

---

Product Manual

# Influenza B Nucleoprotein ELISA Kit

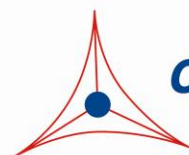
Catalog Numbers

VPK-5175

96 assays

**FOR RESEARCH USE ONLY**  
**Not for use in diagnostic procedures**

---



**CELL BIOLABS, INC.**  
*Creating Solutions for Life Science Research*

## **Introduction**

The influenza virus is an enveloped virus that can be divided into three classes, A, B, and C, largely based upon conserved antigenic differences in the internal nucleoprotein (NP). Only Influenza A and B are clinically relevant for humans.

The primary function of NP is to encapsidate the segmented RNA and bind with the three polymerase subunits, PA, PB1 and PB2, to form ribonucleoprotein particles (RNPs) for RNA transcription, replication and packaging.

Cell Biolabs' Influenza B Nucleoprotein ELISA Kit is an enzyme immunoassay developed for detection and quantitation of the Influenza B nucleoprotein. The ELISA antibodies only recognize the nucleoprotein from Influenza B, will not react with the nucleoprotein from Influenza A nor Influenza C. The kit has a detection sensitivity limit of 313 pg /mL Influenza B nucleoprotein. Each kit provides sufficient reagents to perform up to 96 assays including standard curve and Influenza B lysate samples.

## **Assay Principle**

An anti-Influenza B nucleoprotein monoclonal antibody is adsorbed onto a microtiter plate. Influenza B nucleoprotein present in the sample or standard binds to the antibody adsorbed on the plate; an FITC-conjugated anti-Influenza B nucleoprotein monoclonal antibody is added and binds to the Influenza B nucleoprotein captured by the first antibody. Following incubation and wash steps, an HRP-conjugated mouse anti-FITC antibody is added and binds to the FITC conjugated anti-Influenza B nucleoprotein monoclonal antibody. Unbound HRP-conjugated mouse anti-FITC antibody is removed during a wash step, and a substrate solution reactive with HRP is added to the wells. A colored product is formed in proportion to the amount of Influenza B nucleoprotein present in the sample. The reaction is terminated by addition of Stop Solution and absorbance is measured at 450 nm. A standard curve is prepared from the provided recombinant Influenza B nucleoprotein standard, and sample Influenza B nucleoprotein concentration is then determined.

## **Related Products**

1. VPK-108-H: QuickTiter™ Lentivirus Quantitation Kit (HIV-1 p24 ELISA)
2. VPK-150: QuickTiter™ Hepatitis B Core Antigen (HBcAg) ELISA Kit
3. VPK-151: QuickTiter™ Hepatitis C Core Antigen (HCcAg) ELISA Kit
4. VPK-156: QuickTiter™ MuLV Core Antigen (MuLV p30) ELISA Kit
5. VPK-5003: QuickTiter™ HBV “e” Antigen ELISA Kit
6. VPK-5004: QuickTiter™ HBV Surface Antigen ELISA Kit
7. VPK-5169: Adenovirus Hexon ELISA Kit
8. VPK-5170: RSV Fusion Protein ELISA Kit
9. VPK-5171: RSV Nucleoprotein ELISA Kit
10. VPK-5174: Influenza A Nucleoprotein ELISA Kit

## **Kit Components**

### **Box 1 (shipped at room temperature)**

1. Anti-Influenza B Nucleoprotein Antibody Coated Plate (Part No. 51751B): One strip well 96-well plate.
2. FITC-Conjugated Anti-Influenza B Nucleoprotein Monoclonal Antibody (Part No. 51752C): One 20  $\mu$ L vial.
3. HRP-Conjugated Anti-FITC Monoclonal Antibody (Part No. 310811): One 20  $\mu$ L vial.
4. Assay Diluent (Part No. 310804): One 50 mL bottle.
5. 10X Viral Lysis Buffer (Part No. 51693B): One 15 mL bottle containing 200 mM Tris, pH 7.5, 1500 mM NaCl, 10% Triton X-100, 1% SDS.
6. 10X Wash Buffer (Part No. 310806): One 100 mL bottle.
7. Substrate Solution (Part No. 310807): One 12 mL amber bottle.
8. Stop Solution (Part. No. 310808): One 12 mL bottle.

### **Box 2 (shipped on blue ice packs)**

1. Recombinant Influenza B Nucleoprotein Standard (Part No. 51753D): One 100  $\mu$ L vial of 2  $\mu$ g/mL recombinant human Influenza B nucleoprotein (Met1-Tyr560) in PBS containing BSA.

