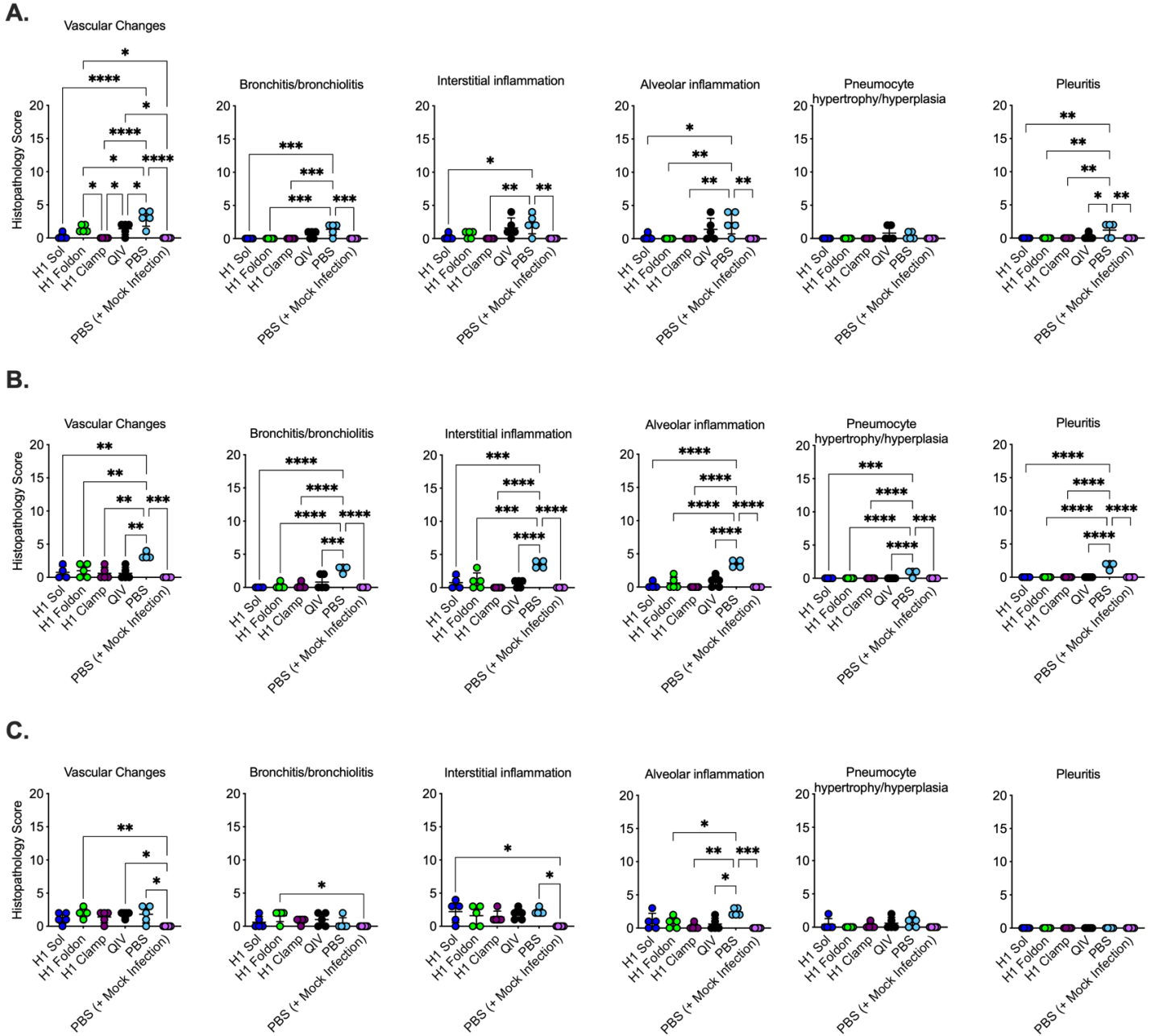
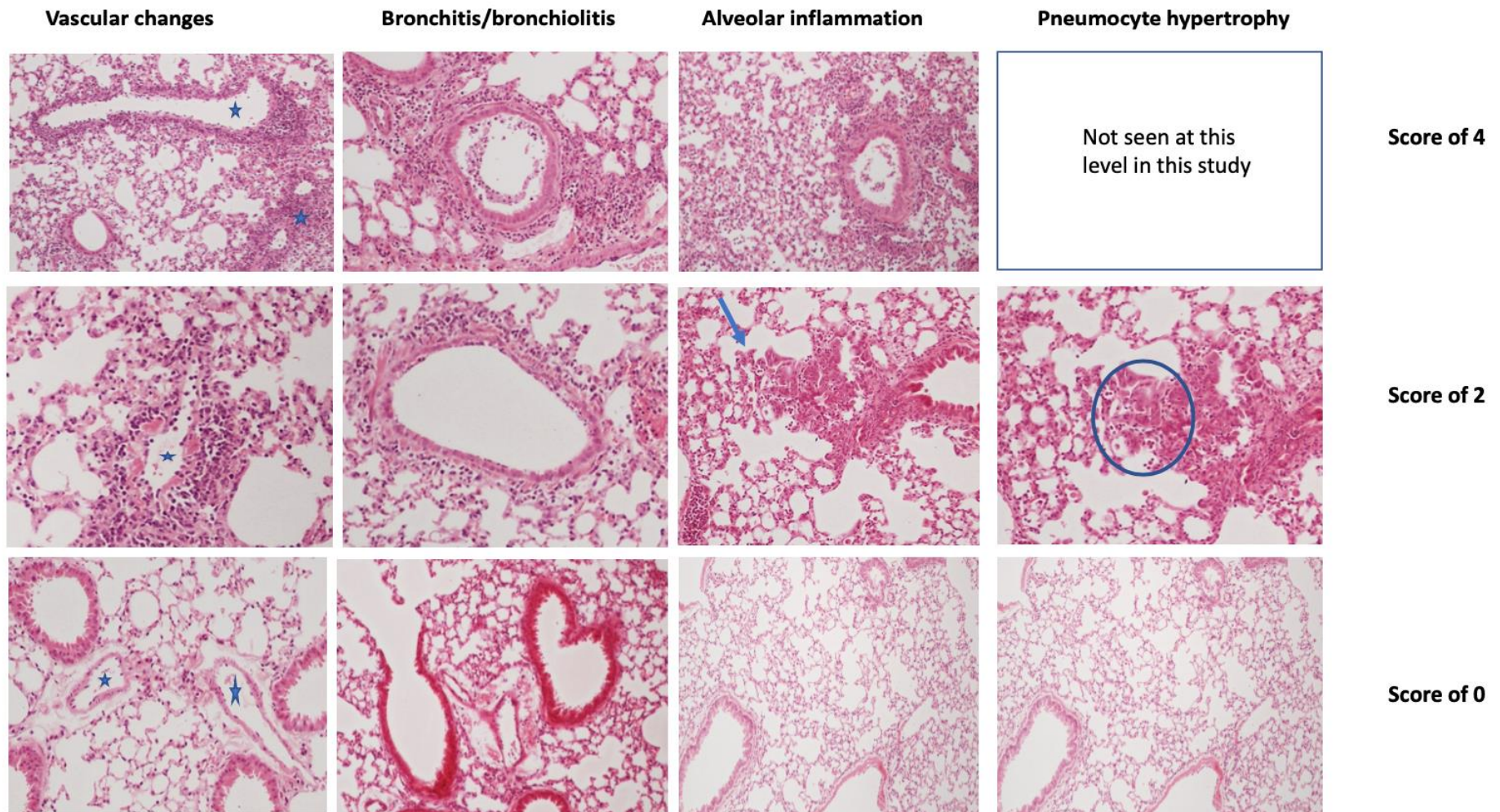


Supplementary figure 1: ELISA curves of mAbs binding to different HA proteins. Recombinant HA proteins from **A.** H3 HAs, **B.** H1 HAs or **C.** Zoonotic HAs were tested for binding by HA-specific monoclonal antibodies via ELISA. The binding sites of each antibody is indicated on the HA structures.





