

Swine influenza viruses in South Korea

Young Ki Choi. DVM, Ph.D

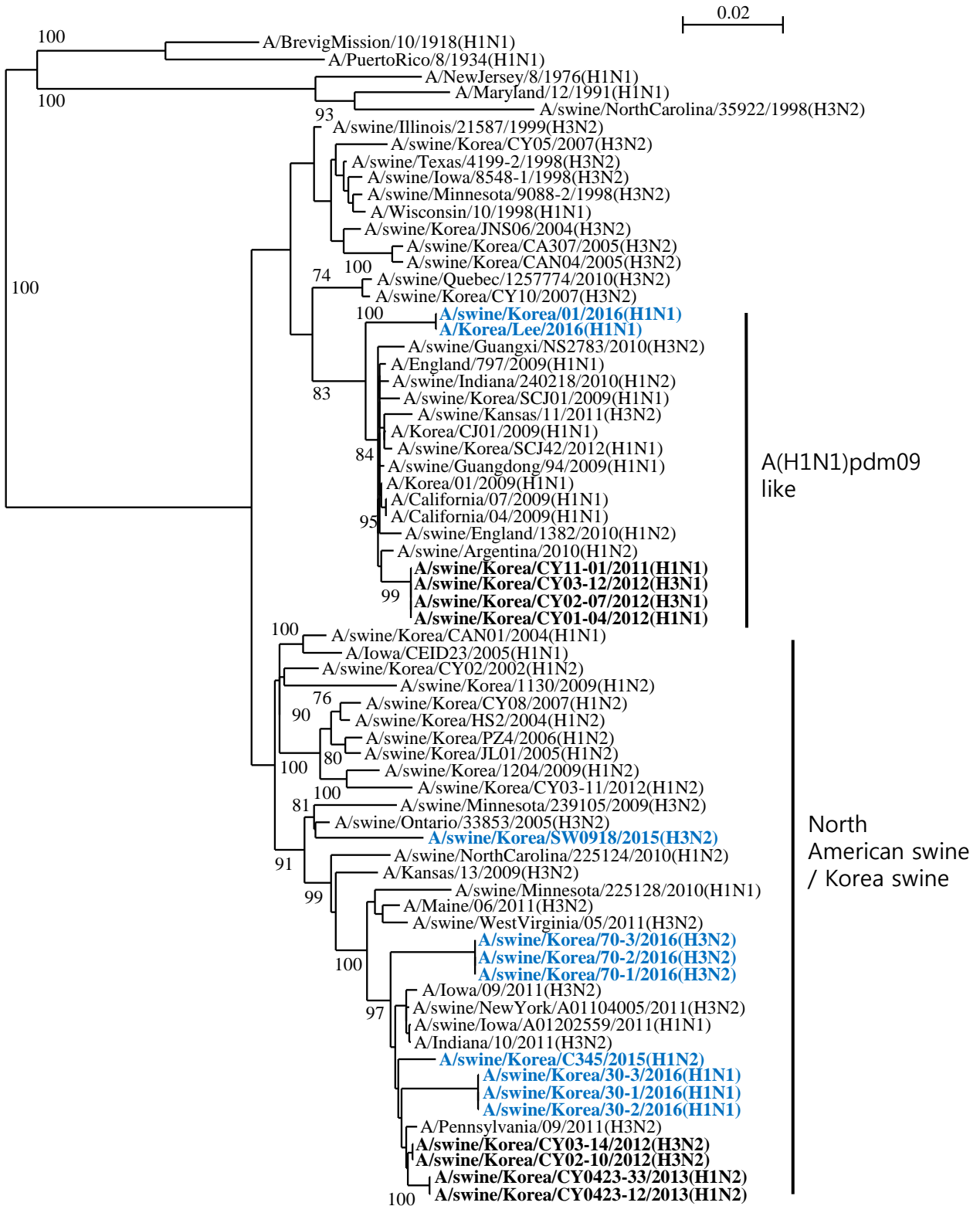
Chungbuk National University

Specimens: Nasal swabs, lung tissues

H1N1: 4 isolates (2016)

H1N2 : 1 isolate (2015)

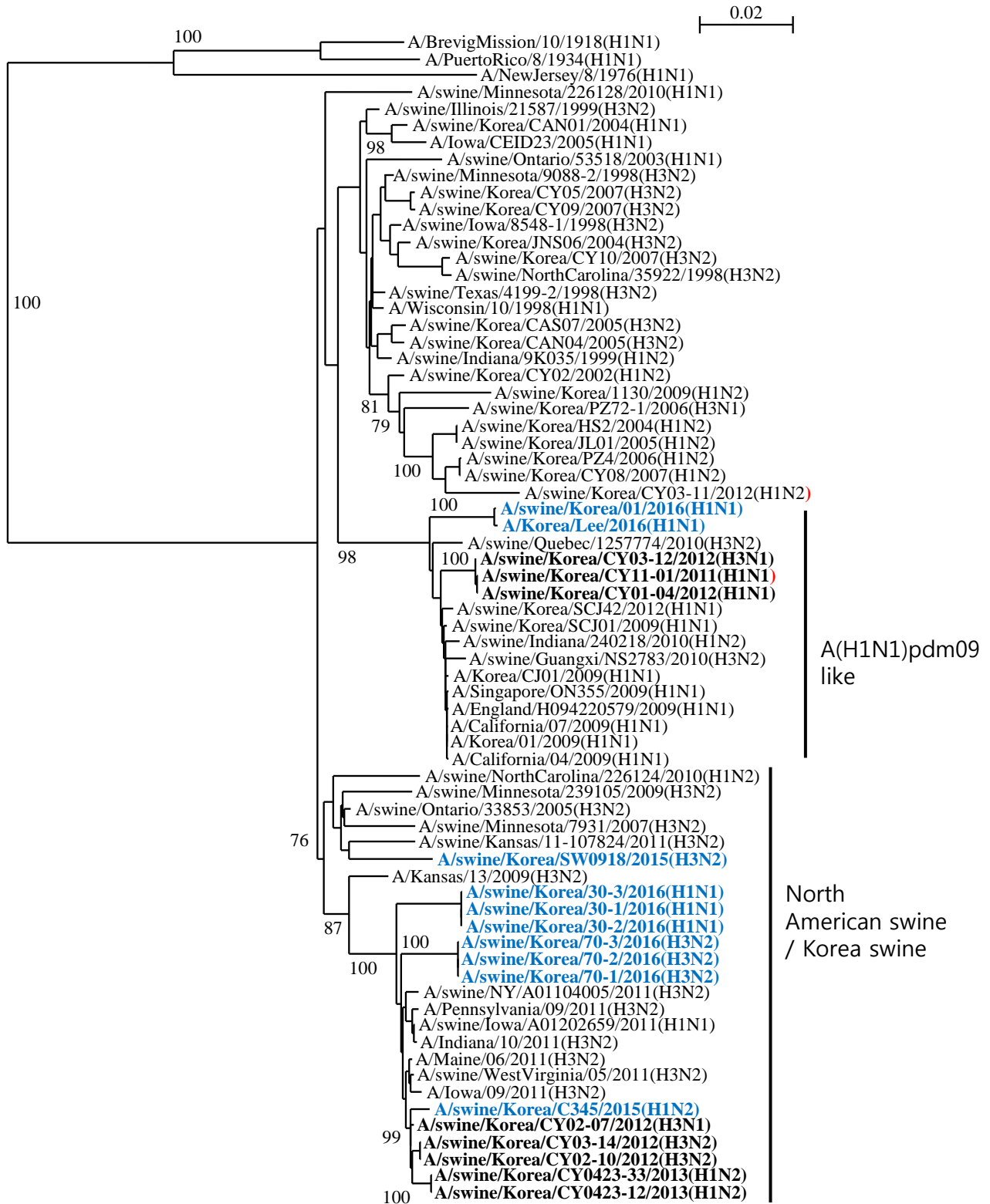
H3N2: 4 isolates (1 in 2015, and 3 in 2016)