## **Materials Not Supplied**

1. Influenza B Sample: purified virus or unpurified viral supernatant
2. Microcentrifuge
3. 10  $\mu$ L to 1000  $\mu$ L adjustable single channel micropipettes with disposable tips
4. 50  $\mu$ L to 300  $\mu$ L adjustable multichannel micropipette with disposable tips
5. Multichannel micropipette reservoir
6. Microplate reader capable of reading at 450 nm (620 nm as optional reference wave length)

## **Storage**

Upon receiving, aliquot and store the Influenza B Nucleoprotein Standard at -20°C and avoid freeze/thaw. Store all other components at 4°C.

## **Safety Considerations**

Remember that your Influenza B samples contain infectious viruses before inactivation; you must follow the recommended NIH guidelines for all materials containing infectious organisms.

## **Preparation of Reagents**

- 1X Wash Buffer: Dilute the 10X Wash Buffer Concentrate to 1X with deionized water. Stir to homogeneity.
- FITC-Conjugated Anti-Influenza B Nucleoprotein Monoclonal Antibody and HRP-Conjugated Anti-FITC Monoclonal Antibody: Immediately before use dilute the FITC-conjugated antibody 1:1000 and HRP-conjugated antibody 1:1000 with Assay Diluent. Do not store diluted solutions.

## **Preparation of Standard Curve**

1. Prepare a dilution series of Influenza B Nucleoprotein Standard in the concentration range of 20 ng/mL – 0.313 ng/mL by diluting the stock solution in Assay Diluent (Table 1).

<b>Standard Tubes</b>	<b>2 µg/mL Influenza B Nucleoprotein Standard (µL)</b>	<b>Assay Diluent (µL)</b>	<b>Influenza B Nucleoprotein (ng/mL)</b>
1	10	990	20
2	500 of Tube #1	500	10
3	500 of Tube #2	500	5
4	500 of Tube #3	500	2.5
5	500 of Tube #4	500	1.25
6	500 of Tube #5	500	0.625
7	500 of Tube #6	500	0.313
8	0	500	0

**Table 1. Preparation of Influenza B Nucleoprotein Standard**

2. Transfer 225 µL of each dilution to a microcentrifuge tube containing 25 µL of 10X Lysis Buffer. Perform the assay as described in Assay Protocol.

## **Influenza Virus Sample Inactivation and Lysis**

1. (Optional) Dilute Influenza B samples in culture medium. Include culture medium as a negative control.
2. Transfer 225 µL of each sample to a microcentrifuge tube containing 25 µL of 10X Lysis Buffer, vortex well. Inactivate Influenza B sample at 56°C for 30 min.
3. Centrifuge at 12,000 x g for 5 minutes at 4°C. Collect the supernatant as Influenza B lysate.