Supplementary figure 3: Representative microphotos of the types of pathological changes assessed and the degree of severity, from within normal limits (score of 0) to mild (score of 2) to severe (score of 4). Scores of 1 (subtle/minimal change) and of 3 (moderate change) not shown. Stars indicate pulmonary vessels. The arrow in the right-centre panel indicates an area of mild alveolitis with focal pneumocyte hypertrophy, show in the enlarged microphoto on the right (circled). Hematoxylin & eosin stained sections taken at 40x or 100x magnification.

Supplementary table 1: Sequences of proteins used in this manuscript.

Igκ signal sequence is in italics, and the Foldon and 6HB domains in bold.

Virus strain – protein name:	Sequence:
A/Switzerland/9715293/2013(H3N2) - H3 Sol	<p>DNA <i>ATGAAGACCATCATCGCTCTGTACATACATCCTTTGTCTGGTGTGTTGCCAGAAAGTCCAGGTAATGATAACTCAACAGCTACTCTTTGTCTGGGTTCATCATGCAGTGCCCAACGGCACCATTGTCAAGACCATCACCAACGATCGGATAGAAGTGACCAACGCCACCGAATTGGTGCAGAAGCTCAATCGGAGAGATCTGCGATAGTCCATCAAATTTTGGACGGAGAAAACCTGCACCTTGATAGATGCTTTGGCTGGCGATCCTCAGTGCAGCGGCTTCCAAAACAAGAAAGTGGGACCTTTTGTGGAGCGCTCTAAGGCCATTTCCAAATGGTATCCATACGATGTTCCAGATTATGCCTCCCTGCGGTCACCTGTGCGTAGTAGCGGAACACTGGAGTTTAAACAACGAGAGTTTCAATTTGGGCTGGAGTGACCCAGAACGGCACCAGTTCTTCATGCAGACGAGGGTCAAAATCTTCAATTTTTCTTAGGCTCAACTGCGCTCATCTCAA TAGTAAATACCCAGCTCTTAACGTGACTATGCCTAACAAATGAGCAATTCGACAAAGTTGTACATCTGGGGTGTGCACCATCTGTACAGATAAAAGATCAGATCTTTCTTACGCCAGTCTCCGGCGTA TAACAGTGTCAACTAAGCGCAGTCAGCAGGCTGTGATCCCTAACATCGGATACAGACCTAGGATACGCGACATCCCAAGCCGATCTCCATCTACTGGACTATTGTAACCTGGCGACATCTTCTGAT CAACAGCACCGGCAACCTCATCGCTCCTCGCGGATTTTAAAGTCCGCTCCGGCAAAAGTAGCATTATGAGGTCGCGACACCTATCGGCAAGTGCAAGTCAGAGTGATTACACAAAACGGAAAGCAT TCCCAATGACAAAACCATTCAGAACGTGAACCGCATCACCTATGGCGCTGTCCAAGATACGTGAAGCAGTCTACCTGAAACTGGCCACAGGTATGCGGAACGTGCCGAGAGGCAAAACCCGAGGCAT CTTCCGGGCAATCGCAGGCTTCATCGAGAACGGGTTGGGAAGGCATGGTTCGATGGCTGGTACGGATTAGACATCAGAACAGTGAAGGGAGAGGCCAAGCCGCTGATTGAAAGTCCACCCAGGCAGCCA TCGACCAGATTAACGGCAAGCTGAACAGGTTGATAGGGAACCAATGAAAAGTTTTCATCAAATTTGAGAAGGAGTTTTCTGAGGTTGAGGGCAGGATTCAGGATCTGGAAGGATGTTGGAAGATACT AAGATCGATCTGTGGAGCTATAACGCCGAGCTGTGGTGAACCTGGAAATCAGCACAAATGACCTCACAGATTCTGAGATGAACAACTGTCGAAAAGACTAAGAAAGCAACTAGGGAAGATGC AGAAGATATGGGCAATGGCTGTTCAAATCTATCATAAGTGTGACAATGCTTGTATCGGTTCCATCAGGAACGGCACTTATGACCATGACGCTTACAGGGATGAAGCCCTGAATAACCGGTTTCAGATC AAGGGAGTCGAACTGAAGAGCGGATACAAAAGTGGCTGTGGTACTTTTCTCTAA</i></p> <p>Amino acid <i>MKTHIALSYILCLVFAQKLPNGDNSTATLCLGHHA VPNGTIVK TITNDRIEVTNATELVQNSSIGEICDSPHQILDGENCTLIDALLGDPQCDGFQNKKWDLFVERSKA YSNCPYDVPDYASLRSLV ASSGTLFENF ESFNWAGVTQNGTSSSRRRGSNSFFSRLNWLTHLNSKYPALNVMPNNEQDFKLYIWGVVHPVTDKQIFLYAQSSGRITVSTKRSQQA VIPNIGYRPRIRDIPSRSIYWTIVKPGDILLINSTGNLIAPRGYFKIRS GKSSIMRSDAPIGKCKSECTTPNGSIPNDKPFQNVNRITYGACPRYVKQSTLKLATGMRNVPERQTRGIFGAIAGFIENGWEGMVDGWYGFRRHQNSEGRGQAADLKSTQAAIDQINGKLNRLIGKTNEKHFHQIEKE FSEVEGRIQDLEKYVEDTKIDLWSYNAELLVALENQHTIDLTDSEMNKLFKFKQLRENAEDMNGCFKFIYHKCDNACIGSIRNGTYDHDVYRDEALNNRFQIKGVELKSGYKDW*</i></p>
