To better understand the ecology and epidemiology of the highly pathogenic avian influenza virus in its transcontinental spread, we sequenced and analyzed the complete genomes of 36 recent influenza A (H5N1) viruses collected from birds in Europe, northern Africa, and southeastern Asia. These sequences, among the first complete genomes of influenza (H5N1) viruses outside Asia, clearly depict the lineages now infecting wild and domestic birds in Europe and Africa and show the relationships among these isolates and other strains affecting both birds and humans. The isolates fall into 3 distinct lineages, 1 of which contains all known non-Asian isolates. This new Euro-African lineage, which was the cause of several recent (2006) fatal human infections in Egypt and Iraq, has been introduced at least 3 times into the European-African region and has split into 3 distinct, independently evolving sublineages. One isolate provides evidence that 2 of these sublineages have recently reassorted.

The first cases of human infection with highly pathogenic avian influenza (HPAI) strain H5N1 occurred in Hong Kong in 1997; it was brought under control by massive culling of the chicken population (1,2). An antigenically distinct strain emerged in 2002, in the same location, and has since spread to hundreds of millions of birds (3,4). More alarming has been the growing number of human influenza (H5N1) infections; by September 2006, 251 human cases had been reported, resulting in 148 deaths (2). From late 2005 to early 2006, HPAI (H5N1) was detected for the first time in birds in eastern Europe, the Middle East, and northern Africa, indications that the virus was spreading, possibly aided by wild bird migration. Human cases were reported beginning in January 2006 in Egypt, Iraq, Turkey, Djibouti, and Azerbaijan.

Methods

We sequenced and analyzed the genomes of 36 recent isolates of highly pathogenic influenza (H5N1) viruses collected from Europe, northern Africa, the Middle East, and Asia. We used high-throughput methods described previously (5).

Sample Collection

Samples primarily consisting of pooled trachea and lung tissue, pooled intestines, or tracheal and cloacal swabs collected from dead or moribund animals were processed for attempted virus isolation as described (6). Hemagglutinating isolates were typed either by reverse transcription–PCR (RT–PCR) or by serologic methods (7). RNA was extracted with the High Pure Extraction Kit (Roche, Indianapolis, IN, USA), according to manufacturer’s instructions.

Primer Design

Sequences from recent human and avian influenza (H5N1) isolates were downloaded from GenBank and were aligned with MUSCLE (8). Degenerate primers were designed on the basis of consensus sequences generated with
BioEdit (9). An M13 sequence tag was added to the 5′ end of each primer to be used for sequencing. Four of the reactions were analyzed by electrophoresis on an agarose gel for quality control purposes. Primer design was optimized by analysis of the sequence success rate of each primer pair. Primers that did not perform well were redesigned and replaced in the primer set. Primers were designed to produce ≈500-nt overlapping amplicons to provide 2× coverage of each genomic segment. Additionally, a second set of primers was designed to produce 500-nt amplicons offset ≈250 nt from the original primer pair, which gave at least 4× sequence coverage of each segment.

cDNA Synthesis

Amplicons tiling the genome of the influenza isolates were generated with a OneStep RT-PCR kit (QIAGEN, Valencia, CA, USA). They were treated with shrimp alkaline phosphatase-exonuclease I (U.S. Biologicals, Swampscott, MA, USA) before sequencing.

Sequencing and Assembly

Sequencing reactions were performed as described previously (5). After sequencing, each segment was downloaded, trimmed to remove ampiclon primer-linker sequence as well as low-quality sequence, and assembled. A small genome assembler called Elvira, based on the open-source Minimus assembler (http://cbcb.umd.edu/software), has been developed to automate these tasks. The Elvira pipeline delivers exceptions, including failed reads, failed amplicons, insufficient coverage of a reference sequence (as obtained from GenBank), ambiguous consensus sequence calls, and low-coverage areas. Additional sequencing and targeted RT-PCR were conducted to close gaps and to increase coverage in low-coverage or ambiguous regions.

All sequence data used in this study are available from GenBank and also from ftp.cbcb.umd.edu/pub/data/flu. GenBank accession numbers are available in the supplementary data (online Technical Appendix 1, available from www.cdc.gov/EID/content/13/5/713-app1.txt).

Phylogenetic Analysis

Multiple sequence alignments of nucleotide data were performed by using MUSCLE (8) with default parameters. Most alignments of segments within a subtype lack internal gaps. Leading and trailing gaps were not considered in tree-length calculations, but all nucleotide positions were considered.

The phylogenetic trees for Figures 1, 2A, and online Appendix Figures 1–3 (available from www.cdc.gov/EID/content/13/5/713-appG1.htm, www.cdc.gov/EID/content/13/5/713-appG2.htm, and www.cdc.gov/EID/content/13/5/713-appG3.htm) were constructed by using the neighbor-joining method as implemented in PAUP* version 4.0b10 (10,11) using the F84 distance between nucleotide sequences and the default parameters. The phylogeny of 71 complete genomes (avian isolates) and 3 hemagglutinin (HA) sequences (human isolates) in Figure 2B comprises isolates chosen because they formed the European-Middle Eastern-African (EMA) clades and the Russian and Chinese sister clades in a larger analysis of 759 influenza (H5N1) isolates from the locales and host range of all H5N1 sequences published since 1996. The figure includes every member of the EMA clade for which the complete genome sequence is currently available, except chicken/Nigeria/1047–62/2006 and chicken/Kurgan/05/2005, which appear to be reassortants.

To find optimal phylogenetic trees for Figure 2B, we used a combination of tree search algorithms available in the “new technology” heuristic strategies in the TNT (12) software package (available from www.zmuc.dk/public/phylogeny/TNT). These strategies include a successive combination of hill-climbing techniques (branch swapping) followed by simulated annealing (ratcheting), divide-and-conquer (sectorial searches), and genetic algorithms (tree fusion). Figure 2B depicts a strict consensus based on 286 minimal-length trees resulting from a parsimony search of 1,000 replicates in TNT under the command “xmult = lev5.” Each component tree had a tree length of 1,613 steps. Gaps were treated as a fifth state, and all edit costs were considered.

Figure 1. Phylogenetic tree of hemagglutinin (HA) segments from 36 avian influenza samples. A 2001 strain (A/duck/Anyang/AVL-1/2001) is used as an outgroup at top. Clade V1 comprises the 5 Vietnamese isolates at the bottom of the tree, and clade V2 comprises the 9 Vietnamese isolates near the top of the tree. The European-Middle Eastern-African (EMA) clade contains the remaining 22 isolates sequenced in this study; the 3 subclades are indicated by red, blue, and purple lines. The reassortant strain, A/chicken/Nigeria/1047–62/2006, is highlighted in red. Note that 4 segments including HA from this reassortant fall in EMA-1; the other 4 fall in EMA-2, as shown in online Appendix Figure 1. Bootstrap values supporting the 3 distinct EMA clades are taken from a consensus tree based on concatenated whole-genome sequences, excluding the reassortant strain. The consensus tree is provided as online Appendix Figure 2.
were given equal weights under the parsimony criterion. The heuristic tree strategy was run until a stable strict consensus was achieved. This strict consensus is a conservative estimate of the phylogenetic relationship between the isolates, where an edge is included only if it was observed in all 4 of the major influenza (H5N1) clades, are highlighted in red. The scale bar indicates an F84 distance of 0.01. A full-scale version of this tree is provided as online Appendix Figure 3. B) Phylogeny of 71 complete genomes (avian isolates, all 8 segments concatenated) and 3 HA sequences (human isolates, marked with red arrows) from Europe, the Middle East, Africa, Russia, and Asia. Bootstrap values represent the percentage of 1,000 bootstrap replicates for which the partition implied by the edge was observed; see Methods for further details. The 3 European-Middle Eastern-African (EMA) subclades from Figure 1 are indicated with the same color scheme. Isolates from human hosts are found only in EMA-1. Colors indicate locales. The names of the isolates newly sequenced in this study are shown in boldface text.

Results and Discussion

The 36 new isolates reported here greatly expand the amount of whole-genome sequence data available from recent avian influenza (H5N1) isolates. Before our project, GenBank contained only 5 other complete genomes from Europe for the 2004–2006 period, and it contained no whole genomes from the Middle East or northern Africa. Our analysis showed several new findings. First, all European, Middle Eastern, and African samples fall into a clade that is distinct from other contemporary Asian clades, all of which share common ancestry with the original 1997 Hong Kong strain. Phylogenetic trees built on each of the
8 segments show a consistent picture of 3 lineages, as illustrated by the HA tree shown in Figure 1. Two of the clades contain exclusively Vietnamese isolates; the smaller of these, with 5 isolates, is labeled V1; the larger clade, with 9 isolates, is V2. The remaining 22 isolates all fall into a third, clearly distinct clade, labeled EMA, which comprises samples from Europe, the Middle East, and Africa. Trees for the other 7 segments display a similar topology, with clades V1, V2, and EMA clearly separated in each case. Analyses of all available complete influenza (H5N1) genomes and of 589 HA sequences placed the EMA clade as distinct from the major clades circulating in People’s Republic of China, Indonesia, and Southeast Asia.

