

# Porcine IgE Immunoassay

**Catalog Number: SEKP-0051**

For the quantitative determination of porcine IgE concentrations in cell culture supernates, serum, and plasma.

For research use only. Not for use in diagnostic procedures.

**MANUFACTURED AND DISTRIBUTED BY:**

Country | Company: China | Beijing Solarbio Science & Technology Co., Ltd

Address: NO.85A, Liandong U Valley, Tongzhou District, Beijing, P.R.China.

Tel: 86-10-56371241      Fax: 86-10-56371282      E-mail: [service@solarbio.com](mailto:service@solarbio.com)

## TABLE OF CONTENTS

SECTION	PAGE
BACKGROUND.....	1
PRINCIPLE OF THE ASSAY.....	1
TECHNICAL HINTS AND LIMITATIONS.....	2
PRECAUTIONS.....	2
KIT COMPONENTS& STORAGE CONDITIONS.....	3
OTHER SUPPLIES REQUIRED BUT NOT SUPPLIED.....	4
SPECIMEN COLLECTION & STORAGE.....	4
REAGENTS PREPARATION.....	4
ASSAY PROCEDURE .....	6
CALCULATION OF RESULTS.....	6
PERFORMANCE CHARACTERISTICS.....	8
REFERENCES.....	10

## BACKGROUND

Immunoglobulin E (IgE) is a class of antibody (or immunoglobulin (Ig) "isotype") that has been found only in mammals. IgE exists as monomers consisting of two heavy chains ( $\epsilon$  chain) and two light chains, with the  $\epsilon$  chain containing 4 Ig-like constant domains (C $\epsilon$ 1-C $\epsilon$ 4). IgE's main function is immunity to parasites such as parasitic worms like *Schistosoma mansoni*, *Trichinella spiralis*, and *Fasciola hepatica*. IgE may also be important during immune defense against certain protozoan parasites such as *Plasmodium falciparum*. IgE also plays an essential role in type I hypersensitivity, which manifests various allergic diseases, such as allergic asthma, allergic rhinitis, food allergy, and some types of chronic urticaria and atopic dermatitis. IgE also plays a pivotal role in allergic conditions, such as anaphylactic reactions to certain drugs, bee stings, and antigen preparations used in specific desensitization immunotherapy.

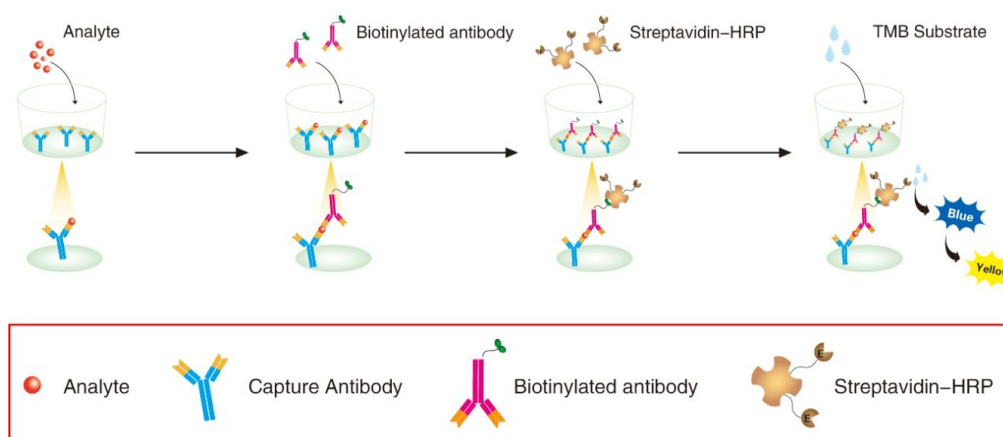
Although IgE is typically the least abundant isotype - blood serum IgE levels in a normal ("nonatopic") individual are only 0.05% of the Ig concentration, compared to 10 mg/ml for the IgGs (the isotypes responsible for most of the classical adaptive immune response) - it is capable of triggering the most powerful inflammation reactions.

IgE was discovered in 1966 by the Japanese scientist couple Teruko and Kimishige Ishizaka.