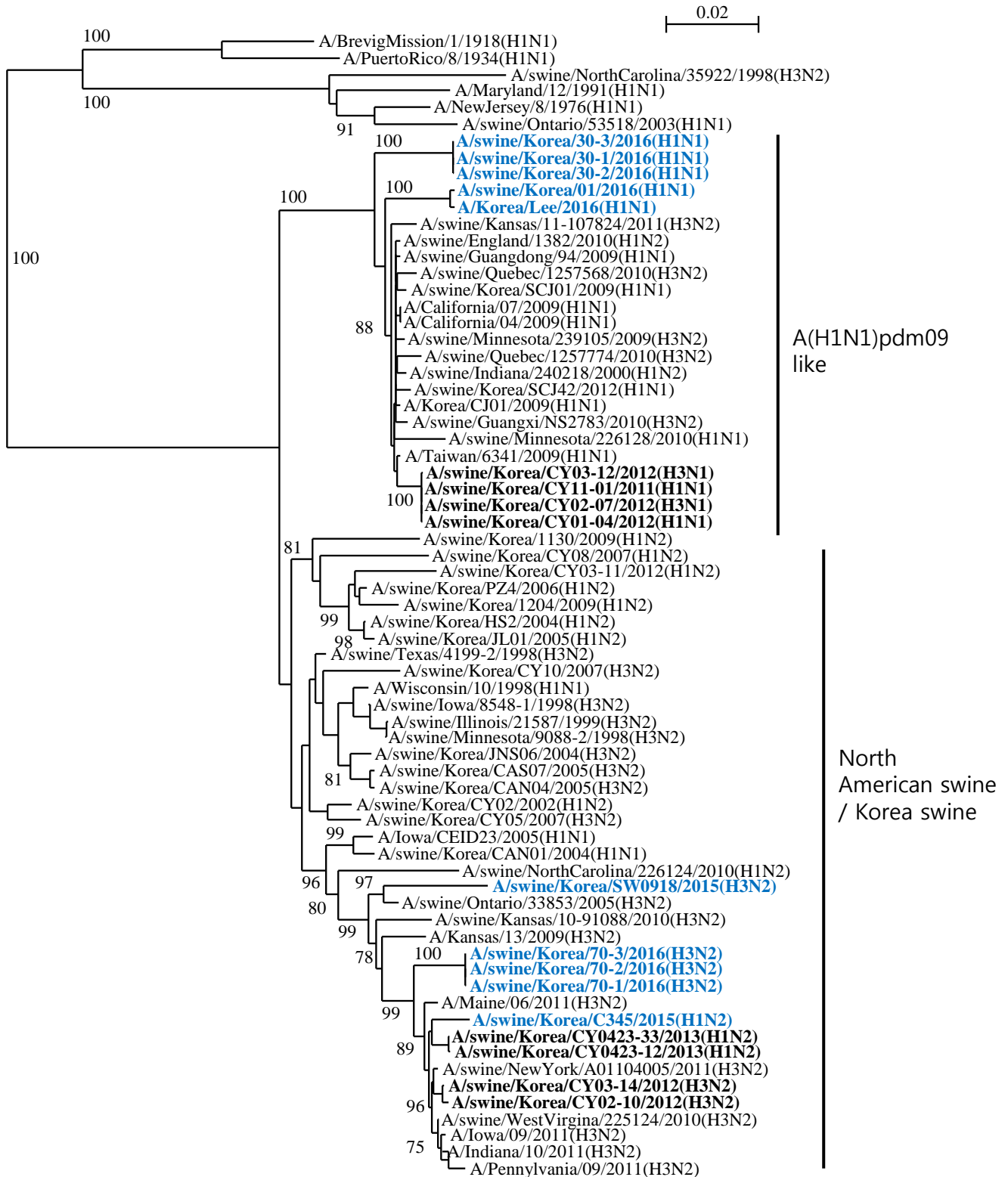


A(H1N1)pdm09 like

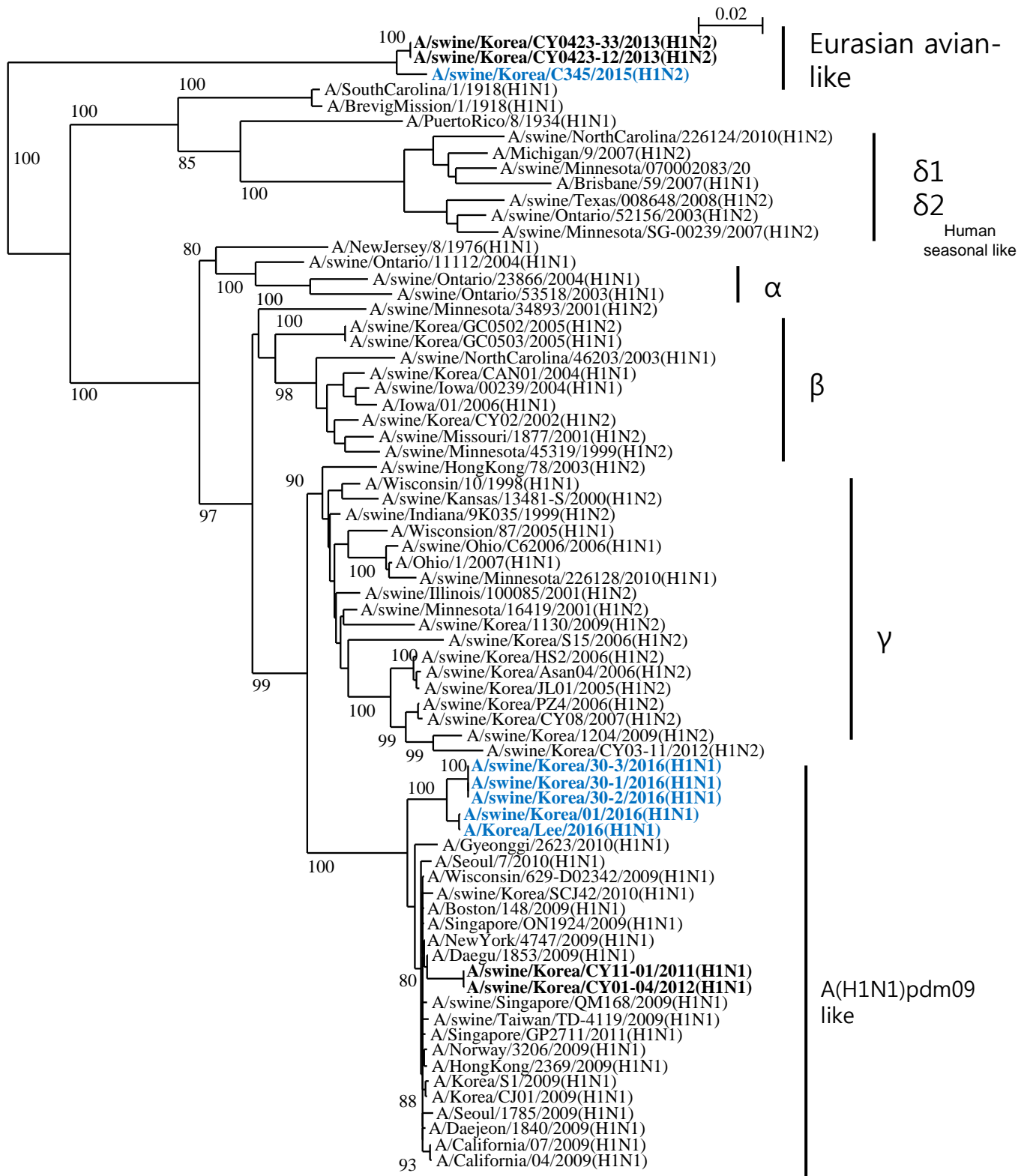
North American swine / Korea swine

- A/BrevigMission/10/1918(H1N1)
- A/PuertoRico/8/1934(H1N1)
- A/NewJersey/8/1976(H1N1)
- A/Maryland/12/1991(H1N1)
- A/swine/NorthCarolina/35922/1998(H3N2)
- A/swine/Illinois/21587/1999(H3N2)
- A/swine/Korea/CY05/2007(H3N2)
- A/swine/Texas/4199-2/1998(H3N2)
- A/swine/Iowa/8548-1/1998(H3N2)
- A/swine/Minnesota/9088-2/1998(H3N2)
- A/Wisconsin/10/1998(H1N1)
- A/swine/Korea/JNS06/2004(H3N2)
- A/swine/Korea/CA307/2005(H3N2)
- A/swine/Korea/CAN04/2005(H3N2)
- A/swine/Quebec/1257774/2010(H3N2)
- A/swine/Korea/CY10/2007(H3N2)
- A/swine/Korea/01/2016(H1N1)**
- A/Korea/Lee/2016(H1N1)**
- A/swine/Guangxi/NS2783/2010(H3N2)
- A/England/797/2009(H1N1)
- A/swine/Indiana/240218/2010(H1N2)
- A/swine/Korea/SCJ01/2009(H1N1)
- A/swine/Kansas/11/2011(H3N2)
- A/Korea/CJ01/2009(H1N1)
- A/swine/Korea/SCJ42/2012(H1N1)
- A/swine/Guangdong/94/2009(H1N1)
- A/Korea/01/2009(H1N1)
- A/California/07/2009(H1N1)
- A/California/04/2009(H1N1)
- A/swine/England/1382/2010(H1N2)
- A/swine/Argentina/2010(H1N2)
- A/swine/Korea/CY11-01/2011(H1N1)**
- A/swine/Korea/CY03-12/2012(H3N1)**
