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ภาคผนวก

ภาคผนวก ก
การเตรียมสารเคมี

1. Virus transportation media

   veal infusion broth 10 g

   bovine albumin fraction V 2 g

   เติมน้ำกลั่นจนมีปริมาตร 400 ml.

   จากนั้นเติม gentamicin sulfate solution (50 mg/ml) 0.8 ml

   และ amphotericin B (250 g/ml) 3.2 ml

   ทำให้ปราศจากเชื้อโดยการกรอง

2. DEPC water

   DEPC 0.1 มิลลิลิตร

   Water 100 ml

   เขย่าแล้วนำไป incubate ที่ 37 ^{o}c นาน 12 ชั่วโมง แล้วนำไป autoclave

3. PBS

   NaCl 8g

   KCl 0.2g

   Na2HPO4 1.15g

   KH2PO4 0.2g

   dH2O QS to 1 liter

4. 2% (w/v) agarose gel

   Agarose gel 4 กรัม

   1 x TBE 200 มิลลิลิตร

   เขย่าแล้วนำเข้าไมโครเวฟจนกว่า agarose gel จะละลายหมด

5. 10% Ethidium bromide

   Ethidium bromide 30 ไมโครลิตร

   น้ำกลั่น 300 มิลลิลิตร

6. Loading dye

   0.25% Bromphenol blue

   40% (w/v) sucrose in water

   จากนั้นเติมน้ำกลั่นจนมีปริมาตร 50 มิลลิลิตร แล้วเก็บที่ 4^{o}c

6 3. 20 mg/ml Proteinase K

Proteinase K	2	ml
Distilled water เป็น	1	ml

ผสมสารละลายให้เข้ากันแล้วเก็บในตู้เย็นที่ -20 oc

7 5. 25:24:1 (v/v) Phenol/chloroform/isoamyl alcohol

Phenol	25	volume
Chloroform	24	volume
Isoamyl alcohol	1	volume

ผสมสารละลายให้เข้ากันแล้วเก็บใส่ในขวดที่ฆ่าเชื้อแล้วในตู้เย็นที่ 4 °c

10. 20 ug/ml glycogen

Glycogen	4	g
Distilled water	1	ml

11. . 10X Tris borate buffer (10X TBE buffer)

Tris-base	100	g
Boric acid	55	g
0.5 M EDTA (pH8.0)	40	ml

ปรับปริมาตรให้เป็น 1000 ml ด้วยน้ำกลั่นที่ฆ่าเชื้อแล้วจากนั้นผสมให้เข้ากันแล้วเก็บที่อุณหภูมิห้อง

12. SOB Medium

Tryptone	20	g
Yeast extract	5	g
NaCl	0.5	g
250 mM KCl	10	ml
Distilled water เป็น	1	L

นำไปฆ่าเชื้อด้วย autoclave

13. SOC medium

SOB ที่มี 2 M $MgCl_2$ และ 2 M glucose

14. LB agar

NaCl	10	g
Tryptone	10	g
Yeast extract	5	g

Agar	15	g
Distilled water เป็น	1	L

ปรับ pH ให้เป็น 7.0 ด้วย 5 N NaOH แล้วนำไปฆ่าเชื้อด้วย autoclave

15. LB broth

NaCl	10	g
Tryptone	10	g
Yeast extract	5	g
Distilled water เป็น	1	L

ปรับ pH ให้เป็น 7.0 ด้วย 5 N NaOH นำไปฆ่าเชื้อด้วย autoclave

16. Ampicillin stock solution (100 mg/ml)

Ampicillin sodium salt	5	g
Deionized water	50	ml

ใช้ Filter-sterilizeเก็บไว้ที่ -20°c

17. IPTG stock solution (0.1 M)

Isopropyl-1-thio-B-D-galactopyranoside	1.2	g
Deionized water	50	ml

ใช้ Filter-sterilize เก็บไว้ที่ -20°c

18. 2M Mg2+ stock

20.33g $MgCl_2 \cdot 6H_2O$

24.65g $MgSO_4 \cdot 7H_2O$

จากนั้นเติมน้ำกลั่นจนมีปริมาตร 100 ml ทำให้ปราศจากเชื้อโดยการกรอง

19. 2M glucose stock

glucose 36 g.

เติมน้ำกลั่น 70 ml และเขย่าให้เข้ากัน

เติมน้ำกลั่นจนมีปริมาตรเป็น 100 ml.