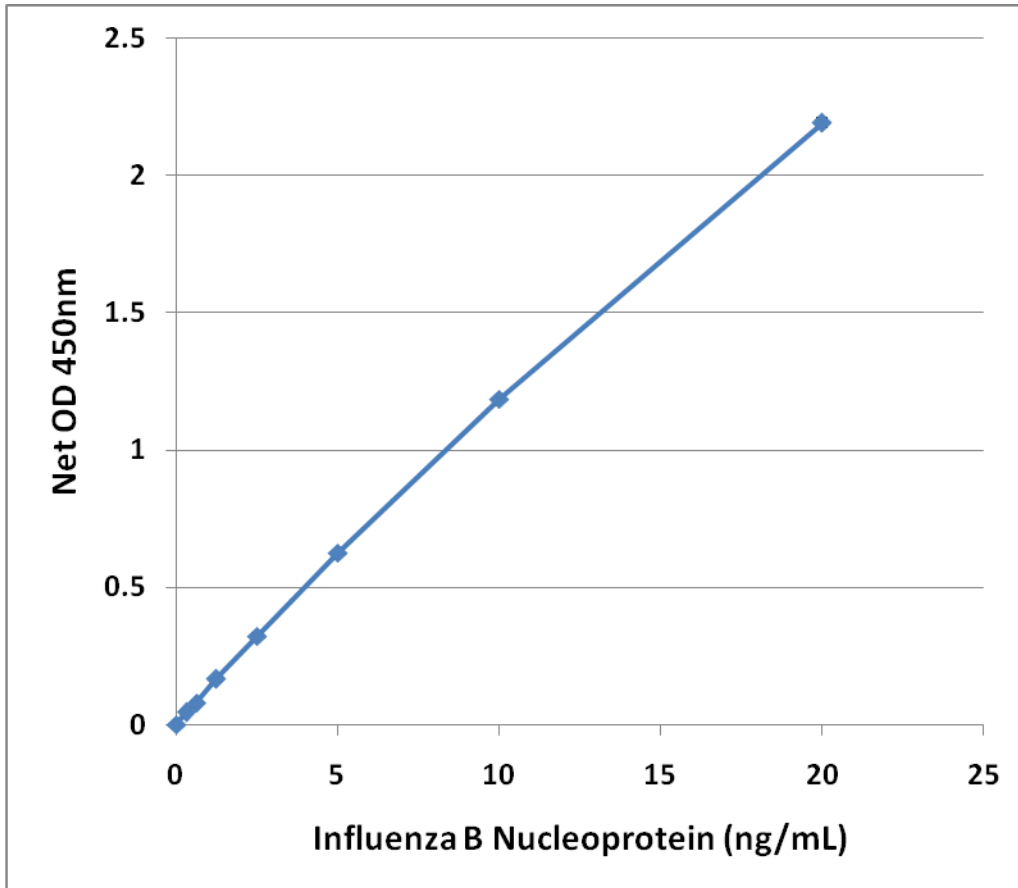
## **Assay Protocol**

1. Prepare and mix all reagents thoroughly before use.
2. Each Influenza B lysate sample, Influenza B nucleoprotein standard, blank, and control medium should be assayed in duplicate.

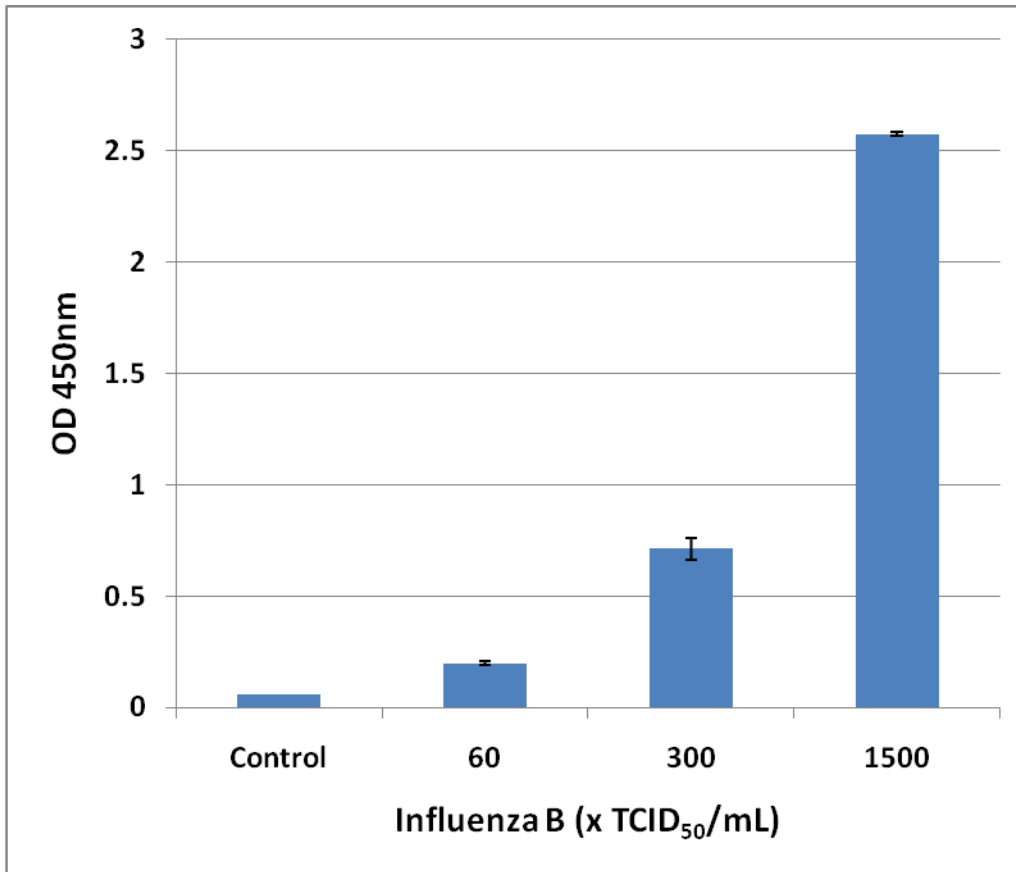
3. Add 100  $\mu$ L of Influenza B lysate or Influenza B nucleoprotein standard to Anti-Influenza B Nucleoprotein Antibody Coated Plate.
4. Cover with a Plate Cover and incubate at 37°C for 2 hours.
5. Remove plate cover and empty wells. Wash microwell strips 5 times with 250  $\mu$ L 1X Wash Buffer per well with thorough aspiration between each wash. After the last wash, empty wells and tap microwell strips on absorbent pad or paper towel to remove excess 1X Wash Buffer.
6. Add 100  $\mu$ L of the diluted FITC-Conjugated Anti-Influenza B Nucleoprotein Monoclonal Antibody to each well.
7. Cover with a plate cover and incubate at room temperature for 1 hour on an orbital shaker.
8. Remove plate cover and empty wells. Wash the strip wells 5 times according to step 5 above.
9. Add 100  $\mu$ L of the diluted HRP-Conjugated Anti-FITC Monoclonal Antibody to all wells.
10. Cover with a plate cover and incubate at room temperature for 1 hour on an orbital shaker.
11. Remove plate cover and empty wells. Wash microwell strips 5 times according to step 5 above. Proceed immediately to the next step.
12. Warm Substrate Solution to room temperature. Add 100  $\mu$ L of Substrate Solution to each well, including the blank wells. Incubate at room temperature on an orbital shaker. Actual incubation time may vary from 2-30 minutes.  
  