- A/swine/Korea/CY02-07/2012(H3N1)**
- A/swine/Korea/CY01-04/2012(H1N1)**
- A/swine/Korea/CAN01/2004(H1N1)
- A/Iowa/CEID23/2005(H1N1)
- A/swine/Korea/CY02/2002(H1N2)
- A/swine/Korea/1130/2009(H1N2)
- A/swine/Korea/CY08/2007(H1N2)
- A/swine/Korea/HS2/2004(H1N2)
- A/swine/Korea/PZ4/2006(H1N2)
- A/swine/Korea/JL01/2005(H1N2)
- A/swine/Korea/1204/2009(H1N2)
- A/swine/Korea/CY03-11/2012(H1N2)
- A/swine/Minnesota/239105/2009(H3N2)
- A/swine/Ontario/33853/2005(H3N2)
- A/swine/Korea/SW0918/2015(H3N2)**
- A/swine/NorthCarolina/225124/2010(H1N2)
- A/Kansas/13/2009(H3N2)
- A/swine/Minnesota/225128/2010(H1N1)
- A/Maine/06/2011(H3N2)
- A/swine/WestVirginia/05/2011(H3N2)
- A/swine/Korea/70-3/2016(H3N2)**
- A/swine/Korea/70-2/2016(H3N2)**
- A/swine/Korea/70-1/2016(H3N2)**
- A/Iowa/09/2011(H3N2)
- A/swine/NewYork/A01104005/2011(H3N2)
- A/swine/Iowa/A01202559/2011(H1N1)
- A/Indiana/10/2011(H3N2)
- A/swine/Korea/C345/2015(H1N2)**
- A/swine/Korea/30-3/2016(H1N1)**
- A/swine/Korea/30-1/2016(H1N1)**
- A/swine/Korea/30-2/2016(H1N1)**
- A/Pennsylvania/09/2011(H3N2)
- A/swine/Korea/CY03-14/2012(H3N2)
- A/swine/Korea/CY02-10/2012(H3N2)
- A/swine/Korea/CY0423-33/2013(H1N2)
- A/swine/Korea/CY0423-12/2013(H1N2)

