



## User's Manual

# H1N1 HA ELISA development kit



DEIA533CaI



5 plates



This product is for research use only and is not intended for diagnostic use.

For illustrative purposes only. To perform the assay the instructions for use provided with the kit have to be used.

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## PRODUCT INFORMATION

### Intended Use

The Influenza A H1N1 (Swine Flu 2009) Hemagglutinin/HA ELISA Pair Set is for the quantitative determination of Influenza A H1N1 (Swine Flu 2009) Hemagglutinin/ HA.

This ELISA Pair Set contains the basic components required for the development of sandwich ELISAs.

### General Description

Influenza (flu) is a viral respiratory infection in mammals and birds. This virus is divided into three main types (A, B and C). Influenza A is found in a wide variety of mammalian and avian species and is associated with the major human pandemics. Influenza B is largely confined to humans and became unexpectedly prevalent in humans during 2000-2002. Influenza C infects humans, dogs and pigs and generally causes only mild upper respiratory tract infection. However, influenza A and B viruses cause a wide spectrum of severe disease including lower respiratory, tract infection, pneumonia and encephalitis. Influenza A is further divided into subtypes based on antigenic differences in the membrane proteins hemagglutinin (HA) and neuraminidase (NA). 16 HAs (H1-H16) and 9 NA (N1-N9) had been identified. While different combinations of the two antigens appear more frequently in some groups of birds than others, only few subtypes have established themselves in humans (HA: H1, H2, and H3; NA: N1 and N2).

The 2009 flu pandemic is caused by a new swine-origin influenza A (H1N1) virus which is a recombinated production by human H3N2, swine H1N1 and avian H5N1 strains. The mixing of new genetic elements in swine can result in the emergence of viruses with pandemic potential in humans. As 2009 H1N1 influenza is a new virus and most people have no or little immunity this virus could cause more infections than are seen with seasonal flu. The virus spread worldwide by human-to-human transmission, causing the World Health Organization to raise its pandemic alert to the highest level 6. The HA, NA, and MP sequences of 2009 H1N1 flu (swine flu) have been placed on deposit at GISAID.

Hemagglutinin (HA), which binds to sialic acid (SA)-containing receptors on host cells, is the protein that produces neutralizing antibodies. Hemagglutinin plays a major role in the determination of host range restriction and virulence because human influenza HA preferentially binds to SA- $\alpha$ -2,6 while avian influenza HA preferentially binds to SA- $\alpha$ -2,3. The cleavage of HA into two disulfide-linked subunits, HA1 and HA2, is a prerequisite for initiating infection. Usually HA is restricted to be cleaved at respiratory tracts by limited proteases. Highly pathogenic avian influenza contains a stretch of basic residues adjacent to the HA cleavage site, enabling its HA to be cleaved by a wide range of proteases with ubiquitous tissue distributions. This process permits productive virus replication in organs outside of the respiratory and gastrointestinal tracts, including the brain, resulting in widespread disease and high mortality rates.

### Principles of Testing

H1N1 HA ELISA development kit is a solid phase sandwich ELISA (Enzyme-Linked Immunosorbent Assay). It utilizes a monoclonal antibody specific for Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA coated on a 96-well plate. Standards and samples are added to the wells, and any Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA present binds to the immobilized antibody. The wells are washed and a horseradish peroxidase conjugated rabbit anti-Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA polyclonal antibody is then added, producing an antibody-antigen-antibody "sandwich". The wells are again

washed and TMB substrate solution is loaded, which produces color in proportion to the amount of Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA present in the sample. To end the enzyme reaction, the stop solution is added and absorbances of the microwell are read at 450 nm.

## Reagents And Materials Provided

Bring all reagents to room temperature before use.

**1.Capture Antibody** : 1 mg/mL of mouse anti-Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA monoclonal antibody (in PBS, pH 7.4).

Dilute to a working concentration of 2 µg/mL in PBS before coating.

**2.Detection Antibody** : 0.2 mg/mL of rabbit anti-Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA polyclonal antibody conjugated to horseradish-peroxidase (HRP) (in PBS, 50 % HRP-Protector, pH 7.4, store at 4°C).

Dilute to working concentration of 1 µg/mL in detection antibody dilution buffer before use.

**3.Standard**: Each vial contains 67 ng of recombinant Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA.

Reconstitute with 1 mL detection antibody dilution buffer. After reconstitution, store at -20°C to -80°C in a manual defrost freezer. A seven-point standard curve using 2-fold serial dilutions in sample dilution buffer, and a high standard of 2000 pg/mL is recommended.