ทำให้ปราศจากเชื้อโดยการกรอง

ภาคผนวก ข
การทดสอบความจำเพาะของไพรเมอร์

ด้วยโปรแกรม BLAST จาก www.ncbi.nlm.nih.gov/BLAST.cgi

1. GAPDHF85

Accession	Description
EF473075.1	Influenza A virus (A/goose/Cambodia/022b/2005(H5N1)) segment 4
EF473074.1	Influenza A virus (A/chicken/Cambodia/022LC3b/2005(H5N1))
EF473073.1	Influenza A virus (A/chicken/Cambodia/013LC1b/2005(H5N1))
EF473070.1	Influenza A virus (A/goose/Cambodia/28/2004(H5N1)) segment 4
EF473069.1	Influenza A virus (A/chicken/Cambodia/7/2004(H5N1)) segment 4
EF473068.1	Influenza A virus (A/chicken/Cambodia/1/2004(H5N1)) segment 4
EF473081.1	Influenza A virus (A/chicken/Indonesia/11/2003(H5N1)) segment 4
EF473080.1	Influenza A virus (A/chicken/Indonesia/7/2003(H5N1)) segment 4
EF467802.1	Influenza A virus (A/chicken/Thailand/2/04(H5N1)) segment 4
EF451059.1	Influenza A virus (A/Viet Nam/3212/2004(H5N1)) segment 4
AY553802.2	Influenza A virus (A/little grebe/Thailand/Phichit-01/2004(H5N1))
EF456805.1	Influenza A virus (A/Cambodia/JP52a/2005(H5N1)) segment 4
EF456802.1	Influenza A virus (A/Viet Nam/JPHN30321/2005(H5N1)) segment 4
EF456799.1	Influenza A virus (A/Viet Nam/JP14/2005(H5N1)) segment 4
EF456798.1	Influenza A virus (A/Viet Nam/JP4207/2005(H5N1)) segment 4
EF456795.1	Influenza A virus (A/Viet Nam/JP178/2004(H5N1)) segment 4
EF208920.1	Influenza A virus (A/chicken/West Java/Cjr3/2005(H5N1))
EF208919.1	Influenza A virus (A/chicken/Jakarta/DKI31/2005(H5N1))
EF208917.1	Influenza A virus (A/chicken/West Java/Smihay1/2005(H5N1))
EF208916.1	Influenza A virus (A/chicken/Jakarta/DKI3a/2005(H5N1))
CY019432.1	Influenza A virus (A/Indonesia/CDC1047S/2007(H5N1)) segment 4
CY019424.1	Influenza A virus (A/Indonesia/CDC1047/2007(H5N1)) segment 4
CY019416.1	Influenza A virus (A/Indonesia/CDC1046T/2007(H5N1)) segment 4
CY019408.1	Influenza A virus (A/Indonesia/CDC1046/2007(H5N1)) segment 4
CY019400.1	Influenza A virus (A/Indonesia/CDC1032T/2007(H5N1)) segment 4
CY019392.1	Influenza A virus (A/Indonesia/CDC1032N/2007(H5N1)) segment 4
CY019384.1	Influenza A virus (A/Indonesia/CDC1032/2007(H5N1)) segment 4
CY019376.1	Influenza A virus (A/Indonesia/CDC1031RE2/2007(H5N1)) segment 4
CY019368.1	Influenza A virus (A/Indonesia/CDC1031T2/2007(H5N1)) segment 4
CY019360.1	Influenza A virus (A/Indonesia/CDC1031T/2007(H5N1)) segment 4
CY019352.1	Influenza A virus (A/Indonesia/CDC1031/2007(H5N1)) segment 4
EF051515.1	Synthetic construct hemagglutinin gene, complete cds
EF051514.1	Synthetic construct hemagglutinin gene, complete cds
EF057808.1	Synthetic construct hemagglutinin (HA) gene, complete cds
EF057807.1	Synthetic construct hemagglutinin (HA) gene, complete cds
DQ999880.1	Influenza A virus (A/chicken/Thailand/PC-168/2006(H5N1))