A/Switzerland/9715293/2013(H3N2) - H3 Foldon	<p>DNA <i>ATGAAGACCATCATCGCTCTGTACATACATCCTTTGTCTGGTGTGTTGCCAGAAAGTCCAGGTAATGATAACTCAACAGCTACTCTTTGTCTGGGTTCATCATGCAGTGCCCAACGGCACCATTGTCAAGACCATCACCAACGATCGGATAGAAGTGACCAACGCCACCGAATTGGTGCAGAAGCTCAATCGGAGAGATCTGCGATAGTCCATCAAATTTTGGACGGAGAAAACCTGCACCTTGATAGATGCTTTGGCT GGGCGATCCTCAGTGCAGCGGCTTCCAAAACAAGAAAGTGGGACCTTTTGTGGAGCGCTCTAAGGCCATTTCCAAATGGTATCCATACGATGTTCCAGATTATGCCTCCCTGCGGTCACCTGTGCGTAGTA GCGGAAACTGGAGTTTAAACAACGAGAGTTTCAATTTGGGCTGGAGTGACCCAGAACGGCACCAGTTCTTCATGCAGACGAGGGTCAAAATCTTCAATTTTTCTTAGGCTCAACTGGCTACTCATCTCAA TAGTAAATACCCAGCTCTTAACGTGACTATGCCTAACAAATGAGCAATTCGACAAAGTTGATACATCTGGGGTGTGCACCATCTGTACAGATAAAAGATCAGATCTTTCTTACGCCAGTCTCCGGCGTA TAACAGTGTCAACTAAGCGCAGTCAGCAGGCTGTGATCCCTAACATCGGATACAGACCTAGGATACGCGACATCCCAAGCCGATCTCCATCTACTGGACTATTGTAACAACTGGCGACATCTTCTGAT CAACAGCACCGGCAACCTCATCGCTCCTCGCGGATTTTAAAGATCCGCTCCGGCAAAAGTAGCATTATGAGGTTCCGACACCTATCGGCAAGTGAAGTCAGAGTGATTACACCAAACGGAAAGCAT TCCCAATGACAAAACCATTCAGAACGTGAACCGCATCACCTATGGCGCTGTCCAAGATACGTGAAGCAGTCTACCTGAAACTGGCCACAGGTATGCGGAACGTGCCGAGAGGCAAAACCCGAGGCAT CTTCCGGGCAATCGCAGGCTTCATCGAGAACGGGTTGGGAAGGCATGGTTCGATGGCTGGTACGGATTAGACATCAGAACAGTGAAGGGAGAGGCCAAGCCGCTGATTGAAAGTCCACCCAGGCAGCCA TCGACCAGATTAACGGCAAGCTGAACAGGTTGATAGGGAACCAATGAAAAGTTTTCATCAAATTTGAGAAGGAGTTCAGGTTGAGGGCAGGATTCAGGATCTGGAAGGATGTTGGAAGATACT AAGATCGATCTGTGGAGCTATAACGCCGAGCTGTGGTGAACCTGGAGAATCAGCACAAATGACCTCACAGATTCTGAGATGAACAACTGTTGAAAAGACTAAGAAAGCAACTAGGGAAGATGC AGAAGATATGGGCAATGGCTGTTCAAATCTATCATAAGTGTGACAATGCTTGTATCGGTTCCATCAGGAACGGCACTTATGACCATGACGCTTACAGGGATGAAGCCCTGAATAACCGGTTTCAGATC AAGGGAGTCGAACTGAAGAGCGGATACAAAAGTGGCTGTGGTACTTTTCTCTAA</i></p> <p>Amino acid <i>MKTHIALSYILCLVFAQKLPNGDNSTATLCLGHHA VPNGTIVK TITNDRIEVTNATELVQNSSIGEICDSPHQILDGENCTLIDALLGDPQCDGFQNKKWDLFVERSKA YSNCPYDVPDYASLRSLV ASSGTLFENF ESFNWAGVTQNGTSSSRRRGSNSFFSRLNWLTHLNSKYPALNVMPNNEQDFKLYIWGVVHPVTDKQIFLYAQSSGRITVSTKRSQQA VIPNIGYRPRIRDIPSRSIYWTIVKPGDILLINSTGNLIAPRGYFKIRS GKSSIMRSDAPIGKCKSECTTPNGSIPNDKPFQNVNRITYGACPRYVKQSTLKLATGMRNVPERQTRGIFGAIAGFIENGWEGMVDGWYGFRRHQNSEGRGQAADLKSTQAAIDQINGKLNRLIGKTNEKHFHQIEKE FSEVEGRIQDLEKYVEDTKIDLWSYNAELLVALENQHTIDLTDSEMNKLFKFKQLRENAEDMNGCFKFIYHKCDNACIGSIRNGTYDHDVYRDEALNNRFQIKGVELKSGYKDWGSAIGGYIPEAPRDGQA YVRKDGEWVLLSTFL*</i></p>
A/Switzerland/9715293/2013(H3N2) - H3 6HB	<p>DNA <i>ATGAAGACCATCATCGCTCTGTACATACATCCTTTGTCTGGTGTGTTGCCAGAAAGTCCAGGTAATGATAACTCAACAGCTACTCTTTGTCTGGGTTCATCATGCAGTGCCCAACGGCACCATTGTCAAGACCATCACCAACGATCGGATAGAAGTGACCAACGCCACCGAATTGGTGCAGAAGCTCAATCGGAGAGATCTGCGATAGTCCATCAAATTTTGGACGGAGAAAACCTGCACCTTGATAGATGCTTTGGCT GGGCGATCCTCAGTGCAGCGGCTTCCAAAACAAGAAAGTGGGACCTTTTGTGGAGCGCTCTAAGGCCATTTCCAAATGGTATCCATACGATGTTCCAGATTATGCCTCCCTGCGGTCACCTGTGCGTAGTA GCGGAAACTGGAGTTTAAACAACGAGAGTTTCAATTTGGGCTGGAGTGACCCAGAACGGCACCAGTTCTTCATGCAGACGAGGGTCAAAATCTTCAATTTTTCTTAGGCTCAACTGGCTACTCATCTCAA TAGTAAATACCCAGCTCTTAACGTGACTATGCCTAACAAATGAGCAATTCGACAAAGTTGATACATCTGGGGTGTGCACCATCTGTACAGATAAAAGATCAGATCTTTCTTACGCCAGTCTCCGGCGTA TAACAGTGTCAACTAAGCGCAGTCAGCAGGCTGTGATCCCTAACATCGGATACAGACCTAGGATACGCGACATCCCAAGCCGATCTCCATCTACTGGACTATTGTAACAACTGGCGACATCTTCTGAT CAACAGCACCGGCAACCTCATCGCTCCTCGCGGATTTTAAAGATCCGCTCCGGCAAAAGTAGCATTATGAGGTTCCGACACCTATCGGCAAGTGAAGTCAGAGTGATTACACCAAACGGAAAGCAT TCCCAATGACAAAACCATTCAGAACGTGAACCGCATCACCTATGGCGCTGTCCAAGATACGTGAAGCAGTCTACCTGAAACTGGCCACAGGTATGCGGAACGTGCCGAGAGGCAAAACCCGAGGCAT CTTCCGGGCAATCGCAGGCTTCATCGAGAACGGGTTGGGAAGGCATGGTTCGATGGCTGGTACGGATTAGACATCAGAACAGTGAAGGGAGAGGCCAAGCCGCTGATTGAAAGTCCACCCAGGCAGCCA TCGACCAGATTAACGGCAAGCTGAACAGGTTGATAGGGAACCAATGAAAAGTTTTCATCAAATTTGAGAAGGAGTTCAGGTTGAGGGCAGGATTCAGGATCTGGAAGGATGTTGGAAGATACT AAGATCGATCTGTGGAGCTATAACGCCGAGCTGTGGTGAACCTGGAGAATCAGCACAAATGACCTCACAGATTCTGAGATGAACAACTGTTGAAAAGACTAAGAAAGCAACTAGGGAAGATGC AGAAGATATGGGCAATGGCTGTTCAAATCTATCATAAGTGTGACAATGCTTGTATCGGTTCCATCAGGAACGGCACTTATGACCATGACGCTTACAGGGATGAAGCCCTGAATAACCGGTTTCAGATC AAGGGAGTCGAACTGAAGAGCGGATACAAAAGTGGCTGTGGTACTTTTCTCTAA</i></p> <p>Amino acid <i>CAAGAAAAGAAATGAACAAGAAATTATTGGAATAG</i></p>