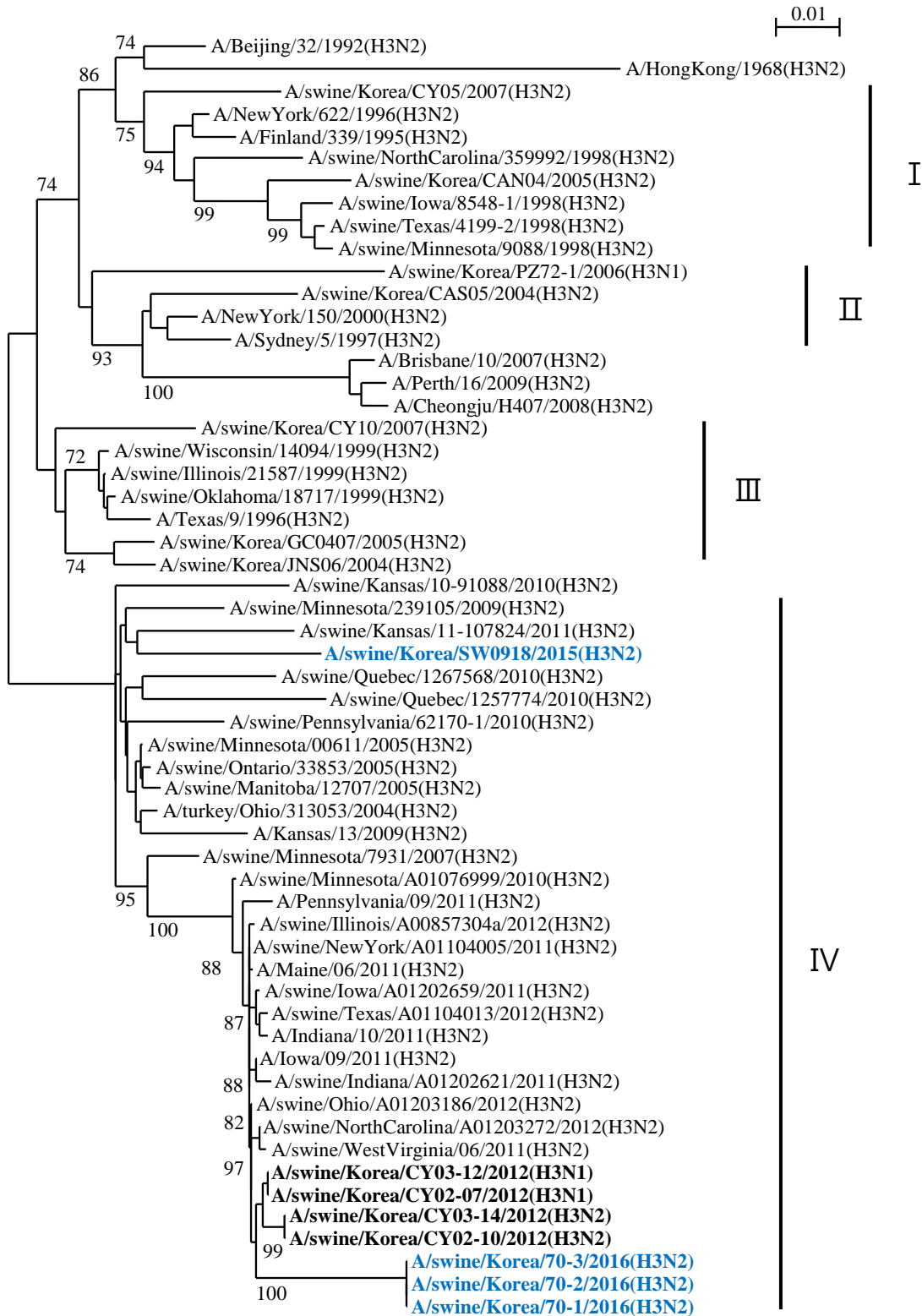




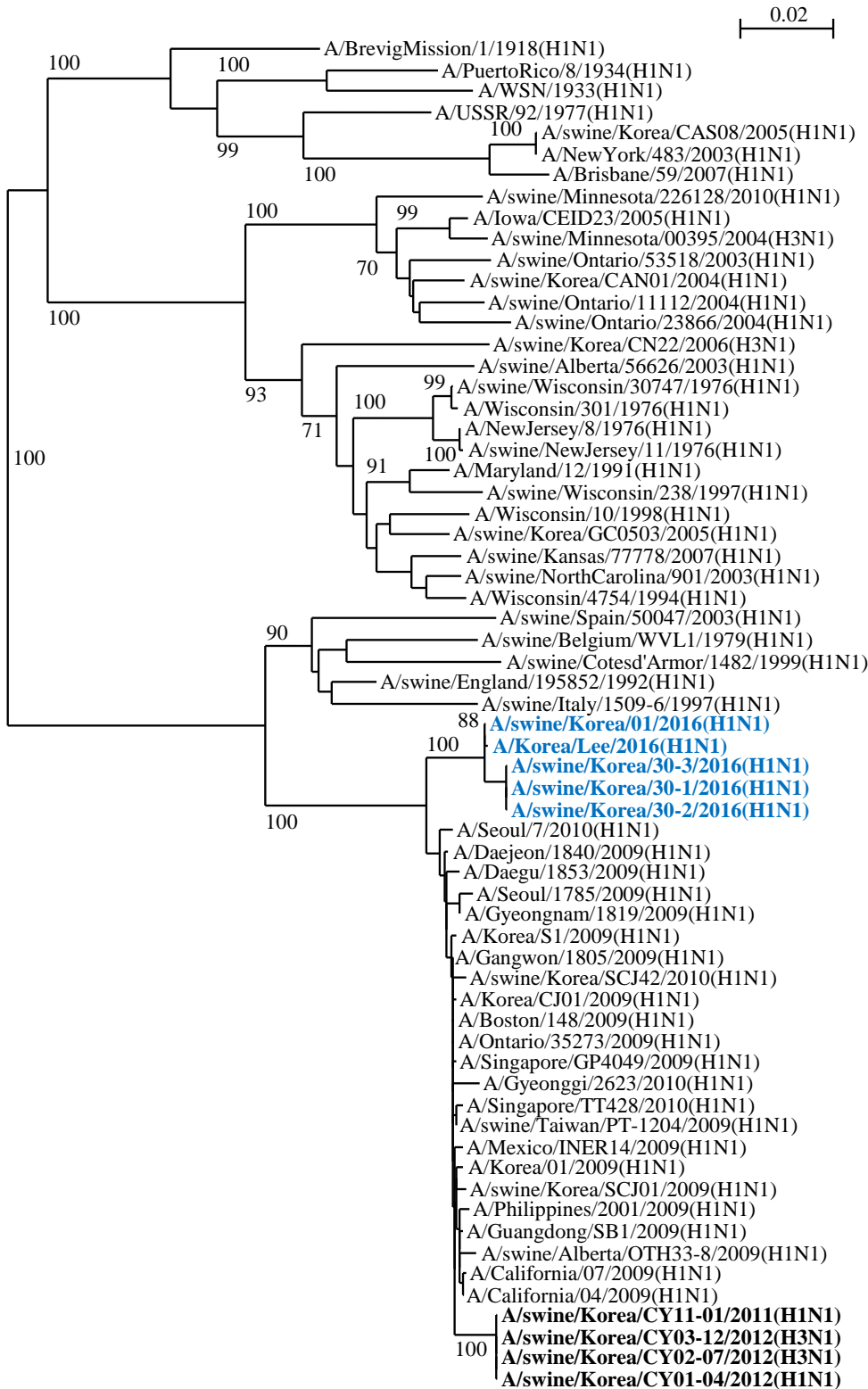
H1



H3



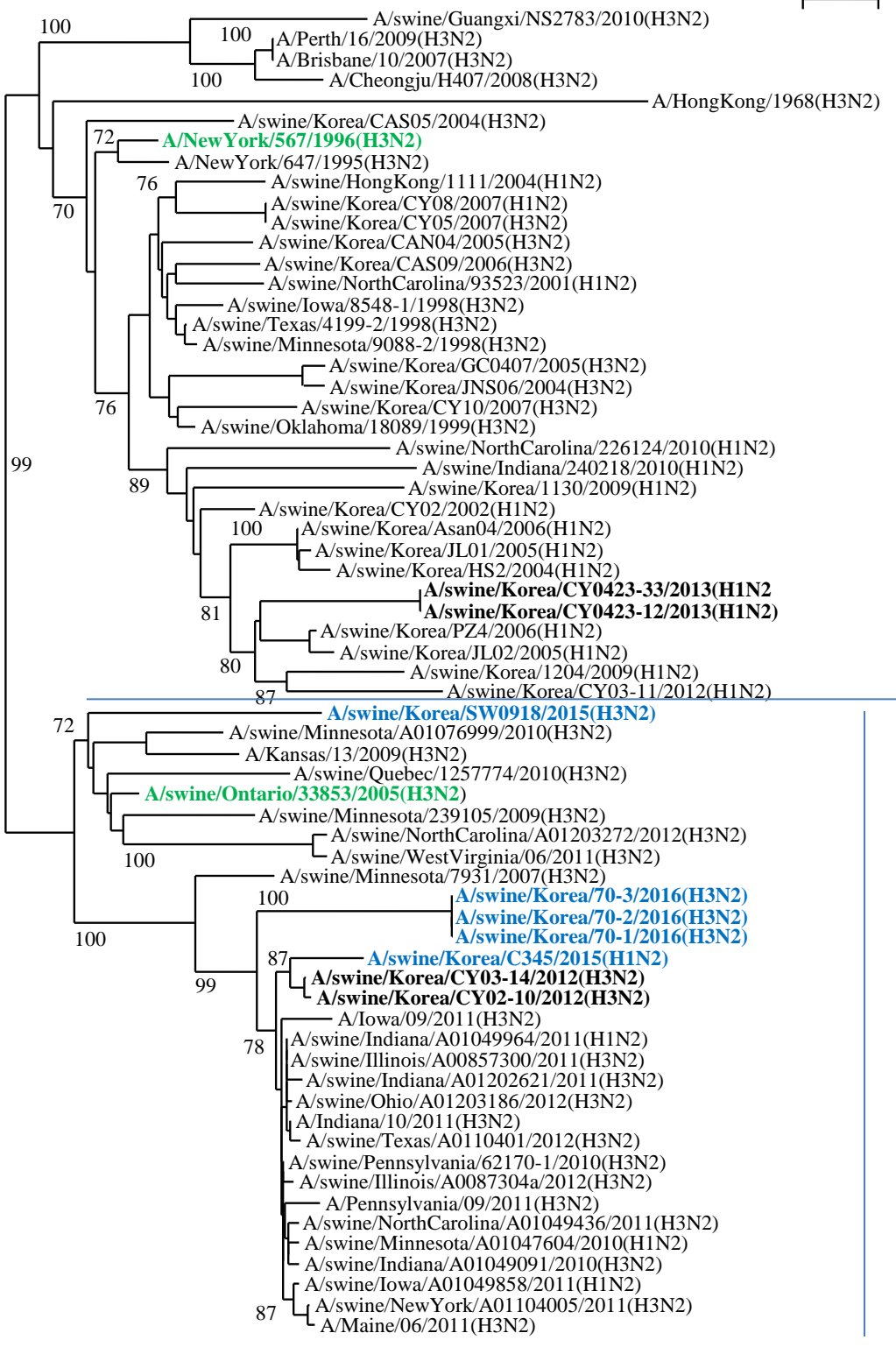
N1



North
American swine