## PRINCIPLE OF THE ASSAY

This assay employs the quantitative sandwich enzyme immunoassay technique. A monoclonal antibody specific for IgE has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any IgE present is captured by the coated antibody after incubation. Following extensive washing, a biotin-conjugate antibody specific for IgE is added to detect the captured IgE protein in sample. For signal development, horseradish peroxidase (HRP)-conjugated Streptavidin is added, followed by tetramethyl-benzidine (TMB) reagent. Following a wash to remove any unbound combination, and enzyme conjugate is added to the wells. Solution containing sulfuric acid is used to stop color development and the color intensity which is proportional to the quantity of bound protein is measurable at 450nm.

### Schematic diagram:



## TECHNICAL HINTS AND LIMITATIONS

1. This Solarbio ELISA should not be used beyond the expiration data on the kit label.
2. To avoid cross-contamination, use a fresh reagent reservoir and pipette tips for each step.
3. To ensure accurate results, some details, such as technique, plasticware and water sources should be emphasized.
4. A thorough and consistent wash technique is essential for proper assay performance.
5. A standard curve should be generated for each set of samples assayed.
6. It is recommended that all standards and samples be assayed in duplicate.
7. Avoid microbial contamination of reagents and buffers. Buffers containing protein should be made under aseptic conditions and be prepared fresh daily.
8. In order to ensure the accuracy of the results, the standard curve should be made every time.

## PRECAUTIONS

The Stop Solution suggested for use with this kit is an acid solution. Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling.

## KIT COMPONENTS & STORAGE CONDITIONS

PART	SIZE	STORAGE OF OPENED/ RECONSTITUTED MATERIAL
<b>Microwell Plate - antibody coated 96-well Microplate (8 wells ×12 strips)</b>	1 plate	Return unused wells to the foil pouch containing the desiccant pack. Reseal along entire edge of the zip-seal. May be stored for up to 1 month at 2 – 8°C**
<b>Standard - lyophilized, 30 ng/ml upon reconstitution</b>	2 vials	Aliquot and Store at -20°C** for six months
<b>lyophilized Biotin-Conjugated antibody</b>	1 vials	Store at 2-8°C **for six months
<b>Concentrated Streptavidin-HRP</b>	1 vial	Store at 2-8°C** for six months
<b>Standard /sample Diluent</b>	1 bottle	Store at 2-8°C** for six months
<b>Biotin-Conjugate antibody Diluent</b>	1 bottle	Store at 2-8°C** for six months
<b>Streptavidin-HRP Diluent</b>	1 bottle	Store at 2-8°C** for six months
<b>20 x Wash Buffer Concentrate</b>	1 bottle	Store at 2-8°C** for six months
<b>Substrate Solution</b>	1 bottle	Store at 2-8°C** for six months
<b>Stop Solution</b>	1 bottle	Store at 2-8°C** for six months
<b>Plate Cover Seals</b>	4 pieces	

\*\*Provided this is within the expiration date of the kit.

## OTHER SUPPLIES REQUIRED BUT NOT SUPPLIED

1. Microplate reader capable of measuring absorbance at 450 nm.
2. Pipettes and pipette tips.
3. Deionized or distilled water.
4. Squirt bottle, manifold dispenser, or automated microplate washer.
5. 500 mL graduated cylinder.

## SPECIMEN COLLECTION & STORAGE

**Cell Culture Supernates** - Centrifuge cell culture media at  $1000\times g$  to remove debris. Assay immediately or aliquot and store samples at  $\leq -20\text{ }^{\circ}\text{C}$ . Avoid repeated freeze-thaw cycles.