	Amino acid	MKTHIALSYILCLVFAQKLPNGDNDSTATLCLGHHA VPNGTIVKTIITNDRIEVNTA TELVYQSSSIEGICDSPHOILDGENTLIDLADLGGPQDCGFQNKKWDLFVFRS KAS YNCYYPYDVPDYASLRSLVASSGTLEFNN ESFNWAGVTQNGTSSSSRRGNSNSSFFSRLNLWHLNLSKYPALNVTMPNNEQDFKLYWGVVHHPVTDKQDQIFLYAQSSSGRITVSKRQQA VIPNIGYRPRIRDIPSRSISYWTIVKPGDKILLNLTGNL IAPRGYFKIRS GKSSMIRSDAIPGKCKSECTPNPNSIPNDKPFQNVNRITYGACPRYVKQSTLKLATGMRVNPERQTRGIFGAIAGFTIENGWEGMVDGWYGFHRQNSEGRRQAADLKSTQAADQINGKLNLTIGKTKNEKFHQIEKE FSEVEGRIQDLEKYVEDTKIDLWSYNAELLVALENQHTIDLTDSEMLNKFEEKQLRENAEDMGNCGCFKHYHKCDNA CIGSIRNGTYDHDVYRDEALNRRFQIKGVELKSKSYKDGSGIVQQQNLLRAIEAQ QHLLQLTVWGIKQLQARILAGSGGHTTWMEWDREINTYLSHLSLESQNQKEQELLE*
A/California/04/2009(H1N1pdm) - H1 Sol	DNA	ATGAAAGTAAAAC TACTGGTCTGTTATGCACATTCGCAACAGCTAACGCCGACACACTTTGTATCGGTTACCATGCCAATAATCCACTGACACCGTGCACACAGTGTGGAAAAGAACGTGCACAGTCA CACACTCAGTCAATCTGCTGGAAAGACAAGCACAACGGCAAGCTGTGCAAGCTGGCGGGAGTGGCACCTTTGCATCTGGGAAAAGTGAATATCGCTGGCTGGATCTGGGCAATCTCGAGTGCGAATCCC TGAGCACCGCCTCTAGCTGGTCTTACATTGTCAAACCTCCTCAAGTGACAACGGGACTTGTACCTCCGGGGACTTCATCGATTACGAAGAATTGCCGTGAGCAGCTGAGCAGCTGAGTTCATTTGAACG CTTTGAGATTTCCCTAAGACCTCCTCCTGGCCCAATCACGACTCCAACAAGGGAGTCACTGCCGCATGTCCCATGTGGAGCAAAATCTTTTACAAAAACCTCATCTGGCTGTCAAGAAAGGAAAC TCATATCCAAAGCTCAGTAAGTCTATATTAACGACAAAGGAAAGGAGGTTCTCGTTCTGTGGGCCATTCCACTCCTCCACACTCCGCAGATCAGCAGTCCCTCTATCAAAACGCCGATACCTATGTGTT TGTCGGGTCATCCCGGTATCCAAAAAATTTAAGCCTGAAAATCGCCATTAGGCCAAAAGGTGCGAGATCAGGAAGGACGCATGAATACTATTGGACTCTTGTGGAGCCTGGCGATAAAGATCACATTCA GGCAACTGGCAACCTGGTGGTTCACAGGTACGCTTTTGCATGGAGCGTAACCGTGAAGTGGTATCATTATCTCTGATACCCTGTGCATGATTGTAACTACTCTGCAAAACCCCTAAGGGAGCTATT AACACTCACTCCCTTTCAAAATATTCATCAATTAATTGGCAATGCCTAAGTATGTTAAATCCCAAGCTCCGCTCGCCACCAGCTGCGCAACATTCATCCATCACAGTCTCGTGGATTGTT GGGGCTATAGCTGGCTTTATAGAGGGCGGATGGACAGGTATGGTTGACGGGTGGTACGGCTACCCACCACGAACGAGGAAAGCGGGTATGCCGCCACTGAAATCAACAGAAACCGTATGCGCCGACTG CGAGATAACCAACAAAGTGAACCTCAGTATAGAAAAGATGAAACACAGATTCACAGCAGTGGTAAAGAGTTTAAACCATCTCGAGAAAAGGATGAGAATCTGAACAAAAAGGTCGACGATGGATTC TGGATTTGGACTTACAATGCAAGCTGCTGGTTCTTCTCGAGAATGAGCGCACTTGAATACAGCTACTAACCTGAAAAACCTCTACGAGAAGGTCCGTTACAGCTGAAGAATAATGCAAAA GATCGGGAACGGGTGTTTTGAATTTATCACAATGCGACAACACCTGCATGGAGTCTGTGAAGAATGGGACTTATGACTACCCTAAGTATTCCGAGGAAGCTAAGCTCAACCGAGAGGATCGACGG GGTCAAGCTTGAAAGCACCCGG
	Amino acid	MKVLLVLLCTFATANADTL CIGYHANNSTDTVDTVLEKNVTVTHSVNLLDKHNGKLC KLRGVAPLHLGKCNIA GWILGNPECESLSTASSWSYIVETPSSDNGTCYPGDFIDYEELREQLSSVSSFERFEIFPKT SSWPNHDSNKGVTAACPHAGAKSFYKNLIWL VKKGNSYPKLSKSYINDKGEVLVLWGIHHPSTSADQQLYQNA DTYVFGSSRYSKFKPEIAIRPKVRDQEGRMNY YWTLVEPGDKITFEATGNLVVPRY AFAMERNAGSGHIIDTPVHDCNTTCTQTPKGAIN TSLFPQNIHPITIGKPKYVKSTKLRLATGLRNPSIQSRGLFGA IAGFIEGGWTGMVDGWYGYHHQNEQSGSYAADLKSTQNAIDEITNKVNSVIEKMNTQFT AVGKEFNHLEKRIENLNKVVDDGFLDIW TYNAELLVLENERLTDYHDSNVKNLYE KVRSQLKNAKEIGNCGFEFYHKCDNTCMESVKNGT YDYPKYSEEAKLNREEIDGVKLESTR*
A/California/04/2009(H1N1pdm) - H1 Foldon (Igc signal sequence)	DNA	ATGGGATGGAGCTGTATCATCCTCTTCTGGTAGCAACAGCTACAGGTGTCCACTCCGAGGACACACTTTGTATCGGTTACCATGCCAATAATCCACTGACACCGTGCACACAGTGTGGAAAAGAACGTCAC CAGTCACACTCAGTCAATCTGCTGGAAGACAAGCACAACGGCAAGCTGTGCAAGCTGCGCGGAGTGGCACCTTTGCATCTGGGAAAAGTGAATATCGCTGGCTGGATCTGGGCAATCTGAGTGCG AATCCCTGAGCACCGCCTCTAGCTGGTCTTACATTGTCAAACCTCCTCAAGTGACAACGGGACTTGTACCTCCGGGACTTCATCGATTACGAAGAATTGCCGTGAGCAGCTGAGCAGCTGAGTTCATT TGAAACGCTTTGAGATTTTCCCTAAGACCTCCTCCTGGCCCAATCAGCACTCAACAAAGGGAGTCACTGCCGCATGTCCCATGTGGAGCAAAATCTTTTACAAAAACCTCATCTGGCTTGTCA