2. GAPDH-R191

Accession	Description
XM_001364697.1	PREDICTED: Monodelphis domestica glyceraldehyde-3-phosphate dehy
XM_001364387.1	PREDICTED: Monodelphis domestica similar to glyceraldehyde-3-phos
XR_030961.1	PREDICTED: Monodelphis domestica similar to glyceraldehyde-3-phos
XR_030984.1	PREDICTED: Monodelphis domestica similar to glyceraldehyde-3-phos
XR_030154.1	PREDICTED: Monodelphis domestica similar to glyceraldehyde 3-phos
AC181771.2	Pan troglodytes chromosome X clone PTB-12981 map human ortholo
AB291587.1	Solea senegalensis GAPDH mRNA for glyceraldehyde-3-phosphate de
DQ894744.2	Synthetic construct clone IMAGE:100009204; FLH178038.01L; RZPDe
DQ891557.2	Synthetic construct clone IMAGE:100004187; FLH178037.01X; RZPDe
AC107864.11	Mus musculus chromosome 10, clone RP23-388A14, complete sequen
XR_027767.1	PREDICTED: Bos taurus similar to Glyceraldehyde-3-phosphate dehy
XM_001488811.1	PREDICTED: Bos taurus similar to Glyceraldehyde-3-phosphate dehy
XM_001252479.1	PREDICTED: Bos taurus similar to Glyceraldehyde-3-phosphate dehy
XR_027343.1	PREDICTED: Bos taurus similar to Glyceraldehyde-3-phosphate dehy
XR_027812.1	PREDICTED: Bos taurus similar to Glyceraldehyde-3-phosphate dehy
AC144771.3	Mus musculus BAC clone RP24-185D13 from chromosome 8, complet
AC182113.2	Canis Familiaris chromosome 11, clone XX-44C17, complete sequence
DQ848604.1	Scophthalmus maximus clone xba786 glyceraldehyde-3-phosphate de
AY034886.1	Sus scrofa mRNA, clone:QtrRN10021E07, expressed in brain
XR_025415.1	PREDICTED: Pan troglodytes similar to glyceraldehyde-3-phosphate d
XR_019963.1	PREDICTED: Pan troglodytes similar to Glyceraldehyde-3-phosphate d
XR_024190.1	PREDICTED: Pan troglodytes similar to Glyceraldehyde-3-phosphate d
XR_021189.1	PREDICTED: Pan troglodytes similar to uracil DNA glycosylase (LOC7
XM_522649.2	PREDICTED: Pan troglodytes similar to Glyceraldehyde-3-phosphate d
XM_001152023.1	PREDICTED: Pan troglodytes glyceraldehyde-3-phosphate dehydroge
XM_001161823.1	PREDICTED: Pan troglodytes glyceraldehyde-3-phosphate dehydroge
XM_508933.2	PREDICTED: Pan troglodytes glyceraldehyde-3-phosphate dehydroge
XM_001162096.1	PREDICTED: Pan troglodytes glyceraldehyde-3-phosphate dehydroge
XM_001162057.1	PREDICTED: Pan troglodytes glyceraldehyde-3-phosphate dehydroge
XR_022687.1	PREDICTED: Pan troglodytes similar to Glyceraldehyde-3-phosphate d
XR_024635.1	PREDICTED: Pan troglodytes similar to aging-associated gene 9 prote
XR_021579.1	PREDICTED: Pan troglodytes similar to Glyceraldehyde-3-phosphate d

3. M F5

Accession	Description
CY021590.1	Influenza A virus (A/mallard/Maryland/899/2002(Mixed)) segment 7,
CY021582.1	Influenza A virus (A/mallard/Ohio/656/2002(Mixed)) segment 7, com
CY021566.1	Influenza A virus (A/mallard/Ohio/184/1986(Mixed)) segment 7, com
EF541461.1	Influenza A virus (A/chicken/Korea/es/2003(H5N1)) segment 7 matri
EF541455.1	Influenza A virus (A/chicken/Viet Nam/Ncvd8/2003(H5N1)) segment 7
EF541454.1	Influenza A virus (A/duck/Viet Nam/Ncvd1/2002(H5N1)) segment 7 m
EF541453.1	Influenza A virus (A/Viet Nam/1203/2004(H5N1)) segment 7 matrix p
EF541452.1	Influenza A virus (A/Viet Nam/1194/2004(H5N1)) segment 7 matrix p
EF541450.1	Influenza A virus (A/chicken/Laos/7191/2004(H5N1)) segment 7 matr
EF541449.1	Influenza A virus (A/chicken/Viet Nam/1/2004(H5N1)) segment 7 mat
EF541448.1	Influenza A virus (A/Thailand/16/2004(H5N1)) segment 7 matrix prot
EF541447.1	Influenza A virus (A/Thailand/Chaivaphum/622/2004(H5N1)) segment
EF541446.1	Influenza A virus (A/Thailand/Kan353/2004(H5N1)) segment 7 matrix
EF541445.1	Influenza A virus (A/Thailand/SP83/2004(H5N1)) segment 7 matrix p
EF541444.1	Influenza A virus (A/Thailand/Prachinburi/6231/2004(H5N1)) segment
CY021846.1	Influenza A virus (A/Albany/10/1968(H3N2)) segment 7, complete se
CY021838.1	Influenza A virus (A/Albany/4/1969(H3N2)) segment 7, complete seq
CY021830.1	Influenza A virus (A/Albany/15/1976(H3N2)) segment 7, complete se
CY021822.1	Influenza A virus (A/Albany/12/1951(H1N1)) segment 7, complete se
CY021814.1	Influenza A virus (A/Albany/1/1958(H2N2)) segment 7, complete seq
CY021806.1	Influenza A virus (A/Albany/22/1957(H2N2)) segment 7, complete se
CY021798.1	Influenza A virus (A/Albany/20/1978(H1N1)) segment 7, complete se
CY021790.1	Influenza A virus (A/Albany/24/1958(H2N2)) segment 7, complete se
CY021782.1	Influenza A virus (A/South Australia/81/2000(H3N2)) segment 7, com
CY021774.1	Influenza A virus (A/South Australia/72/2000(H3N2)) segment 7, com
CY021766.1	Influenza A virus (A/South Australia/53/2005(H3N2)) segment 7, com
CY021758.1	Influenza A virus (A/South Australia/51/2005(H1N1)) segment 7, com
CY021750.1	Influenza A virus (A/South Australia/44/2000(H1N1)) segment 7, com
CY021742.1	Influenza A virus (A/South Australia/11/2000(H3N2)) segment 7, com
CY021734.1	Influenza A virus (A/New York/2924-1/1986(H1N1)) segment 7, comp
CY021726.1	Influenza A virus (A/Memphis/1/1984(H1N1)) segment 7, complete se
CY021718.1	Influenza A virus (A/California/10/1978(H1N1)) segment 7, complete
CY021710.1	Influenza A virus (A/AA/Huston/1945(H1N1)) segment 7, complete se