The influenza (H5N1) viruses isolated in Europe, the Middle East, and Africa show a close relationship, despite the fact that they were collected from a widely dispersed geographic region, including Côte d’Ivoire, Nigeria, Niger, Sudan, Egypt, Afghanistan, Iran, Slovenia, Croatia, and Italy. The shared lineage of the viruses suggests a single genetic source for introduction of influenza (H5N1) into western Europe and northern and western Africa; our analysis places this source most recently in either Russia or Qinghai Province in China (Figure 2B; online Appendix Table [available from www.cdc.gov/EID/content/13/5/713-appT.htm]). The broad dispersal of these isolates throughout these countries during a relatively short period, coupled with weak biosafety standards in place in most rural areas, implicates human-related movement of live poultry and poultry commodities as the source of introduction of influenza (H5N1) into some of these countries. The virus’ presence in wild birds leaves open the alternative possibility that migratory birds may have been the primary source, with secondary spread possibly caused by human-related activities.

A phylogenetic tree containing 589 isolates from 2001 through 2006 (Figure 2A and online Appendix Figure 3) shows the relationship of the 36 recent isolates from this study to previous isolates and shows the 3 major lineages of influenza (H5N1) that are now circulating in Asia plus the fourth lineage, EMA, that has spread west into Europe and Africa. Figure 2B depicts a consensus view of the parsimony-based analysis of 74 isolates of complete genomes from the EMA lineage. The EMA clade contains all known European, Middle Eastern, and North African cases (which began appearing in late 2005), as well as cases from China, Russia, and Mongolia in 2005 and 2006. Some of the EMA clade isolates appear in clusters of influenza (H5N1) infection that were reported in geese in Qinghai Province, China (14), and in mute swans in Astrakhan (15), both of which are possible sources of spread through migration.

The evolutionary relationships shown in Figure 2B provide clear evidence that 3 distinct clades, labeled EMA 1–3, are circulating in the European and African region. These clades clearly share a common ancestor in Asia. The 3 clades may represent separate introductions or, alternatively, a single introduction from Asia into Russia, Europe, or another western site that has subsequently evolved into 3 lineages. More data will be required to pinpoint when and where the 3 clades split apart. All previously reported European and Middle Eastern isolates belong to EMA-1.

Our results show that EMA-2 has spread to Europe and that EMA-3 has spread to both Europe and the Middle East. These results agree in part with a recent study (16) that reported 3 distinct introductions of influenza (H5N1) into Nigeria. Our analysis, based on all available HA sequences (online Appendix Figure 3), indicates that the Nigerian isolates fall into just 2 clades, EMA 1–2, that likely resulted from at least 2 introductions of influenza (H5N1).

European countries have been affected by each of the 3 introductions of the EMA strains. For example, the Italian sequences can be segregated into 2 subgroups (Figure 2B). Two isolates in EMA-1 (Co/Italy/808/06 and Md/Italy/835/2006) are closely related in all segments and likely share a common ancestor with isolates found in Slovenia (Sw/Slovenia/760/2006), Bavaria, and the Czech Republic (Co/Czech Republic/5170/2006). The third Italian strain from our study (Co/Italy/742/2006) falls into EMA-3, along with our newly sequenced isolates from Iran (Co/Iran/754/2006) and Afghanistan (Ck/Afghanistan/1207/2006). EMA-2 contains 1 European isolate, from a swan in Croatia, and multiple isolates from domesticated birds in Nigeria and Niger. This group shares a common ancestor with a group of isolates from Astrakhan and Kurgan (Russia).

Of the 22 EMA isolates newly sequenced in this study, 20 have the amino acid lysine (K) at position 627 of the polymerase basic protein 2 (PB2), while only 2 have glutamic acid (E). (These last 2 are both from Italy and both in EMA-1.) The 627K mutation is associated with virulence in mice and adaptation to mammalian hosts (17) and with increased host range (18). Lysine at this position is common in human viruses: all 65 human influenza (H5N1) isolates from 2001 through 2006 for which the PB2 sequence is available have lysine at position 627. Before the analysis of our collection, the PB2 627K was a relatively rare mutation in avian influenza (H5N1) viruses: it was present in only 42 of 385 isolates previously collected from 2001 through 2006. Our analysis shows that all 42 of these fall in the EMA clade (Figure 2 and supplementary data available in online Technical Appendix 2, available from www.cdc.gov/EID/content/13/5/713-app2.txt). Excluding our current European, Middle Eastern, and African isolates, this mutation appears primarily in isolates obtained from wild birds in Astrakhan (15) and at Qinghai Lake (14, 17). This mutation also occurs in the recent isolate A/Geese/Qinghai/282/2006 and in a mouse-adapted 2001 Asian isolate, A/Chinese Goose/Shantou/1341/2006 and in a mouse-adapted 2001 Asian isolate, A/Chinese Goose/Shantou/1341/2006.

This finding suggests that the virus spread possibly caused by human-related activities.
ing is in keeping with current knowledge of the acquisition of such mutations.

Our study increases current knowledge on strains circulating in Asia before the westward spread of influenza A (H5N1). The Vietnamese samples fall into 2 clusters, the larger of which (V2 in Figure 1) is the same strain responsible for multiple cases in Southeast Asia since 2004, particularly in Vietnam and Thailand. These isolates all seem to derive from earlier Hong Kong samples (including 2 cases of human infection) in 2002 and 2003. The second cluster, V1, which contains 5 samples, significantly expands our understanding of this distinct Vietnamese influenza (H5N1) lineage. The only other isolate from this cluster was recently reported in a Vietnamese duck (A/duck/Vietnam/568/2005) and labeled a “recent Vietnam introduction” (4). This sample groups with the V1 clade when shown in the context of a larger tree of HA sequences (online Appendix Figure 3). The 5 newly sequenced isolates in clade V1 show the same phylogenetic relationship for all segments except PB2 (online Appendix Figure 1). The isolates in clade V1 appear to have undergone the same reassortment as was suggested (4) for the 1 previous example of this Vietnamese clade, A/duck/Vietnam/568/2005; i.e., they have acquired a new PB2 segment. This PB2 is similar to older (1996–2002), A/duck/Guangdong/1/96-like viruses from China. V1 clade isolates are associated with a distinct set of human cases, from China’s Anhui and Guangxi Provinces in 2005, a finding that provides additional support to the hypothesis that this group of influenza (H5N1) viruses was introduced into Vietnam from China (4).

Although EMA has split into 3 independently evolving clades, 1 isolate, A/chicken/Nigeria/1047–62/2006, shows clear evidence of reassortment. In this genome, 4 segments—HA, (nucleocapsid protein, nonstructural protein, and PB1—belong to EMA-1, as seen in Figure 1 and online Appendix Figure 1. The other 4 segments—neuraminidase, matrix protein, PA, and PB2—belong to EMA-2 (online Appendix Figure 1). Individual segment trees based on all available sequences in GenBank corroborate this pattern and consistently split the 8 segments of this Nigerian isolate into 2 distinct clades. Reassortment events such as this can only be discovered by sequencing multiple virus segments.

The presence of all 3 EMA sublineages in the same geographic region creates ample opportunities for reassortment. Isolate A/chicken/Nigeria/1047–62/2006 is the most recent of the Nigerian isolates, consistent with the hypothesis that this reassortant was generated in Africa. Additional surveillance will be necessary to determine if this reassortant strain spreads further in the avian population and to assess its ability to infect mammals.

As shown in Figure 2A, the EMA clade is a distinct lineage evolving independently of the 3 exclusively Asian lineages. All 3 human influenza (H5N1) cases that have been sequenced outside east Asia—from Iraq (19), Djibouti, and Egypt—belong to the EMA lineage. The human sequences A/Djibouti/5691/NAMRU3/06 and A/Egypt/2782/NAMRU3/06 group closely together and consistently fall in EMA-1. The placement of A/Iraq/207/NAMRU3/06 is slightly less certain; it also groups with EMA-1 (Figure 2B) but with lower bootstrap support. EMA viruses isolated from humans are thus quite distinct from the recent large clusters of human cases in Indonesia and China, which fall into separate clades containing none of our samples. The EMA isolates are also distinct from other human cases in Southeast Asia, which fall into the clades (V1 and V2) containing our Vietnamese samples.