CAAAAACCTCATCTGGCTTGTCAAGAAAAGGAAACTCATAATCAAAAGCTCATAATTAACGACAAAGGAAAGGAGTTCATTAACGACAAAGGAAAGGAGTTCCTGTTCTGTGGGGCAATCACCATCCTCCACATCCGCAGATCAG CAGTCCCTCTATCAAAACGCCGATACCTATGTGTTTGTCCGGTCAATCCCGGATTTCAAAAAAATTTAAGCCTGAAATCGCCATTAGGCCAAAGGTGCGAGATCAGGAAGGACGCATGAATTAATATTGGA CTCTGTGGAGCCTGGCGATAAGATCACAATTCGAGGCAACTGGCAACTGGTGGTTCAGGATACGCTTTTGCCATGGAGCGTAAACGCTGGAAGTGGTATCATTATCTGATACCCCTGTGCATGATTGT AACACTACTGTCAAAGGTCGACGATGGATTCTGGATATTTGGACTTCAACATGACAGTCTGCTGTTCTCTCGAGAATGAGCGCACTTGGGATTATACAGCTCTAACGCTGAAAAACCTACGAGAA CAACATCCATCCATACAGTCTGTGGATTGTTGGGGCTATAGCTGGCTTTATAGAGGGCGGATGGACAGGTATGGTGTACCGGGTGTACGGCTACCACCACGAAACGAACAGGGAAGCGGGTATGC CGCCGACTTGAATCAACAGACGCTATCGACAGATAACCAACAAAGTGAACCTCAGTCATAGAAAAGATGAACACACAGTTCACAGCAGTGGTAAAGGATTTAACCTATCCAGAAAAGGATTTG AGAACTGAACAAAAAGGTCGACGATGGATTCTGGATATTTGGACTTCAACATGACAGTCTGCTGTTCTCTCGAGAATGAGCGCACTTGGGATTATACAGCTCTAACGCTGAAAAACCTACGAGAA GGTCCGTTACAGCTGAAGAAATATGCAAAAGAGATCGGGAACGGGTGTTTTGAATTTTATCACAATGCGACAACACCTGCATGGAGTCTGTGAAGAATGGGACTTATGACTACCCTAAGTATTCCGA GGAAGCTAAGCTCAACCGAGAGGATCGACGGGTCAAGCTTGAAGCACCCGGGGTTCAGCAAT TGGTGGCTACATTCAGAGGCCCCACAGATGGACAAGCATACGTGAGAAAAGGATGGC GAATGGGTACTCTTGAGCACTTTTCTGTAA
	Amino acid	MGWSCILFLVATATGVHSED TL CIGYHANNSTDTVDTVLEKNVTVTHSVNLLDKHNGKLC KLRGVAPLHLGKCNIA GWILGNPECESLSTASSWSYIVETPSSDNGTCYPGDFIDYEELREQLSSVSSFERFEIFPK TSSWPNHDSNKGVTAACPHAGAKSFYKNLIWL VKKGNSYPKLSKSYINDKGEVLVLWGIHHPSTSADQQLYQNA DTYVFGSSRYSKFKPEIAIRPKVRDQEGRMNY YWTLVEPGDKITFEATGNLVVPRY AFAMERNAGSGHIIDTPVHDCNTTCTQTPKGAIN TSLFPQNIHPITIGKPKYVKSTKLRLATGLRNPSIQSRGLFGA IAGFIEGGWTGMVDGWYGYHHQNEQSGSYAADLKSTQNAIDEITNKVNSVIEKMNTQFT AVGKEFNHLEKRIENLNKVVDDGFLDIW TYNAELLVLENERLTDYHDSNVKNLYE KVRSQLKNAKEIGNCGFEFYHKCDNTCMESVKNGT YDYPKYSEEAKLNREEIDGVKLESTRGGSAIGGYIPEAPRD GQAYVRKDGEWVLLSTFL*
A/California/04/2009(H1N1pdm) - H1 6HB (Igc signal sequence)	DNA	ATGGGATGGAGCTGTATCATCCTCTTCTGGTAGCAACAGCTACAGGTGTCCACTCCGAGGACACACTTTGTATCGGTTACCATGCCAATAATCCACTGACACCGTGCACACAGTGTGGAAAAGAACGTCAC CAGTCACACTCAGTCAATCTGCTGGAAGACAAGCACAACGGCAAGCTGTGCAAGCTGCGCGGAGTGGCACCTTTGCATCTGGGAAAAGTGAATATCGCTGGCTGGATCTGGGCAATCTGAGTGCG AATCCCTGAGCACCGCCTCTAGCTGGTCTTACATTGTCAAACCTCCTCAAGTGACAACGGGACTTGTACCTCCGGGACTTCATCGATTACGAAGAATTGCCGTGAGCAGCTGAGCAGCTGAGTTCATT TGAAACGCTTTGAGATTTTCCCTAAGACCTCCTCCTGGCCCAATCAGCACTCAACAAAGGGAGTCACTGCCGCATGTCCCATGTGGAGCAAAATCTTTTACAAAAACCTCATCTGGCTTGTCAAGAA GAAAACCTATATCCAAAGCTCAGTAAGTCTTATATTAACGACAAAGGAAAGGAGTTCCTGTTCTGTGGGGCAATCACCATCTCCACATCCCGAGATCAGCAGTCCCTCTATCAAAAACCGCCTACCT ATGTGTTTGTCCGGTCAATCCCGGATTTCAAAAAAATTTAAGCCTGAAATCGCCATTAGGCCAAAGGTGCGAGATCAGGAAGGACGCATGAATTAATTAAGTACTATTGGACTCTTGTGGAGCCTGGCGATAAGATC ATTCGAGGCAACTGGCAACCTGGTGGTTCACAGGTACGCTTTTGCCATGGAGCGTAAACGCTGGAAGTGGTATCATTATCTGTGATACCCCTGTGCATGATTGTAACACTACCTGTCAAAACCCCTAAGGGA GCTATTAACACTCCTCCCTTTCAAAAATATTCACAAATTAATTGGCAATGTCCTAAGTATGTTAAATCCCAAGTCCGCTCGCCACCGGACTCGCAACACTCCATCCATACAGTCTGCTGG ATTGTTTGGGGCTATAGCTGGCTTATAGAGGGCGGATGGACAGGTATGGTGTACCGGTGTACGGCTACCACCACGAAACGAACAGGGAAGCGGGTATGCCCGCAGCTTGAATCAACAGAAACG CTATCGACGAGATAACCAACAAAGTGAACCTCAGTCATAGAAAAGATGAACACACAGTTCACAGCAGTGGTAAAGGATTTAACCTCTCGAGAAAAGGATTGAGAATCTGAACAAAAAGGTCGACGAT GGATTCTGGATATTTGGACTTACAATGCAGAGCTGCTGGTTCTTCTCGAGAATGAGCGCACTGGAATATACAGCTTAAACGCTGAAAAACCTCTACGAGAAGGTCCGTTACAGCTGAAGAAATAAG CAAAAGAGATCGGGAACGGGTGTTTTGAATTTTATCACAATGCGACAACACCTGCATGGAGTCTGTGAAGAATGGGACTTATGACTACCCTAAGTATTCCGAGGAAGCTAAGCTCAACCGAGAGGAGA TCGACGGGTCAAGCTTGAAGCACCCGGGGCTGGT GAATCTGTGGAAGTCAACGACGATCGAGTCCAGTCCAGTCAAGTGAAGTCAAGGATCCAGAACCA CAGCTGAGGCCAGAAATCTCGTGGCGGATCTGGCGGCATACCCTGGATGGAATGGGACAGAGAGATCAACAACTACACCAGCCTGATCCACAGCTGATTGAGGAATCCAGAAACCA CAGAGAGAAGATGAGCAAGAGCTGCTCGAGTAA