4. M-276R

Accession	Description
CY021582.1	Influenza A virus (A/mallard/Ohio/656/2002(Mixed)) segment 7, comp
CY021846.1	Influenza A virus (A/Albany/10/1968(H3N2)) segment 7, complete se
CY021838.1	Influenza A virus (A/Albany/4/1969(H3N2)) segment 7, complete seq
CY021830.1	Influenza A virus (A/Albany/15/1976(H3N2)) segment 7, complete se
CY021822.1	Influenza A virus (A/Albany/12/1951(H1N1)) segment 7, complete se
CY021814.1	Influenza A virus (A/Albany/1/1958(H2N2)) segment 7, complete seq
CY021806.1	Influenza A virus (A/Albany/22/1957(H2N2)) segment 7, complete se
CY021798.1	Influenza A virus (A/Albany/20/1978(H1N1)) segment 7, complete se
CY021790.1	Influenza A virus (A/Albany/24/1958(H2N2)) segment 7, complete se
CY021782.1	Influenza A virus (A/South Australia/81/2000(H3N2)) segment 7, com
CY021774.1	Influenza A virus (A/South Australia/72/2000(H3N2)) segment 7, com
CY021766.1	Influenza A virus (A/South Australia/53/2005(H3N2)) segment 7, com
CY021758.1	Influenza A virus (A/South Australia/51/2005(H1N1)) segment 7, com
CY021742.1	Influenza A virus (A/South Australia/11/2000(H3N2)) segment 7, com
CY021734.1	Influenza A virus (A/New York/2924-1/1986(H1N1)) segment 7, comp
CY021726.1	Influenza A virus (A/Memphis/1/1984(H1N1)) segment 7, complete se
CY021718.1	Influenza A virus (A/California/10/1978(H1N1)) segment 7, complete
CY021702.1	Influenza A virus (A/Albany/4836/1950(H1N1)) segment 7, complete :
CY021694.1	Influenza A virus (A/Memphis/15/2000(H1N1)) segment 7, complete s
CY021686.1	Influenza A virus (A/mallard/Missouri/MO32/2005(H11N9)) segment 7
CY021654.1	Influenza A virus (A/black duck/Ohio/161/1999(H11N9)) segment 7, c
CY021638.1	Influenza A virus (A/mallard/Delaware/418/2005(H7N3)) segment 7, :
CY021630.1	Influenza A virus (A/Wellington/4/2000(H1N1)) segment 7, complete s
CY021622.1	Influenza A virus (A/mallard/Ohio/421/1987(H7N8)) segment 7, comp
CY021614.1	Influenza A virus (A/black duck/Ohio/239/1986(H11N9)) segment 7, c
CY021598.1	Influenza A virus (A/Memphis/3/1971(H3N2)) segment 7, complete se
AB330234.1	Influenza A virus (A/swan/Hokkaido/51/1996(H5N3)) M1, M2 genes fo
AB330231.1	Influenza A virus (A/duck/Hokkaido/447/2000(H5N3)) M1, M2 genes f
AB298831.1	Influenza A virus (A/duck/Mongolia/500/2001(H5N3)) M1, M2 genes fo
AB298824.1	Influenza A virus (A/duck/Mongolia/596/2001(H5N3)) M1 gene for ma
AB330048.1	Influenza A virus (A/swan/Hokkaido/4/1996(H5N3)) M1 gene for matr
AB330041.1	Influenza A virus (A/duck/Hokkaido/69/2000(H5N3)) M1, M2 genes fo
CY021558.1	Influenza A virus (A/duck/Italy/551/2000(H7N1)) segment 7, complet