/ Korea swine

A(H1N1)pdm09
like

0.01

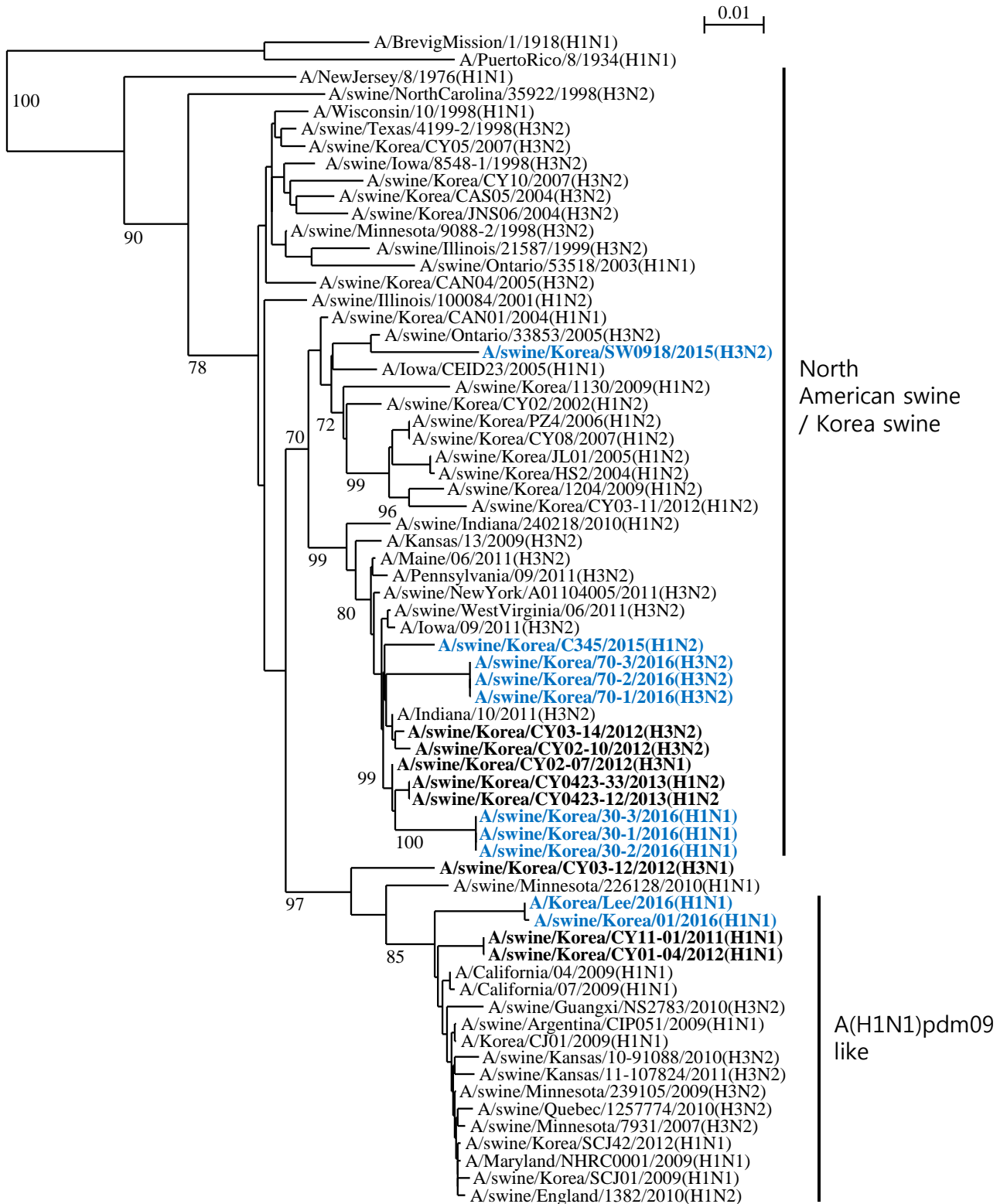


North American swine / Korea swine

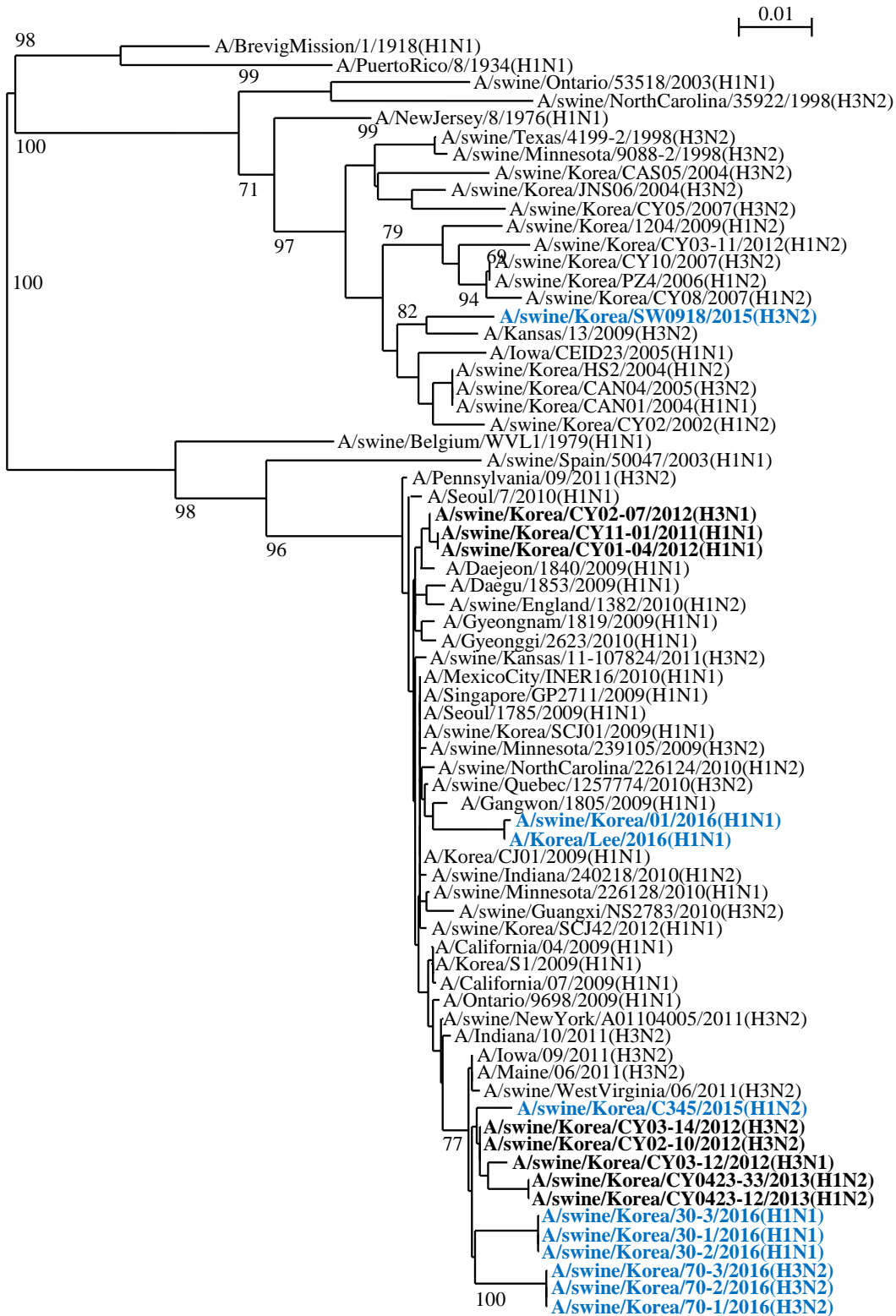