	Amino acid	MGWSCILFLVATATGVHSED TL CIGYHANNSTDTVDTVLEKNVTVTHSVNLLDKHNGKLC KLRGVAPLHLGKCNIA GWILGNPECESLSTASSWSYIVETPSSDNGTCYPGDFIDYEELREQLSSVSSFERFEIFPK TSSWPNHDSNKGVTAACPHAGAKSFYKNLIWL VKKGNSYPKLSKSYINDKGEVLVLWGIHHPSTSADQQLYQNA DTYVFGSSRYSKFKPEIAIRPKVRDQEGRMNY YWTLVEPGDKITFEATGNLVVPRY AFAMERNAGSGHIIDTPVHDCNTTCTQTPKGAIN TSLFPQNIHPITIGKPKYVKSTKLRLATGLRNPSIQSRGLFGA IAGFIEGGWTGMVDGWYGYHHQNEQSGSYAADLKSTQNAIDEITNKVNSVIEKMNTQFT

		AVGKEFNHLEKRIENLNKKVDDGFLDIWYNAELLVLENERLTDYHDSNVKNLYEVRSQLKNNAKEIGNGCFEFYHKDCDNTCMESVKNGTDYDPKYSEEAKLNREEIDGVKLESTRGGSGIVQQNNLLR AIEAQHLLQLTVWGKQLQARILAGSGGTTWMEWDREINNYTSLIHSLEESQNOQEKNEQELLE*
A/Vietnam/1202/2004(H5N1) - H5 Sol	DNA	ATGGAACGGATCGTGTCTGCCCATCGTGTCCCTCGTGAAGTCCGACAGATCGATCGATCCACCGCAACAACCTCCACCGAACAGGTGGACACCATCATGGAAAAAGACGTGACCGTGACCCACGCGCCAGGACATTCGAAAAAGACCCACAACGGCAAGCTGTGCGACTGGACGCGCTGAAAGCCCTGTATCCTGAGAGACTGTTCTGTGGCCGGCTGGCTGCTGGGCAACCCATATGTGGCAGGATTCACAACTGCCCGAGTGGTCTACATCGTGGAAAAGGCCAACCCCTGTGAACGACTGTGTACCCCGGACTTCAACGACTACGAGGAATGAAACATCTGTCTGCCGATCAACCATTCGAGAAGATCCAGATTATCCCAAGTCTCTGGTCTCCACGAGGCTTCTCTGGGGTGTCTCCGATGTCCATAACAGGGCAAGTCCAGCTTCTCCGGAACGTCGTGTGGTGATCAAGAAGAACTCCACCTACCCACCATCAAGCGGTCTACAAACAACCAACCAAGGAAGATCTGCTGGTGTGTGGGGCATCCACCACCTAATGATGCCGCGAGCAGACCAAGCTGTACCAAGAACCCACCACTACATCTCCGTGGCACCTCCACCTGAACCAAGCGGCTGGTGCCTAGAATCGCCACCCGCTCAAAGTGAACGGCCAGTCCGCGAGAATGAAATTTTTCTGGACCATCTCGGGCCAACGACGCCATCAACTTCGAGTCCAACGGCAACTTATCGCCCCGAGTACGCTACAAGATCGTGAAGAAGGGCGACTCTACCATCATGAAGTCTGAGCTGGAATACGGCAACTGCAACGCCAAGTCCAGACCCCATGGGGCCATCAATTCCTCATGCCCTTCCACAACATCCACCCCTGACCATCGGCGAGTGCCCAAATACGTGAAGTCTAACAGACTGGTGTGGCACCGGCTCGGAACTCTCCACGCGGAGCGGAGAAAGAAAGAAAGCGGGCCGTGTTGGCGCTATCGCCGGCTTTATTGAGGGCGGCTGGCAGGGCATGGTGGACGGTGGTACGGCTACCATCACTCAACGAGCAGGGGCTCTGGCTACGCGCCGACAAAAGATCCACCAAAAAGCCATCGACGGCGTACCAACAAGTGAAGTCCATCATGACAAGATGAACACCCAGTTCGAGGCCGTGGGCAGAGAGTTCACCAACCTGGAACGGCGGATCGAGAACCTGAAACAAGAAATGGAGATGGCTTCTGGACGTGTGGACCTACAACGCGGAGTCTGTGTGTGTGAAGAAACAGGCGGACCCCTGGACTTCCACACTCAACCTGTACGCAAAAGTGGCGGCTGAGCAAAAGTGGGCAACGGCTGCTTCCAGTTCTACCAAAAGTGGCACAACGAGTCAAGTGAAGTCCAGTACGCAAAAGTGGGCGCAGCTGCGGGAAGAGATCAGCGGAGTGAAGCTGGAATCCATCCGCTAA
	Amino acid	MERIVLLFAIVSLVKSQDQICGYHANNSTEQVDTIMEKNVTVTHAQDILEKTHNGKLCSDLGKPLILRDCSVAGWLLGNPMCDEFINVPEWSYIVEKANPVDNLCYPGDFNDYEELKHLISRINHFQIHPKSS WSSHEASLVSSAPYQKSSFFRNVVWLIIKKNSTYPTIKRSYNNTNQEDLLVWGIHPNDAAEQTKLYQNPTTYISVGTSTLNQLRVPRIATRSKVNQSGRMEFFWTILRPNDAINFESNGNFIPEYAYKIVK KGDSTIMKSELEYGNCAKQTPMGAISMPFNIHPLTIGCEPKYVKNRNLVLAATGLRNSPQRERRRRKRLFGAIAFGIEGGWQGMVDGWYGYHHSNEQGSYAADKESTQKAIDGVTNKNVSIIDKMNTQ FEAVGREFNLERRIENLNKKMEDGFLDVWYNAELLVLMENERTLDFHDSNVKNLYDKVRLQLRDNKELGNGCFEYHCKDNECMESVRNGTYDYPOYSEEARKKREISGVKLESIG*