5. H1F266A

Accession	Description
CY021792.1	Influenza A virus (A/Albany/20/1978(H1N1)) segment 4, complete se
CY021757.1	Influenza A virus (A/South Australia/51/2005(H1N1)) segment 4, com
CY021717.1	Influenza A virus (A/California/10/1978(H1N1)) segment 4, complete
CY021701.1	Influenza A virus (A/Albany/4836/1950(H1N1)) segment 4, complete
CY021693.1	Influenza A virus (A/Memphis/15/2000(H1N1)) segment 4, complete s
CY021629.1	Influenza A virus (A/Wellington/4/2000(H1N1)) segment 4, complete s
CY021197.1	Influenza A virus (A/Christ's Hospital/157/1982(H1N1)) segment 4, co
CY021029.1	Influenza A virus (A/Baylor/4052/1981(H1N1)) segment 4, complete s
CY021005.1	Influenza A virus (A/Memphis/15/1996(H1N1)) segment 4, complete s
CY020573.1	Influenza A virus (A/Tientsin/78/1977(H1N1)) segment 4, complete se
CY020509.1	Influenza A virus (A/Wellington/6/2000(H1N1)) segment 4, complete s
CY020485.1	Influenza A virus (A/Tonga/14/1984(H1N1)) segment 4, complete seq
CY020477.1	Influenza A virus (A/Singapore/6/1986(H1N1)) segment 4, complete s
CY020453.1	Influenza A virus (A/India/6263/1980(H1N1)) segment 4, complete se
CY020437.1	Influenza A virus (A/Chile/1/1983(H1N1)) segment 4, complete seque
CY020429.1	Influenza A virus (A/Western Australia/22/2001(H1N1)) segment 4, co
CY020421.1	Influenza A virus (A/Western Australia/21/2001(H1N1)) segment 4, co
CY020293.1	Influenza A virus (A/Brazil/11/1978(H1N1)) segment 4, complete sequ
CY020277.1	Influenza A virus (A/Western Australia/19/2001(H1N1)) segment 4, co
CY020269.1	Influenza A virus (A/Western Australia/18/2001(H1N1)) segment 4, co
CY020261.1	Influenza A virus (A/Memphis/1/2001(H1N1)) segment 4, complete se
CY020253.1	Influenza A virus (A/Memphis/14/1996(H1N1)) segment 4, complete s
CY020245.1	Influenza A virus (A/Memphis/5/2003(H1N1)) segment 4, complete se
CY020237.1	Influenza A virus (A/Memphis/39/1983(H1N1)) segment 4, complete s
CY021189.1	Influenza A virus (A/New Zealand/7/1983(H1N1)) segment 4, complet
CY021173.1	Influenza A virus (A/Lackland/7/1978(H1N1)) segment 4, complete se
CY021165.1	Influenza A virus (A/Lackland/3/1978(H1N1)) segment 4, complete se
CY021157.1	Influenza A virus (A/Western Australia/77/2005(H1N1)) segment 4, co
CY021149.1	Influenza A virus (A/Memphis/7/2001(H1N1)) segment 4, complete se
CY021141.1	Influenza A virus (A/Memphis/6/2001(H1N1)) segment 4, complete se
CY021997.1	Influenza A virus (A/Waikato/17/2005(H1N1)) segment 4, complete se

6. H1R627A

Accession	Description
CY021831.1	Influenza A virus (A/Albany/12/1951(H1N1)) segment 4, complete sec
CY021797.1	Influenza A virus (A/Albany/20/1978(H1N1)) segment 4, complete sec
CY021749.1	Influenza A virus (A/South Australia/44/2000(H1N1)) segment 4, com
CY021733.1	Influenza A virus (A/New York/2924-1/1986(H1N1)) segment 4, comp
CY021717.1	Influenza A virus (A/California/10/1978(H1N1)) segment 4, complete
CY021709.1	Influenza A virus (A/AA/Huston/1945(H1N1)) segment 4, complete se
CY021701.1	Influenza A virus (A/Albany/4836/1950(H1N1)) segment 4, complete
CY021637.1	Influenza A virus (A/Christ's Hospital/157/1982(H1N1)) segment 4, co
CY021253.1	Influenza A virus (A/Malaya/302/1954(H1N1)) segment 4, complete s
CY021029.1	Influenza A virus (A/Baylor/4052/1981(H1N1)) segment 4, complete s
CY020373.1	Influenza A virus (A/Tientsin/78/1977(H1N1)) segment 4, complete se
CY020565.1	Influenza A virus (A/Texas/2922-3/1986(H1N1)) segment 4, complete
CY020477.1	Influenza A virus (A/Singapore/6/1986(H1N1)) segment 4, complete s
CY020469.1	Influenza A virus (A/Phila/1935(H1N1)) segment 4, complete sequenc
CY020461.1	Influenza A virus (A/Iowa/1943(H1N1)) segment 4, complete sequenc
CY020453.1	Influenza A virus (A/India/6263/1980(H1N1)) segment 4, complete se
CY020437.1	Influenza A virus (A/Chile/1/1983(H1N1)) segment 4, complete seque
CY020293.1	Influenza A virus (A/Brazil/11/1978(H1N1)) segment 4, complete seq
CY020285.1	Influenza A virus (A/AA/Marton/1943(H1N1)) segment 4, complete se
CY020253.1	Influenza A virus (A/Memphis/14/1996(H1N1)) segment 4, complete s
CY020237.1	Influenza A virus (A/Memphis/39/1983(H1N1)) segment 4, complete s
CY020189.1	Influenza A virus (A/New Zealand/7/1983(H1N1)) segment 4, complet
CY020181.1	Influenza A virus (A/Maryland/2/1980(H1N1)) segment 4, complete se
CY020173.1	Influenza A virus (A/Lackland/7/1978(H1N1)) segment 4, complete se
CY020165.1	Influenza A virus (A/Lackland/3/1978(H1N1)) segment 4, complete se
EF452563.1	Influenza A virus (A/South Africa/214/1999(H1N1)) segment 4 hemag
CY019971.1	Influenza A virus (A/Roma/1949(H1N1)) segment 4, complete sequer
CY019963.1	Influenza A virus (A/Arizona/14/1978(H1N1)) segment 4, complete se
CY019947.1	Influenza A virus (A/Albany/4835/1948(H1N1)) segment 4, complete
CY019857.1	Influenza A virus (A/Memphis/13/1996(H1N1)) segment 4, complete s
CY019803.1	Influenza A virus (A/Memphis/11/1996(H1N1)) segment 4, complete s
CY019795.1	Influenza A virus (A/Memphis/10/1996(H1N1)) segment 4, complete s
CY019787.1	Influenza A virus (A/Memphis/5/1996(H1N1)) segment 4, complete se