The emergence of 3 (or more) substrains from the EMA clade represents multiple new opportunities for avian influenza (H5N1) to evolve into a human pandemic strain. In contrast to strains circulating in Southeast Asia, EMA viruses are derived from a progenitor that has the PB2 627K mutation. These viruses are expected to have enhanced replication characteristics in mammals, and indeed the spread of EMA has coincided with the rapid appearance of cases in mammals—including humans in Turkey, Egypt, Iraq, and Djibouti, and cats in Germany, Austria, and Iraq. Unfortunately, the EMA-type viruses appear to be as virulent as the exclusively Asian strains: of 34 human infections outside of Asia through mid-2006, 15 have been fatal (2).

Analyses of the complete HA tree (Figure 2A and online Appendix Figure 3) suggest that the earliest sequenced relatives of the EMA clade are from the Yunnan region of China (A/duck/Yunnan/6255,6445/2003), Hong Kong, (A/chicken/Hong Kong/WF157/2003), and South Korea (A/chicken/Korea/ES/2003, A/duck/Korea/ESD1/2003), which were part of a regional outbreak in 2003 (20). Experiments on the 2 Korean isolates showed them to be infectious but not fatal in mice (21).

These findings show how whole-genome analysis of influenza (H5N1) viruses is instrumental to the better understanding of the evolution and epidemiology of this infection, which is now present in the 3 continents that contain most of the world’s population. This and related analyses, facilitated by global initiatives on sharing influenza data (22,23), will help us understand the dynamics of infection between wild and domesticated bird populations, which in turn should promote the development of control and prevention strategies.

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Use of trade names is for identification only and does not imply endorsement by the Public Health Service or by the U.S. Department of Health and Human Services.
Other isolates of note are colored as follows:

Vietnam clade V3

Human cases

Ts/Henan/2/04
Ts/Henan/4/04
Ck/Yichang/lung_1/04
Dk/Zhejiang/52/00
Ck/Henan/12/04
Dk/HK/2986.1/00
Dk/Guangxi/50/01
Gs/HK/76.1/01
Ck/Hubei/327/04
Ck/HK/876.1/0
Ck/HK/YU562/01
Ck/HK/FY77/01
Ck/Hebei/326/05
Ck/HK/YU822.2/01_MB
Ck/HK/873.3/01
Gs/HK/385.5/00
Ph/HK/FY155/01
Ph/HK/FY155/01_MB
Ck/HK/879.1/0
Dk/Yokohama/aq10/0
Ck/HK/31.4/0
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| Isolate name                     | PB2     | PB1     | PA      | HA      | NP      | NA      | M       | NS      |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| A/bar-headed goose/Qinghai/12   | DQ095761| DQ095741| DQ095721| DQ095621| DQ095681| DQ095661| DQ095641| DQ095701|
| A/bar-headed goose/Qinghai/5    | DQ095757| DQ095737| DQ095717| DQ095617| DQ095677| DQ095657| DQ095637| DQ095697|
| A/bar-headed goose/Qinghai/59   | DQ095752| DQ095732| DQ095712| DQ095612| DQ095672| DQ095652| DQ095632| DQ095692|
| A/bar-headed goose/Qinghai/60   | DQ095755| DQ095695| DQ095715| DQ095615| DQ095675| DQ095615| DQ095635| DQ095695|
| A/bar-headed goose/Qinghai/61   | DQ095758| DQ095738| DQ095718| DQ095618| DQ095678| DQ095658| DQ095638| DQ095698|
| A/bar-headed goose/Qinghai/62   | DQ095760| DQ095740| DQ095720| DQ095620| DQ095640| DQ095660| DQ095640| DQ095700|
| A/bar-headed goose/Qinghai/65   | DQ095762| DQ095742| DQ095722| DQ095622| DQ095682| DQ095662| DQ095642| DQ095702|
| A/bar-headed goose/Qinghai/67   | DQ095763| DQ095743| DQ095723| DQ095623| DQ095683| DQ095663| DQ095643| DQ095703|
| A/bar-headed goose/Qinghai/68   | DQ095753| DQ095733| DQ095713| DQ095613| DQ095673| DQ095653| DQ095633| DQ095693|
| A/bar-headed goose/Qinghai/75   | DQ095759| DQ095739| DQ095719| DQ095619| DQ095679| DQ095659| DQ095639| DQ095699|
| A/black-headed goose/Qinghai/1   | DQ100542| DQ100546| DQ100550| DQ100554| DQ100558| DQ100562| DQ100566| DQ100570|
| A/black-headed goose/Qinghai/2   | DQ100543| DQ100547| DQ100551| DQ100555| DQ100559| DQ100563| DQ100567| DQ100571|
| A/black-headed gull/Qinghai/1    | DQ100544| DQ100548| DQ100552| DQ100556| DQ100560| DQ100564| DQ100568| DQ100572|
| A/brown headed gull/Qinghai/3    | DQ095756| DQ095736| DQ095716| DQ095616| DQ095676| DQ095656| DQ095636| DQ095696|
| A/cat Germany/606/2006           | DQ643980| DQ643979| DQ643981| DQ643982| DQ643983| DQ643984| DQ643985| DQ643986|
| A/chicken/Afghanistan/1207/2006  | CY016794| CY016793| CY016792| CY016787| CY016790| CY016789| CY016788| CY016791|
| A/chicken/Cote d'Ivoire/1787/34  | CY016818| CY016817| CY016816| CY016811| CY016814| CY016813| CY016812| CY016815|
| A/chicken/Crimea/08/2005         | DQ650670| DQ650669| DQ650668| DQ650663| DQ650666| DQ650665| DQ650664| DQ650667|
| A/chicken/Fujian/1042            | DQ320810| DQ321271| DQ321205| DQ320876| DQ321073| DQ321008| DQ320942| DQ321139|
| A/chicken/Kurgan/3               | DQ449639| DQ449638| DQ449637| DQ449632| DQ449635| DQ449634| DQ449633| DQ449636|
| A/chicken/Nigeria/1047/30/2006   | CY016946| CY016945| CY016944| CY016939| CY016942| CY016941| CY016941| CY016943|
| A/chicken/Nigeria/1047/34/2006   | CY016954| CY016953| CY016952| CY016947| CY016950| CY016949| CY016948| CY016951|
| A/chicken/Nigeria/1047/54/2006   | CY016930| CY016929| CY016928| CY016923| CY016926| CY016925| CY016924| CY016927|
| A/chicken/Nigeria/1047/8/2006    | CY016914| CY016913| CY016912| CY016907| CY016910| CY016909| CY016908| CY016911|
| A/chicken/Nigeria/641/2006       | CY016283| CY016282| CY016281| CY016276| CY016279| CY016278| CY016277| CY016280|
A/chicken/Nigeria/957/20/2006 CY016291 CY016290 CY016289 CY016284 CY016287 CY016286 CY016285 CY016288
A/chicken/Shantou/810 DQ095766 DQ095746 DQ095726 DQ095626 DQ095686 DQ095666 DQ095646 DQ095706
A/chicken/Sudan/1784/10/2006 CY016307 CY016306 CY016305 CY016300 CY016303 CY016302 CY016301 CY016304
A/chicken/Sudan/1784/7/2006 CY016299 CY016298 CY016297 CY016292 CY016295 CY016294 CY016293 CY016296
A/Cygnus cygnus/Iran/754/2006 CY016786 CY016785 CY016784 CY016779 CY016782 CY016781 CY016780 CY016783
A/Cygnus olor/Astrakhan/05201 DQ389161 DQ394578 DQ394579 DQ389158 DQ394577 DQ394576 DQ394575 DQ394574
A/Cygnus olor/Astrakhan/05202 DQ343506 DQ343505 DQ343504 DQ343502 DQ359694 DQ343503 DQ359692 DQ359693
A/Cygnus olor/Astrakhan/05203 DQ358750 DQ358749 DQ358748 DQ358746 DQ358751 DQ358747 DQ358739 DQ358752
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A/Cygnus olor/Astrakhan/05206 DQ365001 DQ365000 DQ364999 DQ364998 DQ364997 DQ364996 DQ364995 DQ364994
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A/Cygnus olor/Astrakhan/05210 DQ434890 DQ423612 DQ423611 DQ423610 DQ423609 DQ423608 DQ423607 DQ423606
A/Cygnus olor/Croatia/1/2005 CY016826 CY016825 CY016824 CY016823 CY016822 CY016821 CY016820 CY016819
A/Cygnus olor/Italy/742/2006 DQ533586 DQ533585 DQ533584 DQ533583 DQ533582 DQ533581 DQ533580 DQ533579
A/Cygnus olor/Italy/808/2006 tigr/ tigr/ tigr/ tigr/ tigr/ tigr/ tigr/ tigr/ 1101672593770 1101672593770 1101672593770 1101672593770 1101672593770 1101672593770 1101672593770 1101672593770
A/Djibouti/5691/NAMRU3/2006 DQ666146
A/duck/Cote d'Ivoire/1787/18/2006 CY016810 CY016809 CY016808 CY016807 CY016806 CY016805 CY016804 CY016803
A/duck/Egypt/2253/3/2006 CY016906 CY016905 CY016904 CY016903 CY016902 CY016901 CY016900 CY016903
A/duck/Fujian/897 DQ320809 DQ321270 DQ321269 DQ321268 DQ320875 DQ320874 DQ320873 DQ320872
A/duck/Hunan/160 DQ320841 DQ321302 DQ321291 DQ321290 DQ320875 DQ320874 DQ320873 DQ320872
A/duck/Kurgan/08/2005 DQ449647 DQ449646 DQ449645 DQ449644 DQ449643 DQ449642 DQ449641 DQ449640
A/duck/Niger/914/2006 CY017034 CY017033 CY017032 CY017031 CY017030 CY017029 CY017028 CY017027
A/duck/Novosibirsk/56 DQ232608 DQ232607 DQ232606 DQ232605 DQ232604 DQ232603 DQ232602 DQ232601
A/Egypt/2782/NAMRU3/2006 DQ464377
| Species                        | Location          | Accession Numbers                                      |
|-------------------------------|-------------------|--------------------------------------------------------|
| A/Environment/Qinghai/31/2005 |                   | DQ320856, DQ321317, DQ321251, DQ320922, DQ321119, DQ321054, DQ320988, DQ321185 |
| A/goose/Shantou/1621          |                   | DQ095768, DQ095748, DQ095728, DQ095628, DQ095688, DQ095668, DQ095648, DQ095708 |
| A/goose/Shantou/2216          |                   | DQ320849, DQ321310, DQ321244, DQ320915, DQ321112, DQ321047, DQ320981, DQ321178 |
| A/great black-headed gull/Qinghai |               | DQ095754, DQ095734, DQ095714, DQ095614, DQ095674, DQ095654, DQ095634, DQ095694 |
| A/goose/Novosibirsk/29        |                   | DQ232607, DQ232605, DQ234075, DQ230521, DQ232609, DQ230523, DQ234077, DQ234073 |
| A/grebe/Tyva/Tyv06/1/2006     |                   | DQ914807, DQ914810, DQ978999, DQ914808, DQ916293, DQ914809, DQ914805, DQ914806 |
| A/grebe/Tyva/Tyv06/2/06       |                   | DQ852607, DQ852606, DQ852603, DQ852600, DQ852601, DQ852604, DQ852605 |
| A/Grebe/Tyva/Tyv06/8/2006     |                   | DQ863510, DQ863509, DQ863508, DQ863503, DQ863506, DQ863507, DQ863504, DQ863505 |
| A/guinea fowl/Nigeria/957/12  |                   | CY017186, CY017185, CY017184, CY017179, CY017182, CY017180, CY017183 |
| A/human/Iraq/207/NAMRU3/2006  |                   | DQ435202                                                |
| A/mallard/Italy/835/2006      |                   | CY016802, CY016801, CY016800, DQ449031, CY016798, CY016797, CY016796, CY016799 |
| A/migratory duck/Jiangxi/1653 |                   | DQ320850, DQ321311, DQ321245, DQ320916, DQ321113, DQ321048, DQ320982, DQ321179 |
| A/migratory duck/Jiangxi/1657 |                   | DQ320851, DQ321312, DQ321246, DQ320917, DQ321114, DQ321049, DQ320983, DQ321180 |
| A/migratory duck/Jiangxi/1701 |                   | DQ320852, DQ321313, DQ321247, DQ320918, DQ321115, DQ321050, DQ320984, DQ321181 |
| A/ostrich/Nigeria/1047/25/2006|                   | CY016922, CY016921, CY016920, CY016915, CY016918, CY016917, CY016916, CY016919 |
| A/quail/Shantou/911           |                   | DQ095767, DQ095747, DQ095727, DQ095627, DQ095687, DQ095667, DQ095647, DQ095707 |
| A/swan/Germany/R65/2006       |                   | DQ464357, DQ464361, DQ464360, DQ464354, DQ464359, DQ464355, DQ464356, DQ464358 |
| A/swan/Slovenia/760/2006      |                   | CY017050, CY017049, CY017048, CY017043, CY017046, CY017045, CY017044, CY017047 |
| A/whooper swan/Mongolia/2/06  |                   | AB264769, AB264770, AB263751, AB263752, AB263753, AB265202, AB265203, AB265204 |
| A/whooper swan/Mongolia/3/05  |                   | AB239307, AB239308, AB239309, AB233320, AB239310, AB239311, AB239312, AB239313 |
| A/whooper swan/Mongolia/4/05  |                   | AB239314, AB239315, AB239316, AB233321, AB239317, AB239318, AB239319, AB239320 |
| A/whooper swan/Mongolia/6/05  |                   | AB239321, AB239322, AB239323, AB233322, AB239324, AB239325, AB239326, AB239327 |
| Amino Acid | Isolate Identifier |
|------------|-------------------|
| E          | A/bird/Thailand/3.1/2004(H5N1) |
| E          | A/chicken/Ayutthaya/Thailand/CU-23/04(H5N1) |
| E          | A/chicken/Bangli_Bali/BBPV6-1/2004(H5N1) |
