079_1997
CY136965_1998	CY136967_1998
EU747327_1999	EU747328_1999
GU050906_2000	EU743324_2000
GU053303_2001	EU743428_2001
CY137466_2002	CY137468_2002
GU053338_2003	GU053340_2003
EU743394_2004	EU743396_2004
CY183702_2005	CY183704_2005
FJ183474_2006	FJ183475_2006
CY076864_2007	AB450445_2007
KX978964_2008	KX978237_2008
CY141391_2009	CY136064_2009
CY097694_2010	CY097672_2010
KX978624_2011	KX979161_2011
KF259194_2012	KF259619_2012
KR077964_2013	KR077966_2013
CY191291_2014	CY191293_2014
KX978577_2015	KX978040_2015

Supplementary table 10. H9N2 Influenza A virus sequence data (accession number_year)

Avian		Human		Swine	
HA	NA	HA	NA	HA	NA
D90305_1966	AJ574907_1966	GU053179_1999	GU053180_1999	AY294658_2003	DQ997429_2003
KF188393_1976	KF188394_1976	KF188327_2000	KF188328_2000	AY790305_2004	AY790299_2004
AY206673_1978	KF188322_1978	KX867849_2004	KX867851_2004	EF612742_2005	EF612744_2005
AY206672_1979	AF523404_1979	KF188289_2008	KF188290_2008	CY075038_2007	EU216107_2007
KF188339_1980	CY005875_1980	KF188316_2009	KF188318_2009	KX867825_2008	HM998916_2008
KF188280_1981	KF188344_1981	KM455872_2013	KM455874_2013	KC779047_2009	KC779051_2009
KF188287_1983	KF188288_1983			KM029503_2010	HQ893764_2010
KF188341_1985	KF188342_1985			KX421150_2012	KX421152_2012
AY206675_1988	KF188286_1988				
EU982308_1989	EU982310_1989				
AY633164_1991	CY014591_1991				
AF384557_1994	DQ874395_1994				
AF203008_1996	AF203786_1996				
AF461530_1997	DQ064408_1997				
AF461510_1998	EF626674_1998				
AY036880_1999	DQ227353_1999				
AF461513_2000	AY451388_2000				
AF461524_2001	DQ681209_2001				
AY281745_2002	AJ697879_2002				
DQ681203_2003	DQ681213_2003				
DQ464352_2004	DQ464353_2004				
EF063732_2005	EF626683_2005				
EU157934_2006	EF078977_2006				
EU216080_2007	EU216093_2007				
AB485600_2008	EU935062_2008				
JN381629_2009	KP185601_2009				
JX273557_2010	KF183629_2010				
JX273551_2011	KF259527_2011				
KF259143_2012	KF259545_2012				
KF259178_2013	KF259581_2013				
KX598435_2014	KX598494_2014				
KX598453_2015	KU143352_2015				

Supplementary table 11. Pearson correlation coefficients (r) of pairwise alignment score between HA and NA gene

Subtype	Host	r	p-value	n
H1N1	Human	0.80*	<i>p</i> <0.001	1,432
H1N1	Avian	0.36*	<i>p</i> <0.001	630
H1N1	Swine	0.38*	<i>p</i> <0.001	1,326
H1N2	Human	-0.22	<i>p</i> >0.5	6
H1N2	Avian	0.58*	<i>p</i> <0.001	91
H1N2	Swine	0.10	<i>p</i> >0.1	231
H2N2	Human	0.55*	<i>p</i> <0.001	66
H2N2	Avian	0.62*	<i>p</i> <0.001	136
H3N2	Human	0.94*	<i>p</i> <0.001	1,176
H3N2	Avian	0.35*	<i>p</i> <0.001	465
H3N2	Swine	0.30*	<i>p</i> <0.001	465
H5N1	Human	0.44*	<i>p</i> <0.001	91
H5N1	Avian	0.84*	<i>p</i> <0.001	276
H5N1	Swine	0.82*	<i>p</i> <0.001	36
H7N2	Avian	0.76*	<i>p</i> <0.001	171
H7N7	Avian	0.63*	<i>p</i> <0.001	325
H7N9	Avian	0.66*	<i>p</i> <0.001	78
H7N10	Avian	0.85*	<i>p</i> <0.001	561
H9N2	Human	0.02	<i>p</i> >0.9	15
H9N2	Avian	0.50*	<i>p</i> <0.001	496
H9N2	Swine	0.84*	<i>p</i> <0.001	28

r: Pearson correlation coefficient, * represents *p*<0.001, n: the number of dataset, Bold font was used for correlations of modest effect size (*r*>0.8, *n*>1,000)