7. H3F3

Accession	Description
CY021565.1	Influenza A virus (A/mallard/Ohio/184/1986(Mixed)) segment 4, comp
CY021845.1	Influenza A virus (A/Albany/10/1968(H3N2)) segment 4, complete se
CY021837.1	Influenza A virus (A/Albany/4/1969(H3N2)) segment 4, complete seq
CY021829.1	Influenza A virus (A/Albany/15/1976(H3N2)) segment 4, complete se
CY021781.1	Influenza A virus (A/South Australia/81/2000(H3N2)) segment 4, com
CY021773.1	Influenza A virus (A/South Australia/72/2000(H3N2)) segment 4, com
CY021765.1	Influenza A virus (A/South Australia/53/2005(H3N2)) segment 4, com
CY021741.1	Influenza A virus (A/South Australia/11/2000(H3N2)) segment 4, com
CY021597.1	Influenza A virus (A/Memphis/3/1971(H3N2)) segment 4, complete se
CY019333.1	Influenza A virus (A/New York/933/2006(H3N2)) segment 4, complete
CY019325.1	Influenza A virus (A/New York/928/2006(H3N2)) segment 4, complete
CY019317.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019309.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019301.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019293.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019285.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019277.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019269.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019261.1	Influenza A virus (A/New York/908/2004(H3N2)) segment 4, complete
CY019253.1	Influenza A virus (A/New York/908/2004(H3N2)) segment 4, complete
CY019245.1	Influenza A virus (A/New York/908/2004(H3N2)) segment 4, complete
CY019189.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019181.1	Influenza A virus (A/New York/905/2004(H3N2)) segment 4, complete
CY019173.1	Influenza A virus (A/New York/905/2004(H3N2)) segment 4, complete
CY019165.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019157.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019149.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019141.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019029.1	Influenza A virus (A/Queensland/56/2005(H3N2)) segment 4, complet
CY019005.1	Influenza A virus (A/Queensland/41/2004(H3N2)) segment 4, complet
CY018997.1	Influenza A virus (A/Queensland/35/2003(H3N2)) segment 4, complet
CY018989.1	Influenza A virus (A/Queensland/34/2003(H3N2)) segment 4, complet
CY018981.1	Influenza A virus (A/Queensland/32/2003(H3N2)) segment 4, complet

8. H3R2

Accession	Description
CY021365.1	Influenza A virus (A/mallard/Ohio/184/1986(Mixed)) segment 4, comp
CY021345.1	Influenza A virus (A/Albany/10/1968(H3N2)) segment 4, complete se
CY021837.1	Influenza A virus (A/Albany/4/1969(H3N2)) segment 4, complete seq
CY021829.1	Influenza A virus (A/Albany/15/1976(H3N2)) segment 4, complete se
CY021781.1	Influenza A virus (A/South Australia/81/2000(H3N2)) segment 4, com
CY021773.1	Influenza A virus (A/South Australia/72/2000(H3N2)) segment 4, com
CY021765.1	Influenza A virus (A/South Australia/53/2005(H3N2)) segment 4, com
CY021741.1	Influenza A virus (A/South Australia/11/2000(H3N2)) segment 4, com
CY021597.1	Influenza A virus (A/Memphis/3/1971(H3N2)) segment 4, complete se
CY019325.1	Influenza A virus (A/New York/928/2006(H3N2)) segment 4, complete
CY019317.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019309.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019301.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019293.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019285.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019277.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019269.1	Influenza A virus (A/New York/913/2005(H3N2)) segment 4, complete
CY019261.1	Influenza A virus (A/New York/908/2004(H3N2)) segment 4, complete
CY019253.1	Influenza A virus (A/New York/908/2004(H3N2)) segment 4, complete
CY019245.1	Influenza A virus (A/New York/908/2004(H3N2)) segment 4, complete
AB289341.1	Influenza A virus (A/swan/Shimane/227/01(H3N9)) HA gene for haem
CY019189.1	Influenza A virus (A/New York/918/2005(H3N2)) segment 4, complete
CY019181.1	Influenza A virus (A/New York/905/2004(H3N2)) segment 4, complete
CY019173.1	Influenza A virus (A/New York/905/2004(H3N2)) segment 4, complete
CY019165.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019157.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019149.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019141.1	Influenza A virus (A/New York/900/2004(H3N2)) segment 4, complete
CY019029.1	Influenza A virus (A/Queensland/56/2005(H3N2)) segment 4, complet
CY019035.1	Influenza A virus (A/Queensland/41/2004(H3N2)) segment 4, complet
CY018997.1	Influenza A virus (A/Queensland/35/2003(H3N2)) segment 4, complet
CY018989.1	Influenza A virus (A/Queensland/34/2003(H3N2)) segment 4, complet
CY018981.1	Influenza A virus (A/Queensland/32/2003(H3N2)) segment 4, complet