| E          | A/chicken/Bangli_Bali/BBPV6-2/2004(H5N1) |
| E          | A/chicken/Dairi/BPPVI/2005(H5N1) |
| E          | A/chicken/Deli_Serdang/BPPVI/2005(H5N1) |
| E          | A/chicken/Fujian/10039/2005(H5N1) |
| E          | A/chicken/Fujian/1042/2005(H5N1) |
| E          | A/chicken/Fujian/10567/2005(H5N1) |
| E          | A/chicken/Fujian/11933/2005(H5N1) |
| E          | A/chicken/Fujian/12239/2005(H5N1) |
| E          | A/chicken/Fujian/584/2006(H5N1) |
| E          | A/chicken/Fujian/9821/2005(H5N1) |
| E          | A/chicken/Guangdong/174/04(H5N1) |
| E          | A/chicken/Guangdong/178/04(H5N1) |
| E          | A/chicken/Guangdong/191/04(H5N1) |
| E          | A/chicken/Guangdong/1212/2006(H5N1) |
| E          | A/chicken/Guangdong/12/2004(H5N1) |
| E          | A/chicken/Guangdong/1951/2006(H5N1) |
| E          | A/chicken/Guangdong/3154/2005(H5N1) |
| E          | A/chicken/Guangdong/3791/2005(H5N1) |
| E          | A/chicken/Guangdong/463/2006(H5N1) |
| E          | A/chicken/Guangdong/4989/2005(H5N1) |
| E          | A/chicken/Guangdong/604/2005(H5N1) |
| E          | A/chicken/Guangdong/683/2006(H5N1) |
| E          | A/chicken/Guilin/1655/2006(H5N1) |
| E          | A/chicken/Guiyang/2147/2005(H5N1) |
| E          | A/chicken/Guiyang/2173/2005(H5N1) |
| E          | A/chicken/Guiyang/237/2006(H5N1) |
| E          | A/chicken/Guiyang/29/2005(H5N1) |
| E          | A/chicken/Guiyang/3055/2005(H5N1) |
| E          | A/chicken/Guiyang/3570/2005(H5N1) |
| E          | A/chicken/Guiyang/3721/2005(H5N1) |
| E          | A/chicken/Guiyang/3923/2005(H5N1) |
| E          | A/chicken/Guiyang/4059/2005(H5N1) |
| E          | A/chicken/Guiyang/441/2006(H5N1) |
| E          | A/chicken/Gunung_Kidal/BBVW/2005(H5N1) |
| E          | A/chicken/Hebei/08/02/2005(H5N1) |
| E          | A/chicken/Hebei/326/2005(H5N1) |
| E          | A/chicken/Hebei/718/2001(H5N1) |
| E          | A/chicken/Henan/1/2004(H5N1) |
| E          | A/chicken/Henan/12/2004(H5N1) |
| E          | A/chicken/Henan/13/2004(H5N1) |
| E          | A/chicken/Henan/16/2004(H5N1) |
| E          | A/chicken/Henan/wu/2004(H5N1) |
| E          | A/chicken/Hong_Kong/282/2006(H5N1) |
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| E          | A/chicken/HongKong/YU562/01(H5N1) |
| E          | A/chicken/HongKong/YU822.2/01(H5N1) |
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| E          | A/chicken/Hubei/327/2004(H5N1) |
| E          | A/chicken/Hubei/489/2004(H5N1) |
| E          | A/chicken/Hubei/wn/2003(H5N1) |
| E          | A/chicken/Hubei/wo/2003(H5N1) |
| E          | A/chicken/Hunan/999/2005(H5N1) |
| E          | A/chicken/Indonesia/CDC24/2005(H5N1) |
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| E          | A/chicken/Jiangsu/cz1/2002(H5N1) |
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| E          | A/chicken/Jilin/hl/2004(H5N1) |
| E          | A/chicken/Jilin/hm/2003(H5N1) |
| E          | A/chicken/Jilin/xw/2003(H5N1) |
| E          | A/chicken/Korea/ES/03(H5N1) |
| E          | A/chicken/Kulon_Progo/BBVet-XII-1/2004(H5N1) |
E A/duck/Fujian/668/2006(H5N1)
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E A/duck/Fujian/897/2005(H5N1)
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E A/duck/Guangdong/173/04(H5N1)
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E A/duck/Novosibirsk/02/05 (H5N1)
E A/duck/Parepare/BBVM/2005 (H5N1)
E A/duck/Shandong/03/2004 (H5N1)
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E A/duck/Shantou/13323/2005 (H5N1)
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E A/duck/Viet_Nam/8/05 (H5N1)
E A/duck/Viet_Nam/CM-V7/2004 (H5N1)
E A/duck/Viet_Nam/TG-007A/2004 (H5N1)
E A/duck/Viet_Nam/TV-V2/2004 (H5N1)
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E A/duck/Yunnan/5820/2005 (H5N1)
E A/duck/Yunnan/5877/2005 (H5N1)
E A/duck/Yunnan/6332/2005 (H5N1)
E A/duck/Yunnan/6607/2005 (H5N1)
E A/duck/Zhejiang/bj/2002 (H5N1)
E A/egret/Hong_Kong/757.2/03 (H5N1)
E A/GF/HK/38/2002 (H5N1)
E A/goose/Fujian/bb/2003 (H5N1)
E A/goose/Guangdong/xb/2001 (H5N1)
E A/goose/Guangxi/1097/2004 (H5N1)
E A/goose/Guangxi/1198/2004 (H5N1)
E A/goose/Guangxi/1458/2006 (H5N1)
E A/goose/Guangxi/1633/2006 (H5N1)
E A/goose/Guangxi/1832/2004 (H5N1)
E A/goose/Guangxi/1898/2006 (H5N1)
E A/goose/Guangxi/2112/2004 (H5N1)
E A/goose/Guangxi/224/2006 (H5N1)
E A/goose/Guangxi/2383/2004 (H5N1)
E A/goose/Guangxi/3017/2005 (H5N1)
E A/goose/Guangxi/3316/2005 (H5N1)
E A/goose/Guangxi/345/2005 (H5N1)
E A/goose/Guangxi/4289/2005 (H5N1)
E A/goose/Guangxi/4513/2005 (H5N1)
E A/goose/Guangxi/532/2006 (H5N1)
E A/goose/Guangxi/5414/2005 (H5N1)
E A/goose/Guangxi/582/2006 (H5N1)
E A/goose/Guangxi/914/2004 (H5N1)
E A/goose/Guiyang/1461/2006 (H5N1)
E A/goose/Guiyang/1636/2006 (H5N1)
E A/goose/Guiyang/1794/2006 (H5N1)
E A/goose/Guiyang/337/2006 (H5N1)
E A/goose/Guiyang/3422/2005 (H5N1)
E A/goose/Guiyang/4030/2005 (H5N1)
E A/goose/Guiyang/4180/2005 (H5N1)
E A/goose/Guiyang/538/2006 (H5N1)
E A/goose/Guiyang/765/2006 (H5N1)
E A/goose/Jilin/hb/2003 (H5N1)
E A/goose/Shantou/18442/2005 (H5N1)
E A/goose/Shantou/2086/2006 (H5N1)
E A/goose/Shantou/2216/2005 (H5N1)
E A/goose/Shantou/239/2006 (H5N1)
E A/goose/Shantou/3265/2006 (H5N1)
E A/goose/Shantou/3295/2006 (H5N1)
E A/goose/Shantou/3624/2006 (H5N1)
E A/goose/Vietnam/3/05 (H5N1)
E A/goose/Yunnan/3315/2005 (H5N1)
E A/goose/Yunnan/3644/2005 (H5N1)
E A/goose/Yunnan/3720/2005 (H5N1)
E A/goose/Yunnan/4129/2005 (H5N1)
E A/goose/Yunnan/4494/2005 (H5N1)
E A/goose/Yunnan/4804/2005(H5N1)
E A/goose/Yunnan/5299/2005(H5N1)
E A/goose/Yunnan/5539/2005(H5N1)
E A/goose/Yunnan/6027/2005(H5N1)
E A/goose/Yunnan/6368/2005(H5N1)
E A/house_crow/Hong_Kong/2648/2006(H5N1)
E A/Japanese_white-eye/Hong_Kong/1038/2006(H5N1)
E A/large-billed_crow/Hong_Kong/2512/2006(H5N1)
E A/little_egret/Hong_Kong/718/2006(H5N1)
E A/mallard/Guangxi/wt/2004(H5N1)
E A/mallard/Italy/835/2006(H5N1)
E A/migratory_duck/Jiangxi/2300/2005(H5N1)
E A/migratory_duck/Jiangxi/406/2003(H5N1)
E A/migratory_duck/Jiangxi/836/2003(H5N1)
E A/munia/Hong_Kong/2454/2006(H5N1)
E A/peregrine_falcon/HK/D0028/2004(H5N1)
E A/Pheasant/HongKong/FY155/01(H5N1)
E A/Pheasant/Shantou/2239/2006(H5N1)
E A/pigeon/Thailand/KU-03/04(H5N1)
E A/Qa/Thailand/57/2005(H5N1)
E A/quail/Guangxi/57/2005(H5N1)
E A/quail/Hong_Kong/2512/2006(H5N1)
E A/quain/Viet Nam/15/2005(H5N1)
E A/quail/VietNam/36/04(H5N1)
E A/qktd/Hong_Kong/366/2006(H5N1)
E A/qktd/Hong_Kong/75/2006(H5N1)
E A/Ck/HK/31.4/02
E A/Ck/HK/YU77/02
K A/bar-headed_goose/Qinghai/0510/05(H5N1)
K A/Bar-headed_Goose/Qinghai/12/05(H5N1)
K A/Bar-headed_Goose/Qinghai/5/05(H5N1)
K A/Bar-headed_Goose/Qinghai/59/05(H5N1)
K A/Bar-headed_Goose/Qinghai/60/05(H5N1)
K A/Bar-headed_Goose/Qinghai/61/05(H5N1)
K A/Bar-headed_Goose/Qinghai/65/05(H5N1)
K A/Bar-headed_Goose/Qinghai/67/05(H5N1)
K A/Bar-headed_Goose/Qinghai/69/05(H5N1)
K A/Bar-headed_Goose/Qinghai/75/05(H5N1)
K A/black-headed_goose/Qinghai/1/2005(H5N1)
K A/black-headed_goose/Qinghai/12/2005(H5N1)
K A/black-headed_guill/Qinghai/1/2005(H5N1)
K A/Brown-headed_Gull/Qinghai/3/05(H5N1)
K A/chicken/Afghanistan/1207/2006(H5N1)
K A/chicken/Cote_d'Ivoire/1787-34/2006(H5N1)
K A/chicken/Crimea/08/2005(H5N1)
K A/chicken/Kurgan/05/2005(H5N1)
K A/chicken/Kurgan/3/2005(H5N1)
K A/chicken/Nigeria/1047-30/2006(H5N1)
K A/chicken/Nigeria/1047-34/2006(H5N1)
K A/chicken/Nigeria/1047-54/2006(H5N1)
K A/chicken/Nigeria/1047-62/2006(H5N1)
K A/chicken/Nigeria/1047-8/2006(H5N1)
K A/chicken/Nigeria/641/2006(H5N1)
K A/chicken/Nigeria/641/2006(H5N1)
K A/chicken/Nigeria/957-20/2006(H5N1)
K A/chicken/Sudan/1784-10/2006(H5N1)
K A/chicken/Sudan/1784-7/2006(H5N1)
K A/cygnus_cygnus/Iran/754/2006(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-10/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-1/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-2/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-3/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-5/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-6/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-7/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-8/2005(H5N1)
K A/Cygnus_olor/Astrakhan/Ast05-2-9/2005(H5N1)
K A/cygnus_olor/Croatia/1/2005(H5N1)
K A/cygnus_olor/Italy/742/2006(H5N1)
K A/Cygnus_olor/Italy/742/2006(H5N1)
K A/duck/Côte_d'Ivoire/1787-18/2006(H5N1)
K A/duck/Egypt/2253-3/2006(H5N1)
K A/duck/Niger/914/2006(H5N1)
K A/duck/Novosibirsk/56/05(H5N1)
K A/great_black-headed_gull/Qinghai/1/2005(H5N1)
K A/Great_Black-headed_Gull/Qinghai/2/05(H5N1)
K A/grebe/Novosibirsk/29/05(H5N1)
K A/grebe/Tyva/Tyv06-1/06(H5N1)
K A/grebe/Tyva/Tyv06-2/06(H5N1)
K A/Grebe/Tyva/Tyv06-8/2006(H5N1)
K A/guinea_fowl/Nigeria/957-12/2006(H5N1)
K A/Guinea_fowl/Shantou/1341/2006(H5N1)
K A/ostrich/Nigeria/1047-25/2006(H5N1)
K A/Pheasant/HongKong/FY155/01-MB(H5N1)
K A/swan/Astrakhan/Russia/Nov-2/2005(H5N1)
K A/swan/Germany/R65/2006(H5N1)
K A/swan/Slovenia/760/2006(H5N1)
K A/whooper_swam/Mongolia/2/06(H5N1)
K A/whooper_swan/Mongolia/3/05(H5N1)
1: CY017194
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 1, complete sequence
gi|117571368|gb|CY017194.1|[117571368]