Early swine N2 - lineage

North American swine / Korea swine

recent swine N2 - lineage (sw/Ontario/33853/05 - like)

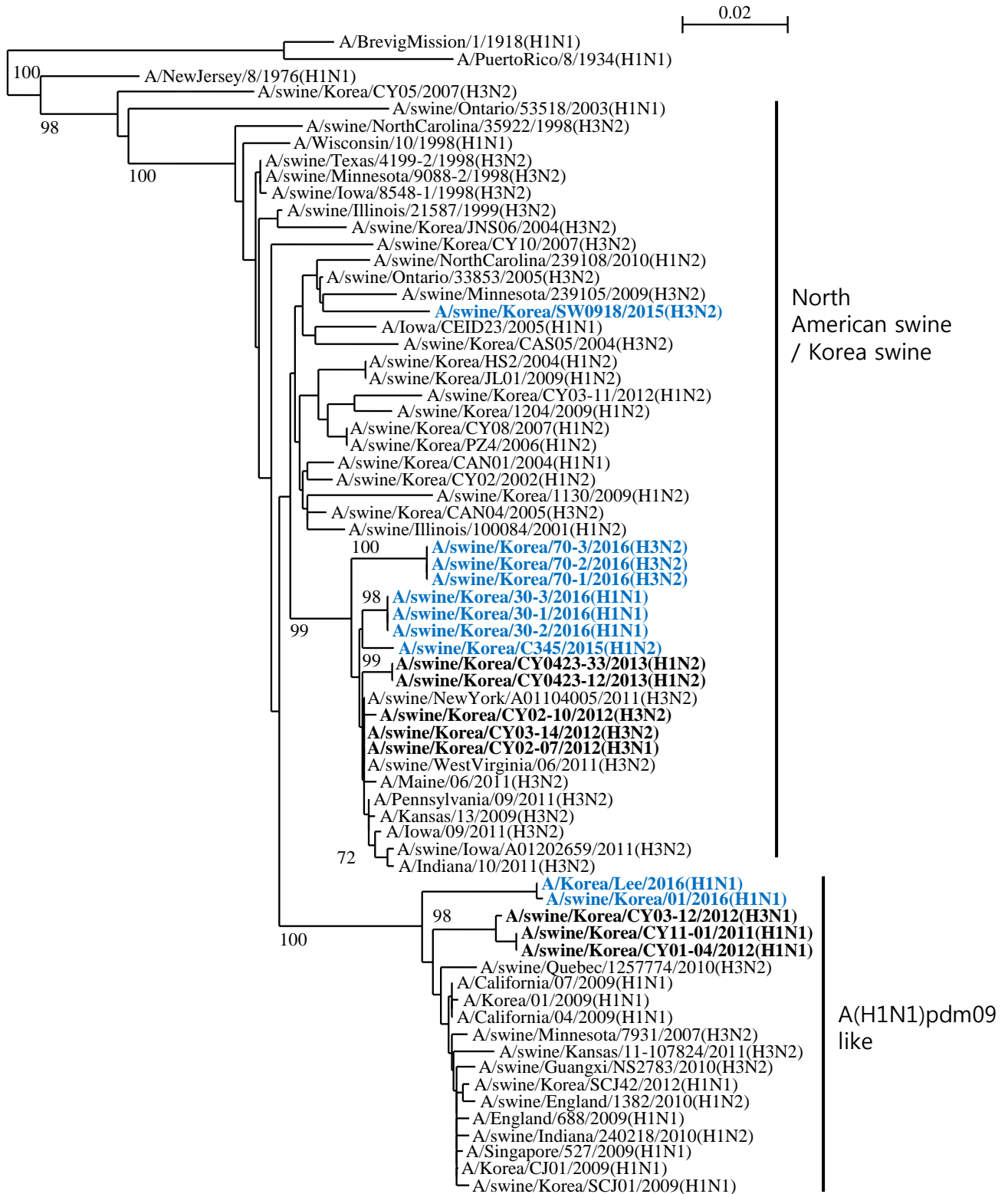


M



North
American swine
/ Korea swine

A(H1N1)pdm09
like



Genotype illustration of the reassortment process of H1N1, H1N2, H3N2 swine influenza viruses in South Korea.