9. H5F3

Accession	Description
EF473075.1	Influenza A virus (A/goose/Cambodia/022b/2005(H5N1)) segment 4
EF473074.1	Influenza A virus (A/chicken/Cambodia/022LC3b/2005(H5N1))
EF473073.1	Influenza A virus (A/chicken/Cambodia/013LC1b/2005(H5N1))
EF473070.1	Influenza A virus (A/goose/Cambodia/28/2004(H5N1)) segment 4
EF473069.1	Influenza A virus (A/chicken/Cambodia/7/2004(H5N1)) segment 4
EF473068.1	Influenza A virus (A/chicken/Cambodia/1/2004(H5N1)) segment 4
EF473081.1	Influenza A virus (A/chicken/Indonesia/11/2003(H5N1)) segment 4
EF473080.1	Influenza A virus (A/chicken/Indonesia/7/2003(H5N1)) segment 4
EF467902.1	Influenza A virus (A/chicken/Thailand/2/04(H5N1)) segment 4
EF451059.1	Influenza A virus (A/Viet Nam/3212/2004(H5N1)) segment 4
AY553902.2	Influenza A virus (A/little grebe/Thailand/Phichit-01/2004(H5N1))
EF456805.1	Influenza A virus (A/Cambodia/JP52a/2005(H5N1)) segment 4
EF456802.1	Influenza A virus (A/Viet Nam/JPHN30321/2005(H5N1)) segment 4
EF456799.1	Influenza A virus (A/Viet Nam/JP14/2005(H5N1)) segment 4
EF456798.1	Influenza A virus (A/Viet Nam/JP4207/2005(H5N1)) segment 4
EF456795.1	Influenza A virus (A/Viet Nam/JP178/2004(H5N1)) segment 4
EF208920.1	Influenza A virus (A/chicken/West Java/Cjr3/2005(H5N1))
EF208919.1	Influenza A virus (A/chicken/Jakarta/DKI31/2005(H5N1))
EF208917.1	Influenza A virus (A/chicken/West Java/Smihay1/2005(H5N1))
EF208916.1	Influenza A virus (A/chicken/Jakarta/DKI3a/2005(H5N1))
CY019432.1	Influenza A virus (A/Indonesia/CDC1047S/2007(H5N1)) segment 4
CY019424.1	Influenza A virus (A/Indonesia/CDC1047/2007(H5N1)) segment 4
CY019416.1	Influenza A virus (A/Indonesia/CDC1046T/2007(H5N1)) segment 4
CY019408.1	Influenza A virus (A/Indonesia/CDC1046/2007(H5N1)) segment 4
CY019400.1	Influenza A virus (A/Indonesia/CDC1032T/2007(H5N1)) segment 4
CY019392.1	Influenza A virus (A/Indonesia/CDC1032N/2007(H5N1)) segment 4
CY019384.1	Influenza A virus (A/Indonesia/CDC1032/2007(H5N1)) segment 4
CY019376.1	Influenza A virus (A/Indonesia/CDC1031RE2/2007(H5N1)) segment 4
CY019368.1	Influenza A virus (A/Indonesia/CDC1031T2/2007(H5N1)) segment 4
CY019360.1	Influenza A virus (A/Indonesia/CDC1031T/2007(H5N1)) segment 4
CY019352.1	Influenza A virus (A/Indonesia/CDC1031/2007(H5N1)) segment 4
EF051515.1	Synthetic construct hemagglutinin gene, complete cds
EF051514.1	Synthetic construct hemagglutinin gene, complete cds
EF057908.1	Synthetic construct hemagglutinin (HA) gene, complete cds
EF057907.1	Synthetic construct hemagglutinin (HA) gene, complete cds
DQ999880.1	Influenza A virus (A/chicken/Thailand/PC-168/2006(H5N1))