## Materials Required But Not Supplied

**PBS**: 136.9 mM NaCl, 10.1 mM Na<sub>2</sub>HPO<sub>4</sub>, 2.7 mM KCl, 1.8 mM KH<sub>2</sub>PO<sub>4</sub>, pH 7.4, 0.2 µm filtered

**Wash Buffer**: 0.05% Tween20 in PBS, pH 7.2 - 7.4

**Blocking Buffer**: 2% BSA in Wash Buffer

**Dilution Buffer**: 0.1% BSA in wash buffer, pH 7.2 - 7.4, 0.2 µm filtered

**Substrate Solution**: To achieve best assay results, fresh substrate solution is recommended

**Substrate stock solution**: 10mg / ml TMB ( Tetramethylbenzidine ) in DMSO

**Substrate dilution buffer**: 0.05M Na<sub>2</sub>HPO<sub>4</sub> and 0.025M citric acid ; adjust pH to 5.5

**Substrate working solution**: For each plate dilute 250 µl substrate stock solution in 25ml substrate dilution buffer and then add 80 µl 0.75% H<sub>2</sub>O<sub>2</sub>, mix it well

**Stop Solution**: 2 N H<sub>2</sub>SO<sub>4</sub>

## Storage

**Capture Antibody**: Aliquot and store at -20°C to -80°C for up to 6 months from date of receipt. Avoid repeated freeze-thaw cycles.

**Detection Antibody**: Store at 4°C and protect it from prolonged exposure to light for up to 6 months from date of receipt. DO NOT FREEZE!

**Standard**: Store lyophilized standard at -20°C to -80°C for up to 6 months from date of receipt. Aliquot and

store the reconstituted standard at -80°C for up to 1 month. Avoid repeated freeze-thaw cycles.

## Plate Preparation

1. Dilute the capture antibody to the working concentration in PBS. Immediately coat a 96-well microplate with 100µL per well of the diluted capture antibody. Seal the plate and incubate overnight at 4°C.
2. Aspirate each well and wash with at least 300µl wash buffer, repeating the process two times for a total of three washes. Complete removal of liquid at each step is essential for good performance. After the last wash, remove any remaining wash buffer by inverting the plate and blotting it against clean paper towels.
3. Block plates by adding 300 µL of blocking buffer to each well. Incubate at room temperature for a minimum of 1 hour.
4. Repeat the aspiration/wash as in step 2. The plates are now ready.

## Assay Procedure

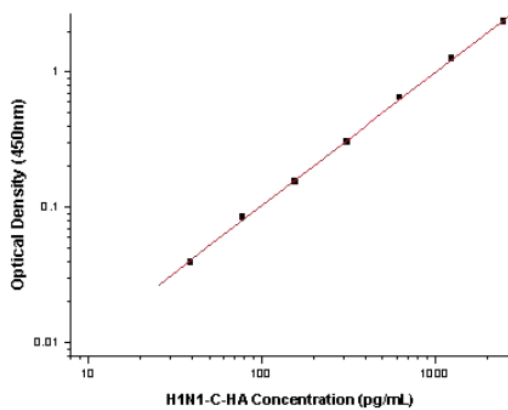
1. Add 100 µL of sample or standards in Dilution Buffer per well. Seal the plate and incubate 2 hours at room temperature.
2. Repeat the aspiration/wash as in step 2 of plate preparation.
3. Add 100 µL of the detection antibody, diluted in Dilution Buffer, to each well. Seal the plate and incubate 1 hour at room temperature.
4. Repeat the aspiration/wash as in step 2 of plate preparation.
5. Add 200 µL of substrate solution to each well. Incubate for 20 minutes at room temperature ( if substrate solution is not as requested, the incubation time should be optimized ). Avoid placing the plate in direct light.
6. Add 50 µL of stop solution to each well. Gently tap the plate to ensure thorough mixing.
7. Determine the optical density of each well immediately, using a microplate

## Calculation

1. Calculate the mean absorbance for each set of duplicate standards, controls and samples. Subtract the mean zero standard absorbance from each.
2. Construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph.
3. To determine the concentration of the unknowns, find the unknowns' mean absorbance value on the y-axis and draw a horizontal line to the standard curve. At the point of intersection, draw a vertical line to the x-axis and read the concentration. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.
4. Alternatively, computer-based curve-fitting statistical software may also be employed to calculate the concentration of the sample.

## Typical Standard Curve

This standard curve is only for demonstration purposes. A standard curve should be generated for each assay.



Concentration ( pg/mL)	Zero standard subtracted OD
0	0
39.06	0.039
78.13	0.085
156.25	0.155
312.5	0.305
625	0.647
1250	1.269
2500	2.340

## Sensitivity

The minimum detectable dose of Influenza A H1N1 (Swine Flu 2009) Hemagglutinin / HA was determined to be approximately 39.06 pg/ml. This is defined as at least three times standard deviations above the mean optical density of 10 replicates of the zero standard.

## Specificity

The following hemagglutinin of different influenza virus types and subtypes prepared at 200 ng/mL were tested and no cross-reactivity was identified.

H1N1 (A/Brisbane/59/2007)

H5N1 (A/Anhui/1/2005)

H5N1 (A/Vietnam/1194/2004)

Influenza B (B/Florida/4/2006)

H3N2 (A/Brisbane/10/2007)

## Precautions

The Stop Solution suggested for use with this Pair Set is an acid solution. Wear eye, hand, face, and clothing protection when using this material.