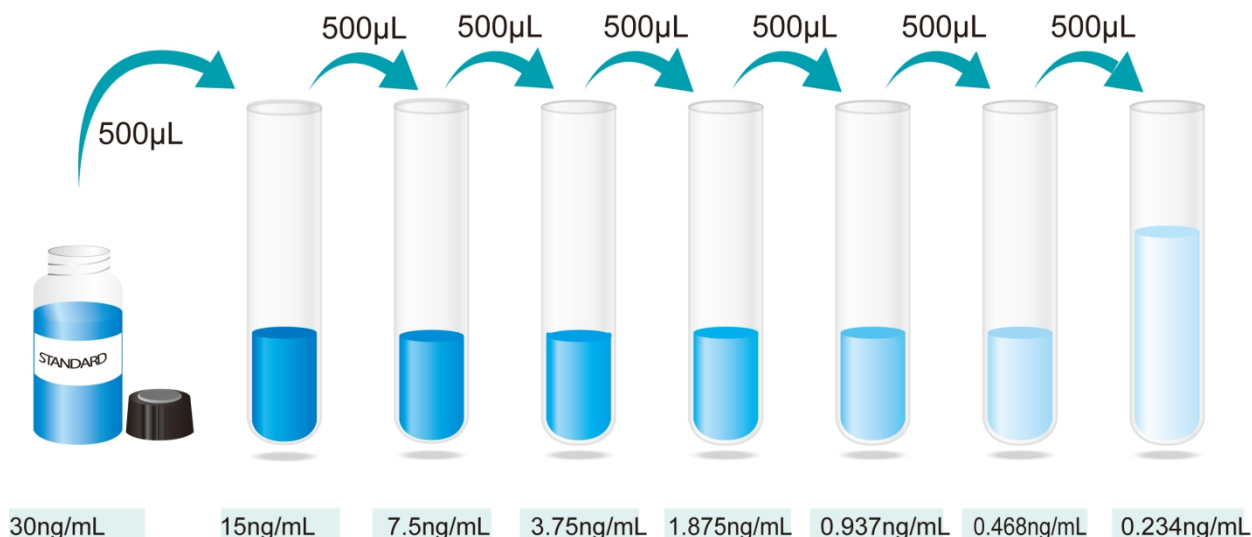
**Serum** - Use a serum separator tube (SST) and allow samples to clot for 2 hours at room temperature or overnight at  $2-8\text{ }^{\circ}\text{C}$ . Centrifuge at approximately for 15 minutes at  $1000\times g$ . Assay immediately or aliquot and store samples at  $\leq -20\text{ }^{\circ}\text{C}$ . Avoid repeated freeze-thaw cycles.

**Plasma** - Collect plasma using EDTA, heparin, or citrate as an anticoagulant. Centrifuge for 15 minutes at  $1000\times g$  within 30 minutes of collection. Assay immediately or aliquot and store samples at  $\leq -20\text{ }^{\circ}\text{C}$ . Avoid repeated freeze-thaw cycles.

**It is recommended to conduct a pre-test before the formal experiment to determine the dilution ratio**

## REAGENTS PREPARATION

1. **Temperature returning** - Bring all kit components and specimen to room temperature ( $20-25\text{ }^{\circ}\text{C}$ ) before use.
2. **Wash Buffer** - Dilute 30mL of 20x Wash Buffer Concentrate with 570mL of deionized or distilled water to prepare 600mL of Wash Buffer. If crystals have formed in the concentrate Wash Buffer, warm to room temperature and mix gently until the crystals have completely dissolved.
3. **Standard\Sample(2 vials)** - porcine IgE Standard has a total of 2 vials. Each vial contains the standard sufficient for generating a standard curve. Reconstitute the Standard with 1.0mL of **Standard /Sample Diluent**. This reconstitution produces a stock solution of 30 ng/mL. Allow the standard to sit for a minimum of 15 minutes with gentle agitation prior to making dilutions. Pipette 500 $\mu\text{L}$  of **Standard /Sample Diluent** into 15ng/ml tube and the remaining tubes. Use the stock solution of 30ng/mL to produce a 2-fold dilution series (below). Mix each tube thoroughly(vortex 20 sec for each of dilution step) and change pipette tips between each transfer. The 15ng/mL standard serves as the high standard. The **Standard /Sample Diluent** serves as the zero standard (0 pg/mL)



### Preparation of porcine IgE standard dilutions

**\*If you do not run out of re-melting standard, store it at -20°C. Diluted standard shall not be reused.**

- Working solution of Biotin-Conjugate anti-porcine IgE antibody(1 vials)** - The lyophilized Detection Antibody should be stored at 4°C to -20°C in a manual defrost freezer for up to 6 months, if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains sufficient Detection Antibody for a 96-well plate. Add **110 µL** of sterile Biotin-Conjugate antibody Diluent to each vial and vortex 30 sec to obtain the stock solution. If the entire 96-well plate is used, take **25µL** of detection antibody stock solution into 10 mL of Biotin-Conjugate antibody Diluent to make working dilution of Detection Antibody and mix thoroughly prior to the assay. If the partial antibody is used. make a **1:400** dilution of the concentrated Biotin-Conjugate solution with the Biotin-Conjugate antibody Diluent in a clean plastic tube.