2: CY017193
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 2, complete sequence
gi|117571365|gb|CY017193.1|[117571365]

3: CY017192
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 3, complete sequence
gi|117571363|gb|CY017192.1|[117571363]

4: CY017191
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 8, complete sequence
gi|117571359|gb|CY017191.1|[117571359]

5: CY017190
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 5, complete sequence
gi|117571357|gb|CY017190.1|[117571357]

6: CY017189
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 6, complete sequence
gi|117571355|gb|CY017189.1|[117571355]

7: CY017188
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 7, complete sequence
gi|117571351|gb|CY017188.1|[117571351]

8: CY017187
Influenza A virus (A/duck/Viet Nam/19/2005(H5N1)) segment 4, complete sequence
gi|117571349|gb|CY017187.1|[117571349]

9: CY017186
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 1, complete sequence
gi|117571327|gb|CY017186.1|[117571327]

10: CY017185
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 2, complete sequence
gi|117571323|gb|CY017185.1|[117571323]

11: CY017184
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 3, complete sequence
gi|117571321|gb|CY017184.1|[117571321]

12: CY017183
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 8, complete sequence
gi|117571318|gb|CY017183.1|[117571318]

13: CY017182
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 5, complete sequence
gi|117571315|gb|CY017182.1|[117571315]

14: CY017181
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 6, complete sequence
gi|117571313|gb|CY017181.1|[117571313]

15: CY017180
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 7, complete sequence
gi|117571309|gb|CY017180.1|[117571309]

16: CY017179
Influenza A virus (A/guinea fowl/Nigeria/957-12/2006(H5N1)) segment 4, complete sequence
gi|117571307|gb|CY017179.1|[117571307]
17: CY017058
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 1, complete sequence
gi|116070400|gb|CY017058.1|[116070400]

18: CY017057
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 2, complete sequence
gi|116070397|gb|CY017057.1|[116070397]

19: CY017056
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 3, complete sequence
gi|116070395|gb|CY017056.1|[116070395]

20: CY017055
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 8, complete sequence
gi|116070392|gb|CY017055.1|[116070392]

21: CY017054
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 5, complete sequence
gi|116070390|gb|CY017054.1|[116070390]

22: CY017053
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 6, complete sequence
gi|116070388|gb|CY017053.1|[116070388]

23: CY017052
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 7, complete sequence
gi|116070385|gb|CY017052.1|[116070385]

24: CY017051
Influenza A virus (A/quail/Viet Nam/15/2005(H5N1)) segment 4, complete sequence
gi|116070383|gb|CY017051.1|[116070383]

25: CY017066
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 1, complete sequence
gi|116070381|gb|CY017066.1|[116070381]

26: CY017065
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 2, complete sequence
gi|116070378|gb|CY017065.1|[116070378]

27: CY017064
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 3, complete sequence
gi|116070376|gb|CY017064.1|[116070376]

28: CY017063
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 8, complete sequence
gi|116070373|gb|CY017063.1|[116070373]

29: CY017062
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 5, complete sequence
gi|116070371|gb|CY017062.1|[116070371]

30: CY017061
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 6, complete sequence
gi|116070369|gb|CY017061.1|[116070369]

31: CY017060
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 7, complete sequence
gi|116070366|gb|CY017060.1|[116070366]

32: CY017059
Influenza A virus (A/chicken/Viet Nam/17/2005(H5N1)) segment 4, complete sequence
gi|116070364|gb|CY017059.1|[116070364]

33: CY017035
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 4, complete sequence gi|116070055|gb|CY017035.1|[116070055]

34: CY017074
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 1, complete sequence gi|116070110|gb|CY017074.1|[116070110]

35: CY017073
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 2, complete sequence gi|116070107|gb|CY017073.1|[116070107]

36: CY017072
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 3, complete sequence gi|116070105|gb|CY017072.1|[116070105]

37: CY017071
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 8, complete sequence gi|116070102|gb|CY017071.1|[116070102]

38: CY017070
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 5, complete sequence gi|116070100|gb|CY017070.1|[116070100]

39: CY017069
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 6, complete sequence gi|116070098|gb|CY017069.1|[116070098]

40: CY017068
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 7, complete sequence gi|116070095|gb|CY017068.1|[116070095]

41: CY017067
Influenza A virus (A/duck/Viet Nam/18/2005(H5N1)) segment 4, complete sequence gi|116070093|gb|CY017067.1|[116070093]

42: CY017050
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 1, complete sequence gi|116070091|gb|CY017050.1|[116070091]

43: CY017049
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 2, complete sequence gi|116070088|gb|CY017049.1|[116070088]

44: CY017048
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 3, complete sequence gi|116070086|gb|CY017048.1|[116070086]

45: CY017047
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 8, complete sequence gi|116070083|gb|CY017047.1|[116070083]

46: CY017046
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 5, complete sequence gi|116070081|gb|CY017046.1|[116070081]

47: CY017045
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 6, complete sequence gi|116070079|gb|CY017045.1|[116070079]

48: CY017044
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 7, complete sequence gi|116070076|gb|CY017044.1|[116070076]

49: CY017043
Influenza A virus (A/swan/Slovenia/760/2006(H5N1)) segment 4, complete sequence
50: CY017042
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 1, complete sequence

51: CY017041
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 2, complete sequence

52: CY017040
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 3, complete sequence

53: CY017039
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 8, complete sequence

54: CY017038
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 5, complete sequence

55: CY017037
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 6, complete sequence

56: CY017036
Influenza A virus (A/cygnus olor/Italy/742/2006(H5N1)) segment 7, complete sequence

57: CY017034
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 1, complete sequence

58: CY017033
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 2, complete sequence

59: CY017032
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 3, complete sequence

60: CY017031
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 8, complete sequence

61: CY017030
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 5, complete sequence

62: CY017029
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 6, complete sequence

63: CY017028
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 7, complete sequence

64: CY017027
Influenza A virus (A/duck/Niger/914/2006(H5N1)) segment 4, complete sequence

65: CY016874
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 1, complete sequence
66: CY016873
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 2, complete sequence
gi|115953523|gb|CY016873.1|[115953523]

67: CY016872
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 3, complete sequence
gi|115953520|gb|CY016872.1|[115953520]

68: CY016871
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 8, complete sequence
gi|115953516|gb|CY016871.1|[115953516]

69: CY016870
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 5, complete sequence
gi|115953513|gb|CY016870.1|[115953513]

70: CY016869
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 6, complete sequence
gi|115953510|gb|CY016869.1|[115953510]

71: CY016868
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 7, complete sequence
gi|115953506|gb|CY016868.1|[115953506]

72: CY016867
Influenza A virus (A/chicken/Viet Nam/10/2005(H5N1)) segment 4, complete sequence
gi|115953503|gb|CY016867.1|[115953503]

73: CY016842
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 1, complete sequence
gi|115953095|gb|CY016842.1|[115953095]

74: CY016841
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 2, complete sequence
gi|115953092|gb|CY016841.1|[115953092]

75: CY016840
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 3, complete sequence
gi|115953090|gb|CY016840.1|[115953090]

76: CY016839
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 8, complete sequence
gi|115953087|gb|CY016839.1|[115953087]

77: CY016838
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 5, complete sequence
gi|115953085|gb|CY016838.1|[115953085]

78: CY016837
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 6, complete sequence
gi|115953083|gb|CY016837.1|[115953083]

79: CY016836
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 7, complete sequence
gi|115953080|gb|CY016836.1|[115953080]

80: CY016835
Influenza A virus (A/chicken/Viet Nam/2/2005(H5N1)) segment 4, complete sequence
gi|115953078|gb|CY016835.1|[115953078]

81: CY016850
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 1, complete sequence
gi|115953015|gb|CY016850.1|[115953015]
82: CY016849
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 2, complete sequence
gi|115953012|gb|CY016849.1|[115953012]

83: CY016848
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 3, complete sequence
gi|115953010|gb|CY016848.1|[115953010]

84: CY016847
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 8, complete sequence
gi|115953007|gb|CY016847.1|[115953007]