A/Vietnam/1202/2004(H5N1) - H5 6HB	DNA	ATGGAACGGATCGTGTCTGTGTCGCCATCGTGTCCCTCGTGAAGTCCGACAGATCGATCGGCTACCACGCCACAACCTCCACCGAACAGGTGGACACCATCATGGAAAAAGACGTGACCGTGACCCACGCGCCAGGACATTCGAAAAAGACCCACAACGGCAAGCTGTGCGACTGGACGCGCTGAAAGCCCTGTATCCTGAGAGACTGTTCTGTGGCCGGCTGGCTGCTGGGCAACCCATATGTGGCAGGATTCATCAACGTGCCCGAGTGGTCTACATCGTGGAAAAGGCCAACCCGTGAAGCAGCTGTGCTACCCCGGCGACTTCAACGACTACGAGGAATGAAACATCTGTCTGCCGGATCAACCAATTCGAGAAGATCCAGATTATCCCAAGTCTCTGGTCTCCACGAGGCTTCTCTGGCGGTGTCTCCGATGTCCATAACAGGGCAAGTCCAGCTTCTCCGGAACGTCGTGTGGTGATCAAGAAGAACTCCACCTACCCACCATCAAGCGGCTCAACAACAACCAACCAAGGAAGATCTGTGGTGTGGGGCATCCACCCATAATGATGCCCGGAGCAGCAAGCTGTACCAAGCTTCCAGCAACCCACCTACATCTCCGTGGCACCTCCACCTGAACCAAGCGGCTGGTGCCTAGAATCGCCACCCGCTCAAAGTGAACGGCCAGTCCGCGAGAATGAAATTTTTCTGGACCATCTCGGGCCAACGACGCCATCAACTTCGAGTCCAACGGCAACTTATCGCCCCGAGTACGCTACAAGATCGTGAAGAAGGGCGACTCTACCATCATGAAGTCTGAGCTGGAATACGGCAACTGCAACGCCAAGTCCAGCAACCCCATGGGGCCATCAATTCCTCATGCCCTTCCACAACATCCACCCCTGACCATCGGCGAGTGGCCAAATACGTGAAGTCAACAGACTGGTGTGCCACCGGCTCGGAACTTCCCCAGCGCAGCGGAGAAAGAAAGCGGGGCTGTTGGCGCTATCGCCGGCTTTATTGAGGGCGGCTGGCAGGGCATGGTGGACGGTGGTACGGCTACCATCACTCAACGAGCAGGGCTCTGGCTACGCGCCGACAAAAGATCCACCAAAAAGCCATCGACGGCGTGACCAACAAGTGAAGTCCATCATGACAAGATGAACACCCAGTTCGAGGCCGTGGGCAGAGAGTTCACCAACCTGGAACGGCGGATCGAGAACCTGAAACAAGAAATGGAAGTGGCTTCTGGACGTGTGGACTCAACCGCGAGCTGTGTGTGTGTGAAGAAACAGCGGACCTGGAAGTCCAGCTTCCAGCTCAACGAGTGAAGAACCTGTACGCAAAAAGTGGCGCTGCAAGTGGGACAAAGTGGGCAACGGCTGCTTCCAGTTCTACCAAAAGTGGCACAACGAGTGAAGTCCGTCGCGGAACGGCACCTACGACTACCCCGGACTCTGAGGAACCCCGGCTGAAGCGGGAAGATCAGCGGAGTGAAGCTGGAATCCATCGCCGGTGGCTGTGATAGTGCACGAGCAACAATTTGAGGGGCTATTGAGGCGCAACAGCATCTGTGCAACTCGCTGGGGCATCAAGCAGCTCCAAGCAAGATCTAGCTGGTGGCTCCGCGGCTCACAGCTGAGTGGAGTGGGACAGGAAATTAACAATTAACAAGCTTAATACTCTTAATTGAAGAACTCGCAAAACCAAGCAAGAAATGAACAAGAAATATTGGAATAG
	Amino acid	MERIVLLFAIVSLVKSQDQICGYHANNSTEQVDTIMEKNVTVTHAQDILEKTHNGKLCSDLGKPLILRDCSVAGWLLGNPMCDEFINVPEWSYIVEKANPVDNLCYPGDFNDYEELKHLISRINHFQIHPKSS WSSHEASLVSSAPYQKSSFFRNVVWLIIKKNSTYPTIKRSYNNTNQEDLLVWGIHPNDAAEQTKLYQNPTTYISVGTSTLNQLRVPRIATRSKVNQSGRMEFFWTILRPNDAINFESNGNFIPEYAYKIVK KGDSTIMKSELEYGNCAKQTPMGAISMPFNIHPLTIGCEPKYVKNRNLVLAATGLRNSPQRERRRRKRLFGAIAFGIEGGWQGMVDGWYGYHHSNEQGSYAADKESTQKAIDGVTNKNVSIIDKMNTQ FEAVGREFNLERRIENLNKKMEDGFLDVWYNAELLVLMENERTLDFHDSNVKNLYDKVRLQLRDNKELGNGCFEYHCKDNECMESVRNGTYDYPOYSEEARKKREISGVKLESIGGGSGIVQQNNLL RAIEAQHLLQLTVWGKQLQARILAGSGGHTTWMEWDREINNYTSLIHSLEESQNOQEKNEQELLE*
A/Shanghai01/2014(H7N9) - H7 6HB (Igk signal sequence)	DNA	ATGGGATGGAGCTGTATCATCTCTTCTTGGTAGCAACAGTACAGGTTGCCACTCCGAGGACAAAATTTGCCCTGGGACACCATGGCAGTGTAGTAATGGAACAAAAGGTCAACACCCCTGACTGAGCGAGGAGTCCAGGTGGTGAACGCAACAGAAACAGTTGAGAGAACCAATATTCCTGCATCTGCTCCAAAAGGCGACAGTGAATCTTGGGCACTATCGGACAGTGTGGACTTCTGGGCACTATCAAGGCCCTCCCCAGTGTGACAGTTCTGGGATTCAGTGCCGATCTGATTATCGAAAAGCGGAGAAGGCGAGCGATGTGTATCTCGAAAAGTTCGTGAACGAAGAGGCTTGAAGACAGATACTAGGGAATCTGGCGGGATCGACAAAAGAGCCATGGGTTTACCTATCCGGGATCAGGACTAACGGGGCCACTCAGCATGCCCGGCTCCGGCAGTCAATTTATGCTGAGATGAAATGGCTGTGAGTAACACAGACAACCGTCTTTCCCAATGACTAAGTCTCAAAAACACCCGCAAACTCTCTGCCTTATTGTGGGCATTCATCACAGACCAAGCTCTACGGGTCCGGCAATAAAGTTGGTGACAGTGCTCTCCAACTACCAGCAGAGCTTCTGTCCTCTCCCGGAGCAAGGCCCAAGTAAACGGGCTTAGCGGGCAATGACTTCCACTGGTGTGATGCTGAAATCCCAATGACACCGTCACTATTAGCTTCAATGGGGCTTTCATAGCCCCAGAGCCGCACTCTTTTGGCGGCAAGTCTATGGGCATCCAGTCCGGTGTCCAGGTGGATGCAAACTCGGAGGGCGACTGTTACCCTCTGGCGGTACCAATATCAACTATCCAACTGGCCTTCCAGAACATCGATCCCGCGCTCGGAAATGCCAGATACGTGAAGCAGGCTTCTGCTTCTGCCACTGGTATGAAGAATGTCCAGAAATTCCTAAAGGCCGGGTCTGTTCGGCCATCGCAGGCTTTCATGAGAACGGATGGGAGGACTGATCGACGGTGTGGTACGGCTTCAGACACCAGAACGCAAGGAGGAGAGGACAGCAGCGGACTACAAAAGTACTCAGTCTGCCATCGACAGATCAGAGAAAATGAAACCGCTCATCGAAAACAAATCAGCAATTTGAACTCATAGATAACGAGTTCAACGAGGTTGAGAAAACAGATCGGTAAACGTGATAAACTGGACAGACAGCAGCAGTCCGAGGTGTGTCCTATAATCGAGAGCTCCTGTCGCAATGGAGAATCAGCATACCATGATCTGGCAGATAGTGAATGGATAAGTGTACGAAAAGGTTCAAGAGACAGCTCCGGGAAATCGACAGGAAGATGGAACCCGTTGTTTTGAAATATCCAAAATCGGATGATGATTCATGGCTAGCATCCGAAATAACACTTACGACATCCAAGTACGGAAGAAAGCTATCGCAACCTGATCCAGACCTGAAACTTCTAGCGGTTACAAAGACGTGATACTGGCGGCTCGGAACTCGGACAGCAGAAACCTGTAGAGACTCGGCGGAGCAGCATCTGCTGCACTGACCGGTGAGCCATGAAAGCGTGCAGGCCAAGTTCTCGCTGGCGGATCTGGCGCCATACCACCTGGATGGAATGGGACAGAGAGATCAACAACCTACACCAGCCTGATCCACAGCCTGATTGAGGAATCCCAAGAACCAAGAGAGAAATGAGCAAGAGCTGCTCGAGTAA