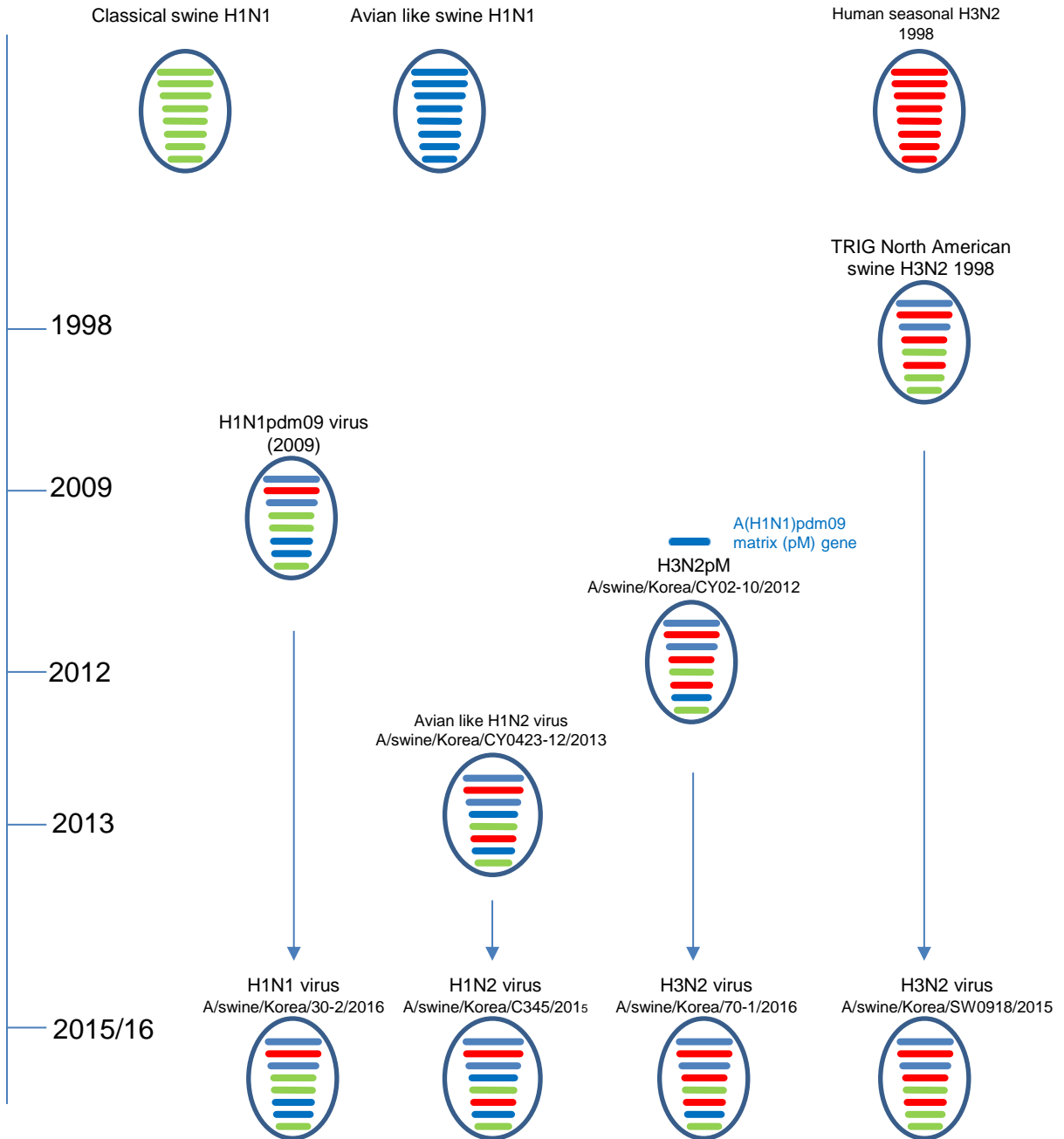


Table . Comparison of seroprevalence of antibodies against different swine influenza virus lineages.

Seropositivity	Number (%) of sera positive		Subtotal
	2012	2013	
None	338 (91.1)	669 (56.5)	1007 (64.7)
A(H1N1)pdm09	24 (6.5)	126 (10.6)	150 (9.6)
Korean H1N2	5 (1.3)	47 (4)	52 (3.3)
EA avian-like swine H1	0	131 (11.1)	131 (8.4)
Korea H3N2	16(6.2)	7 (5.9)	23(1.5)
H3N2pM	109(29.4)	115(10)	224 (14)
A(H1N1)pdm09, Korean H1N2	4 (1.1)	23 (1.9)	27 (1.7)
A(H1N1)pdm09, EA avian-like swine H1	0	157 (13.2)	157 (10.1)
Korean H1N2, EA avian-like swine H1	0	6 (0.5)	6 (0.4)
A(H1N1)pdm09, Korean H1N2, EA avian-like swine H1	0	26 (2.2)	26 (1.7)
Total sera positive	158 (42.6)	638 (53.8)	796 (51.2)

Seropositivity	Number (%) of sera positive				Subtotal
	2014	2015	2016	2017	
None	149 (65.4)	208 (69.3)	375 (79.3)	124 (48.4)	855 (68.0)
A(H1N1)pdm09 -like	59 (25.9)	32 (10.7)	73 (15.4)	101 (39.5)	265(21.1)
EA avian-like swine H1	6 (2.6)	3 (1.0)	12 (2.5)	52 (20.3)	73 (5.8)
H3N2pM/Korea H3N2	38 (16.7)	74 (24.7)	28 (5.9)	51 (19.9)	191 (15.2)
Korea H9N2	0	0	0	0	0
Korea H5N8	0	0	3 (0.6)	0	3 (0.2)
A(H1N1)pdm09, Korea H1N2	3 (1.3)	3 (1.0)	5 (1.1)	6 (2.3)	17 (1.4))
A(H1N1)pdm09, Korea H1N1	4 (1.8)	4 (1.3)	5 (1.1)	7 (2.7)	20 (1.6)
Korea H1N2, Korea H1N1	3 (1.3)	1 (0.3)	2 (0.4)	7 (2.7)	13 (1.0)
A(H1N1)pdm09, Korea H1N2, Korea H1N1	2 (0.9)	1 (0.3)	2 (0.4)	5 (2.0)	10 (0.8)
Total sera positive	79 (34.7)	92 (30.7)	98 (20.7)	132 (51.6)	402(32.0)
Total sera tested	228	300	473	256	1257