



## **PRODUCT INFORMATION & ELISA MANUAL**

### **Influenza A H1N1 Hemagglutinin Antibody Pair [HRP] *NBP2-79293***

***Sample Insert for reference use only***

Matched Antibody Pair utilized in an Enzyme-linked  
Immunosorbent Assay for quantitative detection of  
Influenza A Virus H1N1 Influenza A Hemagglutinin H1N1.

For research use only.

Not for diagnostic or therapeutic procedures.

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Novus kits are guaranteed for 6 months from date of receipt

## BACKGROUND

Influenza (flu) is a 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 bird and mammal species and is further divided into subtypes based on differences in the membrane proteins hemagglutinin (HA) and neuraminidase (NA). Influenza A H1N1 virus is a subtype of influenza A virus. Some strains of H1N1 are endemic in humans and cause a small fraction of all influenza-like illness and a small fraction of all seasonal influenza. H1N1 strains caused a few percent of all human flu infections in 2004-2005. Other strains of H1N1 are endemic in pigs (swine influenza) and in birds (avian influenza). H1N1 was the most common cause of human influenza (flu) in 2009. In June 2009, the World Health Organization declared the new strain of swine-origin H1N1 as a pandemic. This strain is often called swine flu by the public media. This novel virus spread worldwide and had caused about 17,000 deaths by the start of 2010. Hemagglutinin (HA) is a single-pass type I? integral membrane glycoprotein from the influenza virus, and comprises over 80% of the envelope proteins present in the virus particle. In natural infection, inactive HA is matured into HA1 and HA2 outside the cell by one or more trypsin-like, arginine-specific endoprotease secreted by the bronchial epithelial cells. Binding of HA to sialic acid-containing receptors on the surface of its target cell brings about the attachment of the virus particle to the cell and forms an endosome. Low pH in endosomes induce an irreversible conformational change in HA2, releasing the hydrophobic portion "fusion peptide". After which, virus penetrates the cell and pours its contents including the RNA genome into the cytoplasm mediated by fusion of the endocytosed virus particle's own membrane and the endosomal membrane. Hemagglutinin plays a major role in the determination of host range restriction and virulenc.

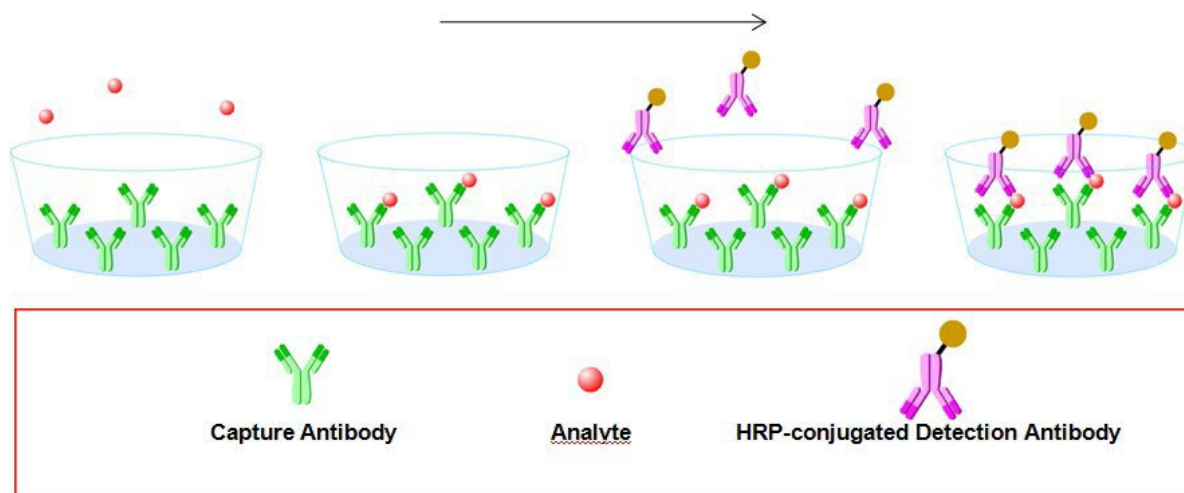
## PRINCIPLE OF THE TEST

The Novus Biologicals ELISA Pair Set is a solid phase sandwich ELISA (Enzyme-Linked Immunosorbent Assay). It utilizes a monoclonal antibody specific for Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA coated on a 96-well plate. Standards and samples are added to the wells, and any Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA present binds to the immobilized antibody. The wells are washed and a horseradish peroxidase conjugated rabbit anti-Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA monoclonal 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 (A/Puerto Rico/8/1934) 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.

## INTENDED USE

- ◆ The Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA ELISA Pair Set is for the quantitative determination of Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA.
- ◆ This ELISA Pair Set contains the basic components required for the development of sandwich ELISAs.

## ASSAY PROCEDURE SUMMARY



**This Pair Set has been configured for research use only and is not to be used in diagnostic procedures.**

## MATERIALS PROVIDED

**Bring all reagents to room temperature before use.**

**Capture Antibody** – 0.5 mg/mL of rabbit anti-Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA monoclonal antibody (in PBS, pH 7.4). Dilute to a working concentration of 2 µg/mL in PBS before coating.