	Amino acid	MGWSCHLFLVATATGVHSEDKICLGHHAHSVNGTKVNTLTERGVEVVNATETVERTNIPRICSKGKRTVDLGCQGLLGTITGPPQCDQFLFESADLIERREGSDVCPYKGFVNEALRQILRESGGIDKEAMGFYSG IRTNGATSARRSSFSYAEKMWLLSNTDNAFFQMTKSYKNTKRSALIVWGIHHSVSTAETKLYGSGNKLVTGSSNYQQSFVPSGAPQVNLGSRIDFWLMLNPNNDTVTFNFGAFIAPDRASFLRGLK SMIGQSGVQDANECGDYHSGGTIISNLPFNIDSRVAGKCPRYVKQRSLLATGMKNVPEIKPGRFLFGAIAFIENGWELIDGWYGFRHQNAQGEHTAADYKSTQSALDIQTLKLNRIEKNVQFELIDNE FNEVEKQIGNVINWTRDSITEVWSYNAELLVAMENQHTIDLADSEMDKLYERVKRQLRENAEEDTGCFEIFHKDDDCMASIRNNTYDHSKYREEMQNRQIQIDPVKLSYKDVILGGSGIVQQNNLLRAI EAQHLLQLTVWGKQLQARILAGSGGHTTWMEWDREINNYTSLIHSLEESQNOQEKNEQELLE*

A/Chicken/Quind ao/020/2014(H9N2) - H9 6HB (Igk signal sequence)	DNA	ATGGGATGGAGCTGTATCATCTCTTCTTGGTAGCAACAGTACAGGTGTCCACTCCGAGGACAAAATCTGCATTGGATATCAGAGTACCACTCCACCGAGACCGTGGATACCTTGACCGAAAACAACGTGC CTGTCACCCACGCTAAAGAGCTGCTGCACACTGAGCACAATGGCATGCTGTGTGCCACTAGCCTGGGCCAGCCACTCGTCTGGATACCTGCACCATAGAAGGCCTATTTACGGTAATCCATCTCGGA TCTCAGCCTGGAAGGTCCGGGAATGGAGCTATATTGTCGAACGGCCATCTGCCGTGAACGGTCTGTGCTATCCCGGGAACGTTGAAAACCTGGAAAGGCTTCGTAGCTTGTTCAGTGCTAGGTCTTAT CAGAGAATCCAGATTTTCCAGACACCATCTGGAACGTCAGCTATGATGGGACCAGTAAATGCCTGTAGTGGCTCTTTTATCGCTCTATCAGGTGGCTTACACGCAAAAATGGAGATTACCCAATTCAG ACGCCAGTACACTAACAATCAAGGGAAGAATATACTGTTTATGTGGGGCATCAACCAACCTACCAATCAGACCCTCAGCGTGACCTTACACAAGAAGTACACCACCCTAGCGTGGCAACCGAAG AGATCAACAGAAATTTCAAGCCTCTGATCGGCCACGGCCTCTGGTCAACGGGCTGATGGGGCGAATTGACTACTATTGGTCAGTACTCAAGCCCGCCAGACTTTGAGGATTAATCTGATGGTAATTT GATCGCCCTTGGTATGGACACATCTTGTCTGGCGAGTCCACGGTCCGATTCTGAAAACCTGATTTGAAGAGGGGATCTTGCACCGTGCAGTGCCAAACAGAAAAAGGCGGCCTCAACACCACACTTCC ATTCCAAAACGTCAGTAAGTATGCTTTTGGAAACTGCTCCAAGTATATTGGGATCAAGTCACTGAAGTTGGCAGTCGGACTGCGCAACGTCCTAGCCGGTCCAGTAGGGGACTGTTCCGGTCTATCGCC GGTTTCATCGAGGGCGGCTGGTCCGGTCTGGTGGCCGGATGGTACGGCTTTCAGCATAGTAATGATCAGGGGGTCCGATGGCAGCCGACAGAGACTCCACCCAGAAGGCTATCGATAAAATCACAAAGC AAGGTGAACAATATTGTAGACAAAATGAACAAGCAGTACGAGATTATCGATCAGAGTTTCAGCGAGGTCGAGACCCGCTGAACATGATTAATAACAAAATAGACGACCAGATCCAGGACATTTGGGC ATACAACGCAGAGCTTCTGGTGTCTCTGGAGAATCAGAAAGCCCTCGATGAGCAGCAGCCAAACGTTAATAACCTGTATAATAAGGTGAAACGGGCCTTGGGAAGCAACGCCGTGGAGGACGGCAAGG GCTGCTTTGAGCTTTACCATAAATCGCATGACCAGTGCATGAAAAAATCAGGAACGGGACATACAACCGTAGAAAAGTACCAAGAGGAGTCTAAACTTGAGAGGCAGAAAAATAGAGGGCCTAAACTG GAGAGCGAAGGAAGTACAAGATACTCGGCGGGTCTGGTATAGTGCAGCAGCAGAAACAATTTGCTGAGGGCTATTGAGGCGCAACAGCATCTGTTGCAACTCACAGTCTGGGGCATCAAGCAGC TCCAAGCAAGAAATCTAGCTGGTGGCTCCGGCGGTTCACACGACCTGGATGGAGTGGGACAGAGAAATTAACAATTAACAAGCTTAATACACTCCTTAATTGAAGAAATCGCAAAACAGCAA GAAAAGATGAACAAGAATTATTGGAATAG
	Amino acid	MGWSCILFLVATATGVHSEDKICIGYQSTNSTETVDTLTENNVPVTHAKELLHTEHNGMLCATSLGQPLVLDTCITIEGLIYGNPSCDLSLEGREWSYIVERPSAVNGLCYPGNVNLEELRSLFSSARSYQRIQIFPDT IWNVSYDGTSNACSGSFYRSIRWLTRKNGDYPIQDAQYTNQKGNILFMWGINQPTNQTQRDLYTRDTTTSVATEEINRIFKPLIGRPLVNLGMRIDYYWSVLKPGQTLRIKSDGNLIAPWYGHILSGESHG RILKTDLKRGSCTVQCQTERGGNTLTPFNVSQYAFGNCSKYIGIKSLKLAVALRNVPSSRSLGFAIAGFIEGGWSGLVAGWYGFQHSNDQGVMAADRSTQKAIKITSKVNINVDKMNKYEIIDHEFS EVETRLNMINNKIDDQIQDIWAYNAELLVLENQKTLDEHDANVNNLYNKVLRALGNSNAVEDGKGFELYHKCDDQCMETIRNGTYNRRKYQEESKLERQKIEGVKLESEGTYKILGGSGIVQQQNLLRAIE AQHLLQLTVWGIKQLQARILAGSGGHTTWMEWDREINNYTSLIHSLEESQNOQEKNEQELLE*