10. H5R2++

Accession	Description
EF205160.1	Influenza A virus (A/chicken/Tula/4/05(H5N1)) segment 4, complete
EF205159.1	Influenza A virus (A/chicken/Krasnodar/123/06(H5N1)) segment 4, co
EF205158.1	Influenza A virus (A/turkey/Suzdalka/12/05(H5N1)) segment 4, comp
EF205157.1	Influenza A virus (A/goose/Krasnoozerskoe/627/05(H5N1)) segment
EF205156.1	Influenza A virus (A/goose/Suzdalka/10/05(H5N1)) segment 4, comp
EF205155.1	Influenza A virus (A/chicken/Omsk/14/05(H5N1)) segment 4, complet
EF205154.1	Influenza A virus (A/chicken/Suzdalka/06/05(H5N1)) segment 4, com
CY021517.1	Influenza A virus (A/chicken/Ivory Coast/1787-35/2006(H5N1)) segm
AM492155.1	Influenza A virus (A/stone marten/Germany/R747/2006(H5N1)) H5H2
AM408216.1	Influenza A virus (A/tufted duck/Germany/R1240/06(H5N1)) HA gene
AM408215.1	Influenza A virus (A/gull/Germany/R882/06(H5N1)) HA gene for hem
AM408213.1	Influenza A virus (A/common buzzard/Germany/R870/06(H5N1)) par
AM408212.1	Influenza A virus (A/great crested grebe/Germany/R1224/06(H5N1)
AM408211.1	Influenza A virus (A/falcon/Germany/R899/06(H5N1)) partial HA gene
AM408210.1	Influenza A virus (A/goose/Germany/R696/06(H5N1)) partial HA gene
AM408209.1	Influenza A virus (A/cormorant/Germany/R292/06(H5N1)) partial HA
AM403476.1	Influenza A virus (A/stork/Germany/R1239/06(H5N1)) HA gene for he
AM403474.1	Influenza A virus (A/Canada goose/Germany/R1207/06(H5N1)) HA ge
AM403473.1	Influenza A virus (A/eagle owl/Germany/R1166/06(H5N1)) HA gene f
AM403472.1	Influenza A virus (A/turkey/Germany/R1077/06(H5N1)) HA gene for h
AM403471.1	Influenza A virus (A/mute swan/Germany/R854/06(H5N1)) HA gene f
AM403470.1	Influenza A virus (A/duck/Germany/R751/06(H5N1)) HA gene for hem
AM403469.1	Influenza A virus (A/coot/Germany/R655/06(H5N1)) HA gene for hem
AM403468.1	Influenza A virus (A/cat/Germany/R606/06(H5N1)) HA gene for hema
AM403467.1	Influenza A virus (A/duck/Germany/R603/06(H5N1)) HA gene for hem
AM403466.1	Influenza A virus (A/duck/Germany/R532/06(H5N1)) HA gene for hem
AM403465.1	Influenza A virus (A/pochard/Germany/R348/06(H5N1)) HA gene for
AM403464.1	Influenza A virus (A/duck/Germany/R338/06(H5N1)) HA gene for hem
AM403463.1	Influenza A virus (A/common buzzard/Germany/R306/06(H5N1)) HA
AM403462.1	Influenza A virus (A/whooper swan/Germany/R88/06(H5N1)) HA gene
AM403461.1	Influenza A virus (A/Canada goose/Germany/R71/06(H5N1)) HA gene
AM403460.1	Influenza A virus (A/mute swan/Germany/R65/06(H5N1)) HA gene fo
EF469660.1	Influenza A virus (A/chicken/Egypt/1891N3-HK49/2007(H5N1)) hemag
EF469659.1	Influenza A virus (A/chicken/Egypt/1891N3-CLEVB/2007(H5N1)) hem
EF469658.1	Influenza A virus (A/goose/Egypt/13009N3-SM2/2006(H5N1)) hemagg
EF469657.1	Influenza A virus (A/duck/Egypt/1888N3-SM25/2007(H5N1)) hemagglu
EF469656.1	Influenza A virus (A/duck/Egypt/13010N3-CLEVB/2006(H5N1)) hemag
EF469655.1	Influenza A virus (A/duck/Egypt/12380N3-CLEVB/2006(H5N1)) hemag

ประวัติผู้เขียนวิทยานิพนธ์

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อายุ 25 ปี **เกิด** 2 พฤศจิกายน 2524

สถานที่เกิด โรงพยาบาลรามา กรุงเทพมหานคร

ที่อยู่ 77/12 ม. 8 ต.บางด้วน อ. เมือง จ. สมุทรปราการ 10270

ประวัติการศึกษา

ระดับปริญญาตรี สำเร็จการศึกษาวิทยาศาสตรบัณฑิต (สาขาพันธุศาสตร์) จาก คณะวิทยาศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ใน ปี 2546

ระดับปริญญาโท เข้าศึกษาต่อระดับวิทยาศาสตร์มหาบัณฑิต หลักสูตรวิทยาศาสตร์การแพทย์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย เมื่อปี พ.ศ.2548

ประวัติการทำงาน

ทำงานในตำแหน่งนักวิทยาศาสตร์ ณ ศูนย์เชี่ยวชาญเฉพาะทางด้านไวรัสวิทยาคลินิค เป็นเวลา 1 ปี หลังจากจบการศึกษาระดับปริญญาตรี ระหว่างปี 2546-2547