85: CY016846
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 5, complete sequence
gi|115953005|gb|CY016846.1|[115953005]

86: CY016845
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 6, complete sequence
gi|115953003|gb|CY016845.1|[115953003]

87: CY016844
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 7, complete sequence
gi|115953000|gb|CY016844.1|[115953000]

88: CY016843
Influenza A virus (A/chicken/Viet Nam/6/2005(H5N1)) segment 4, complete sequence
gi|115952998|gb|CY016843.1|[115952998]

89: CY016858
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 1, complete sequence
gi|115952912|gb|CY016858.1|[115952912]

90: CY016857
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 2, complete sequence
gi|115952907|gb|CY016857.1|[115952907]

91: CY016856
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 3, complete sequence
gi|115952904|gb|CY016856.1|[115952904]

92: CY016855
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 8, complete sequence
gi|115952899|gb|CY016855.1|[115952899]

93: CY016854
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 5, complete sequence
gi|115952895|gb|CY016854.1|[115952895]

94: CY016853
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 6, complete sequence
gi|115952892|gb|CY016853.1|[115952892]

95: CY016852
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 7, complete sequence
gi|115952888|gb|CY016852.1|[115952888]

96: CY016851
Influenza A virus (A/chicken/Viet Nam/8/2005(H5N1)) segment 4, complete sequence
gi|115952885|gb|CY016851.1|[115952885]

97: CY016866
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 1, complete sequence
gi|115952810|gb|CY016866.1|[115952810]
98: CY016865
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 2, complete sequence
gi|115952806|gb|CY016865.1|[115952806]

99: CY016864
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 3, complete sequence
gi|115952801|gb|CY016864.1|[115952801]

100: CY016863
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 8, complete sequence
gi|115952798|gb|CY016863.1|[115952798]

101: CY016862
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 5, complete sequence
gi|115952795|gb|CY016862.1|[115952795]

102: CY016861
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 6, complete sequence
gi|115952793|gb|CY016861.1|[115952793]

103: CY016860
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 7, complete sequence
gi|115952789|gb|CY016860.1|[115952789]

104: CY016859
Influenza A virus (A/chicken/Viet Nam/9/2005(H5N1)) segment 4, complete sequence
gi|115952786|gb|CY016859.1|[115952786]

105: CY016882
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 1, complete sequence
gi|115952239|gb|CY016882.1|[115952239]

106: CY016881
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 2, complete sequence
gi|115952236|gb|CY016881.1|[115952236]

107: CY016880
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 3, complete sequence
gi|115952233|gb|CY016880.1|[115952233]

108: CY016879
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 8, complete sequence
gi|115952229|gb|CY016879.1|[115952229]

109: CY016878
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 5, complete sequence
gi|115952226|gb|CY016878.1|[115952226]

110: CY016877
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 6, complete sequence
gi|115952224|gb|CY016877.1|[115952224]

111: CY016876
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 7, complete sequence
gi|115952220|gb|CY016876.1|[115952220]

112: CY016875
Influenza A virus (A/chicken/Viet Nam/11/2005(H5N1)) segment 4, complete sequence
gi|115952217|gb|CY016875.1|[115952217]

113: CY016890
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 1, complete sequence
gi|115951830|gb|CY016890.1|[115951830]

114: CY016889
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 2, complete sequence
gi|115951826|gb|CY016889.1|115951826

115: CY016888
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 3, complete sequence
gi|115951824|gb|CY016888.1|115951824

116: CY016887
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 8, complete sequence
gi|115951820|gb|CY016887.1|115951820

117: CY016886
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 5, complete sequence
gi|115951818|gb|CY016886.1|115951818

118: CY016885
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 6, complete sequence
gi|115951815|gb|CY016885.1|115951815

119: CY016884
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 7, complete sequence
gi|115951812|gb|CY016884.1|115951812

120: CY016883
Influenza A virus (A/duck/Viet Nam/12/2005(H5N1)) segment 4, complete sequence
gi|115951804|gb|CY016883.1|115951804

121: CY016818
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 1, complete sequence
gi|115609313|gb|CY016818.1|115609313

122: CY016817
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 2, complete sequence
gi|115609310|gb|CY016817.1|115609310

123: CY016816
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 3, complete sequence
gi|115609308|gb|CY016816.1|115609308

124: CY016815
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 8, complete sequence
gi|115609305|gb|CY016815.1|115609305

125: CY016814
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 5, complete sequence
gi|115609303|gb|CY016814.1|115609303

126: CY016813
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 6, complete sequence
gi|115609301|gb|CY016813.1|115609301

127: CY016812
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 7, complete sequence
gi|115609298|gb|CY016812.1|115609298

128: CY016811
Influenza A virus (A/chicken/Cote d'Ivoire/1787-34/2006(H5N1)) segment 4, complete sequence
gi|115609292|gb|CY016811.1|115609292

129: CY016898
Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 1, complete sequence
gi|115609777|gb|CY016898.1|115609777

130: CY016897
Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 2, complete sequence
| ID      | Description                                                                 |
|---------|-----------------------------------------------------------------------------|
| CY016896| Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 3, complete sequence |
| CY016895| Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 8, complete sequence |
| CY016894| Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 5, complete sequence |
| CY016893| Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 6, complete sequence |
| CY016892| Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 7, complete sequence |
| CY016891| Influenza A virus (A/duck/Viet Nam/20/2005(H5N1)) segment 4, complete sequence |
| CY016834| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 1, complete sequence   |
| CY016833| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 2, complete sequence   |
| CY016832| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 3, complete sequence   |
| CY016831| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 8, complete sequence   |
| CY016830| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 5, complete sequence   |
| CY016829| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 6, complete sequence   |
| CY016828| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 7, complete sequence   |
| CY016827| Influenza A virus (A/duck/Viet Nam/1/2005(H5N1)) segment 4, complete sequence   |
| CY016810| Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 1, complete sequence   |
| CY016809| Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 2, complete sequence   |
147: CY016808
Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 3, complete sequence
gi|115609549|gb|CY016808.1|[115609549]

148: CY016807
Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 8, complete sequence
gi|115609546|gb|CY016807.1|[115609546]

149: CY016806
Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 5, complete sequence
gi|115609544|gb|CY016806.1|[115609544]

150: CY016805
Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 6, complete sequence
gi|115609542|gb|CY016805.1|[115609542]

151: CY016804
Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 7, complete sequence
gi|115609538|gb|CY016804.1|[115609538]

152: CY016803
Influenza A virus (A/duck/Cote d'Ivoire/1787-18/2006(H5N1)) segment 4, complete sequence
gi|115609536|gb|CY016803.1|[115609536]

153: CY016954
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 1, complete sequence
gi|115608218|gb|CY016954.1|[115608218]

154: CY016953
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 2, complete sequence
gi|115608215|gb|CY016953.1|[115608215]

155: CY016952
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 3, complete sequence
gi|115608213|gb|CY016952.1|[115608213]

156: CY016951
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 8, complete sequence
gi|115608210|gb|CY016951.1|[115608210]

157: CY016950
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 5, complete sequence
gi|115608208|gb|CY016950.1|[115608208]

158: CY016949
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 6, complete sequence
gi|115608206|gb|CY016949.1|[115608206]

159: CY016948
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 7, complete sequence
gi|115608203|gb|CY016948.1|[115608203]

160: CY016947
Influenza A virus (A/chicken/Nigeria/1047-34/2006(H5N1)) segment 4, complete sequence
gi|115608201|gb|CY016947.1|[115608201]

161: CY016946
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 1, complete sequence
gi|115608199|gb|CY016946.1|[115608199]

162: CY016945
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 2, complete sequence
gi|115608196|gb|CY016945.1|[115608196]
163: CY016944
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 3, complete sequence
 gi|115608194|gb|CY016944.1|[115608194]

164: CY016943
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 8, complete sequence
 gi|115608191|gb|CY016943.1|[115608191]

165: CY016942
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 5, complete sequence
 gi|115608189|gb|CY016942.1|[115608189]

166: CY016941
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 6, complete sequence
 gi|115608187|gb|CY016941.1|[115608187]

167: CY016940
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 7, complete sequence
 gi|115608184|gb|CY016940.1|[115608184]

168: CY016939
Influenza A virus (A/chicken/Nigeria/1047-30/2006(H5N1)) segment 4, complete sequence
 gi|115608182|gb|CY016939.1|[115608182]

169: CY016938
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 1, complete sequence
 gi|115608180|gb|CY016938.1|[115608180]

170: CY016937
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 2, complete sequence
 gi|115608177|gb|CY016937.1|[115608177]

171: CY016936
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 3, complete sequence
 gi|115608175|gb|CY016936.1|[115608175]

172: CY016935
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 8, complete sequence
 gi|115608172|gb|CY016935.1|[115608172]

173: CY016934
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 5, complete sequence
 gi|115608170|gb|CY016934.1|[115608170]