**Detection Antibody** – 0.2 mg/mL of rabbit anti-Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA monoclonal antibody conjugated to horseradish-peroxidase (HRP) (in PBS, 50 % HRP-Protector, pH 7.4, store at 4°C). Dilute to working concentration of 0.5 µg/mL in detection antibody dilution buffer before use.

**Standard** – Each vial contains 100 ng of recombinant Influenza A H1N1 (A/Puerto Rico/8/1934) 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.

## SOLUTIONS REQUIRED

**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

**TBS** - 20 mM Tris, 150 mM NaCl, pH 7.4

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

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

**Sample dilution buffer** - 0.1% BSA in wash buffer, pH 7.2 - 7.4, 0.2 µm filtered

**Detection antibody dilution buffer** - 0.5% 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>

## PRECAUTION

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.

## STORAGE

**Capture Antibody:** Aliquot and store at  $-20^{\circ}\text{C}$  to  $-80^{\circ}\text{C}$  for up to 6 months from date of receipt. Avoid repeated freeze-thaw cycles.

**Detection Antibody:** Store at  $4^{\circ}\text{C}$  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  $-20^{\circ}\text{C}$  to  $-80^{\circ}\text{C}$  for up to 6 months from date of receipt. Aliquot and store the reconstituted standard at  $-80^{\circ}\text{C}$  for up to 1 month. Avoid repeated freeze-thaw cycles.

## GENERAL ELISA PROTOCOL

### 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 for sample addition.

### Assay Procedure

1. Add 100 µL of sample or standards in sample 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 antibody 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 reader set to 450 nm.

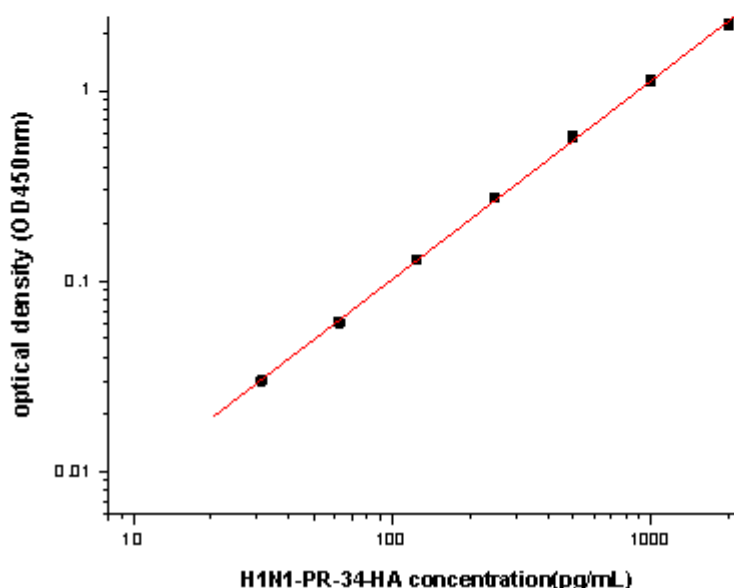
## CALCULATION OF RESULTS

- Calculate the mean absorbance for each set of duplicate standards, controls and samples. Subtract the mean zero standard absorbance from each.
- 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.
- 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.
- Alternatively, computer-based curve-fitting statistical software may also be employed to calculate the concentration of the sample.

## TYPICAL DATA

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
31.25	0.030
62.5	0.061
125	0.130
250	0.275
500	0.577
1000	1.129
2000	2.228



## PERFORMANCE CHARACTERISTIC

### SENSITIVITY

The minimum detectable dose of Influenza A H1N1 (A/Puerto Rico/8/1934) Hemagglutinin / HA was determined to be approximately **31.25 pg/ml**. This is defined as at least three times standard deviations above the mean optical density of 10 replicates of the zero standard.

## TROUBLE SHOOTING

Problems	Possible Sources	Solutions
No signal	Incorrect or no Detection Antibody was added	Add appropriate Detection Antibody and continue
	Substrate solution was not added	Add substrate solution and continue
	Incorrect storage condition	Check if the kit is stored at recommended condition and used before expiration date
Poor Standard Curve	Standard was incompletely reconstituted or was inappropriately stored	Aliquot reconstituted standard and store at -80 °C
	Imprecise / inaccurate pipetting	Check / calibrate pipettes
	Incubations done at inappropriate temperature, timing or agitation	Follow the general ELISA protocol
	Background wells were contaminated	Avoid cross contamination by using the sealer appropriately
Poor detection value	The concentration of antigen in samples was too low	Enriching samples to increase the concentration of antigen
	Samples were ineffective	Check if the samples are stored at cold environment. Detect samples in timely manner
High Background	Insufficient washes	Use multichannel pipettes without touching the reagents on the plate
		Increase cycles of washes and soaking time between washes
	TMB Substrate Solution was contaminated	TMB Substrate Solution should be clear and colorless prior to addition to wells
	Materials were contaminated.	Use clean plates, tubes and pipettes tips
Non-specificity	Samples were contaminated	Avoid cross contamination of samples
	The concentration of samples was too high	



# ELISA Plate Template

1	2	3	4	5	6	7	8	9	10	11	12
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**A**

# B

C

D

## E

# F

# G

H

## Notes