*Note: Watch plate carefully; if color changes rapidly, the reaction may need to be stopped sooner to prevent saturation.*
13. Stop the enzyme reaction by adding 100  $\mu$ L of Stop Solution into each well, including the blank wells. Results should be read immediately (color will fade over time).
14. Read absorbance of each microwell on a spectrophotometer using 450 nm as the primary wave length.

### Example of Results

The following figures demonstrate typical Influenza B Nucleoprotein ELISA results. One should use the data below for reference only. This data should not be used to interpret actual results.



**Figure 1: Influenza B Nucleoprotein ELISA Standard Curve.**



**Figure 2: Influenza B Nucleoprotein in Influenza B Culture Fluid.** Influenza B culture fluid ( $3.80 \times 10^6$  TCID<sub>50</sub>/mL) was first diluted 100-fold with culture medium, then heat inactivated and lysed in Viral Lysis Buffer. Influenza B lysate was subjected to Influenza B Nucleoprotein ELISA Kit according to Assay Protocol.

## References

1. Einfeld AJ, Neumann G, Kawaoka Y. (2015) At the centre: influenza A virus ribonucleoproteins. *Nat Rev Micro.* **13**, 28–41.
2. Compans RW, Content J, Duesberg PH. (1972) Structure of the Ribonucleoprotein of Influenza Virus. *J Virol.* **10**, 795–800.
3. Martin K, Helenius A. (1991) Transport of incoming influenza virus nucleocapsids into the nucleus. *J Virol.* **65**, 232–244.
4. O’Neill RE, Jaskunas R, Blobel G, Palese P, Moroianu J. (1995) Nuclear import of influenza virus RNA can be mediated by viral nucleoprotein and transport factors required for protein import. *J Biol Chem.* **270**, 22701–22704.
5. Avalos RT, Yu Z, Nayak DP. (1997) Association of influenza virus NP and M1 proteins with cellular cytoskeletal elements in influenza virus-infected cells. *J Virol.* **71**, 2947–2958.
6. Digard P, Elton D, Bishop K, Medcalf E, Weeds A, Pope B. (1999) Modulation of nuclear localization of the influenza virus nucleoprotein through interaction with actin filaments. *J Virol.* **73**, 2222–2231.

7. Herz C, Stavnezer E, Krug R, Gurney T. (1981) Influenza virus, an RNA virus, synthesizes its messenger RNA in the nucleus of infected cells. *Cell* **26**, 391–400.
8. Jackson DA, Caton AJ, McCready SJ, Cook PR. (1982) Influenza virus RNA is synthesized at fixed sites in the nucleus. *Nature* **296**, 366–368.

## **Warranty**

These products are warranted to perform as described in their labeling and in Cell Biolabs literature when used in accordance with their instructions. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THIS EXPRESSED WARRANTY AND CELL BIOLABS DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR PARTICULAR PURPOSE. CELL BIOLABS's sole obligation and purchaser's exclusive remedy for breach of this warranty shall be, at the option of CELL BIOLABS, to repair or replace the products. In no event shall CELL BIOLABS be liable for any proximate, incidental or consequential damages in connection with the products.

## **Contact Information**

Cell Biolabs, Inc.  
7758 Arjons Drive  
San Diego, CA 92126  
Worldwide: +1 858-271-6500  
USA Toll-Free: 1-888-CBL-0505  
E-mail:  
[www.cellbiolabs.com](http://www.cellbiolabs.com)

©2023: Cell Biolabs, Inc. - All rights reserved. No part of these works may be reproduced in any form without permissions in writing.