174: CY016933
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 6, complete sequence
 gi|115608168|gb|CY016933.1|[115608168]

175: CY016932
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 7, complete sequence
 gi|115608165|gb|CY016932.1|[115608165]

176: CY016931
Influenza A virus (A/chicken/Nigeria/1047-62/2006(H5N1)) segment 4, complete sequence
 gi|115608163|gb|CY016931.1|[115608163]

177: CY016930
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 1, complete sequence
 gi|115608161|gb|CY016930.1|[115608161]

178: CY016929
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 2, complete sequence
 gi|115608158|gb|CY016929.1|[115608158]
179: CY016928
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 3, complete sequence
gi|115608156|gb|CY016928.1|[115608156]

180: CY016927
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 8, complete sequence
gi|115608153|gb|CY016927.1|[115608153]

181: CY016926
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 5, complete sequence
gi|115608151|gb|CY016926.1|[115608151]

182: CY016925
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 6, complete sequence
gi|115608149|gb|CY016925.1|[115608149]

183: CY016924
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 7, complete sequence
gi|115608146|gb|CY016924.1|[115608146]

184: CY016923
Influenza A virus (A/chicken/Nigeria/1047-54/2006(H5N1)) segment 4, complete sequence
gi|115608144|gb|CY016923.1|[115608144]

185: CY016922
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 1, complete sequence
gi|115608142|gb|CY016922.1|[115608142]

186: CY016921
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 2, complete sequence
gi|115608139|gb|CY016921.1|[115608139]

187: CY016920
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 3, complete sequence
gi|115608137|gb|CY016920.1|[115608137]

188: CY016919
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 8, complete sequence
gi|115608134|gb|CY016919.1|[115608134]

189: CY016918
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 5, complete sequence
gi|115608132|gb|CY016918.1|[115608132]

190: CY016917
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 6, complete sequence
gi|115608130|gb|CY016917.1|[115608130]

191: CY016916
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 7, complete sequence
gi|115608127|gb|CY016916.1|[115608127]

192: CY016915
Influenza A virus (A/ostrich/Nigeria/1047-25/2006(H5N1)) segment 4, complete sequence
gi|115608125|gb|CY016915.1|[115608125]

193: CY016914
Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 1, complete sequence
gi|115608123|gb|CY016914.1|[115608123]

194: CY016913
Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 2, complete sequence
gi|115608120|gb|CY016913.1|[115608120]

195: CY016912
Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 3, complete sequence

196: CY016911

Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 8, complete sequence

197: CY016910

Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 5, complete sequence

198: CY016909

Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 6, complete sequence

199: CY016908

Influenza A virus (A/chicken/Nigeria/1047-8/2006(H5N1)) segment 7, complete sequence

200: CY016907

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 1, complete sequence

201: CY016906

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 2, complete sequence

202: CY016905

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 3, complete sequence

203: CY016904

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 8, complete sequence

204: CY016903

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 5, complete sequence

205: CY016902

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 6, complete sequence

206: CY016901

Influenza A virus (A/duck/Egypt/2253-3/2006(H5N1)) segment 7, complete sequence

207: CY016900

Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 1, complete sequence

208: CY016899

Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 4, complete sequence

209: CY016826

Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 1, complete sequence

210: CY016825

Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 2, complete sequence

211: CY016824

Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 3, complete sequence
212:  CY016823
Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 8, complete sequence

213:  CY016822
Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 5, complete sequence

214:  CY016821
Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 6, complete sequence

215:  CY016820
Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 7, complete sequence

216:  CY016819
Influenza A virus (A/cygnus olor/Croatia/1/2005(H5N1)) segment 4, complete sequence

217:  CY016802
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 1, complete sequence

218:  CY016801
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 2, complete sequence

219:  CY016800
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 3, complete sequence

220:  CY016799
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 8, complete sequence

221:  CY016798
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 5, complete sequence

222:  CY016797
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 6, complete sequence

223:  CY016796
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 7, complete sequence

224:  CY016795
Influenza A virus (A/mallard/Italy/835/2006(H5N1)) segment 4, complete sequence

225:  CY016794
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 1, complete sequence

226:  CY016793
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 2, complete sequence

227:  CY016792
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 3, complete sequence
228: CY016791
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 8, complete sequence
gi|115608039|gb|CY016791.1|[115608039]

229: CY016790
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 5, complete sequence
gi|115608037|gb|CY016790.1|[115608037]

230: CY016789
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 6, complete sequence
gi|115608035|gb|CY016789.1|[115608035]

231: CY016788
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 7, complete sequence
gi|115608032|gb|CY016788.1|[115608032]

232: CY016787
Influenza A virus (A/chicken/Afghanistan/1207/2006(H5N1)) segment 4, complete sequence
gi|115608030|gb|CY016787.1|[115608030]

233: CY016786
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 1, complete sequence
gi|115608028|gb|CY016786.1|[115608028]

234: CY016785
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 2, complete sequence
gi|115608025|gb|CY016785.1|[115608025]

235: CY016784
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 3, complete sequence
gi|115608023|gb|CY016784.1|[115608023]

236: CY016783
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 8, complete sequence
gi|115608020|gb|CY016783.1|[115608020]

237: CY016782
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 5, complete sequence
gi|115608018|gb|CY016782.1|[115608018]

238: CY016781
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 6, complete sequence
gi|115608016|gb|CY016781.1|[115608016]

239: CY016780
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 7, complete sequence
gi|115608013|gb|CY016780.1|[115608013]

240: CY016779
Influenza A virus (A/cygnus cygnus/Iran/754/2006(H5N1)) segment 4, complete sequence
gi|115608011|gb|CY016779.1|[115608011]

241: CY016307
Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 1, complete sequence
gi|115344810|gb|CY016307.1|[115344810]

242: CY016306
Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 2, complete sequence
gi|115344807|gb|CY016306.1|[115344807]

243: CY016305
Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 3, complete sequence
gi|115344805|gb|CY016305.1|[115344805]
Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 8, complete sequence
gi|115344802|gb|CY016304.1|[115344802]

Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 5, complete sequence
gi|115344800|gb|CY016303.1|[115344800]

Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 6, complete sequence
gi|115344798|gb|CY016302.1|[115344798]

Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 7, complete sequence
gi|115344795|gb|CY016301.1|[115344795]

Influenza A virus (A/chicken/Sudan/1784-10/2006(H5N1)) segment 4, complete sequence
gi|115344793|gb|CY016300.1|[115344793]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 1, complete sequence
gi|115344791|gb|CY016299.1|[115344791]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 2, complete sequence
gi|115344788|gb|CY016298.1|[115344788]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 3, complete sequence
gi|115344786|gb|CY016297.1|[115344786]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 8, complete sequence
gi|115344783|gb|CY016296.1|[115344783]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 5, complete sequence
gi|115344781|gb|CY016295.1|[115344781]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 6, complete sequence
gi|115344779|gb|CY016294.1|[115344779]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 7, complete sequence
gi|115344776|gb|CY016293.1|[115344776]

Influenza A virus (A/chicken/Sudan/1784-7/2006(H5N1)) segment 4, complete sequence
gi|115344774|gb|CY016292.1|[115344774]

Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 1, complete sequence
gi|115344772|gb|CY016291.1|[115344772]

Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 2, complete sequence
gi|115344769|gb|CY016290.1|[115344769]

Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 3, complete sequence
gi|115344767|gb|CY016289.1|[115344767]
260: CY016288
Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 8, complete sequence
gi|115344764|gb|CY016288.1|[115344764]

261: CY016287
Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 5, complete sequence
gi|115344762|gb|CY016287.1|[115344762]

262: CY016286
Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 6, complete sequence
gi|115344760|gb|CY016286.1|[115344760]

263: CY016285
Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 7, complete sequence
gi|115344757|gb|CY016285.1|[115344757]

264: CY016284
Influenza A virus (A/chicken/Nigeria/957-20/2006(H5N1)) segment 4, complete sequence
gi|115344755|gb|CY016284.1|[115344755]

265: CY016283
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 1, complete sequence
gi|115344753|gb|CY016283.1|[115344753]

266: CY016282
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 2, complete sequence
gi|115344750|gb|CY016282.1|[115344750]

267: CY016281
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 3, complete sequence
gi|115344748|gb|CY016281.1|[115344748]

268: CY016280
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 8, complete sequence
gi|115344745|gb|CY016280.1|[115344745]

269: CY016279
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 5, complete sequence
gi|115344743|gb|CY016279.1|[115344743]

270: CY016278
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 6, complete sequence
gi|115344741|gb|CY016278.1|[115344741]

271: CY016277
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 7, complete sequence
gi|115344738|gb|CY016277.1|[115344738]

272: CY016276
Influenza A virus (A/chicken/Nigeria/641/2006(H5N1)) segment 4, complete sequence
gi|115344736|gb|CY016276.1|[115344736]