**\*The working solution should be used within one day after dilution.**

- Working solution of Streptavidin-HRP(120µL)** - Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains 120 µL HRP Conjugate sufficient for a 96-well plate. Make **1:100** dilutions in Reagent Diluent. If the entire 96-well plate is used, add **100 ul** of HRP Conjugate to 10 mL of Streptavidin-HRP Diluent to make working dilution of HRP Conjugate and mix thoroughly prior to the assay. The rest of undiluted HRP Conjugate can be stored at 4° C for up to 6 months. DO NOT FREEZE.

**\*The working solution should be used within one day after dilution.**

## ASSAY PROCEDURE

Prepare all reagents and standards as directed. Wash the plate 3 times before assay.



Add 100µl standard or samples to each well, shaking with Micro-oscillator (100r/min) to incubate 60 minutes at room temperature( $25 \pm 2^\circ\text{C}$ ).



Aspirate and wash 4 times

Add 100µl working solution of Biotin-Conjugate anti-porcine IgE antibody to each well, shaking with Micro-oscillator (100r/min) to incubate 60 minutes at room temperature( $25 \pm 2^\circ\text{C}$ ).



Aspirate and wash 4 times

Add 100µl working solution of Streptavidin-HRP to each well, shaking with Micro-oscillator (100r/min) to incubate 20 minutes at room temperature( $25 \pm 2^\circ\text{C}$ ).



Aspirate and wash 5 times

Add 100µl Substrate solution to each well, incubate 5-20 minutes (depending on signal) at room temperature( $25 \pm 2^\circ\text{C}$ ). Protect from light.



Add 50µl Stop solution to each well. Read at 450nm within 5 minutes.

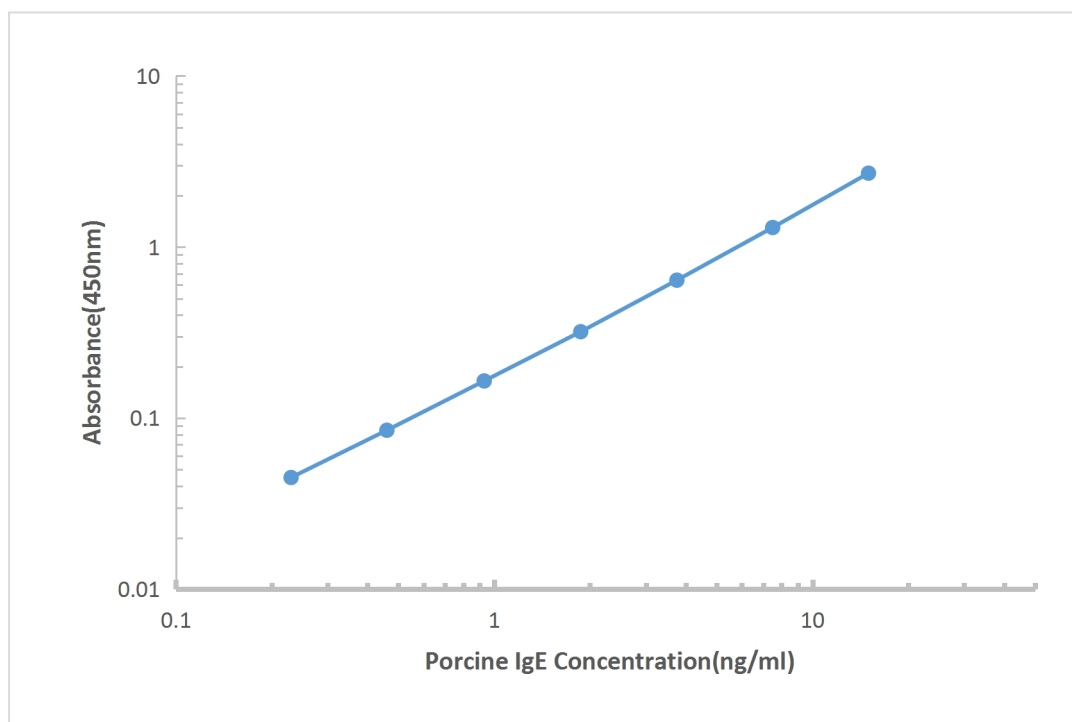
## CALCULATION OF RESULTS

1. The standard curve is used to determine the amount of specimens.
2. First, average the duplicate readings for each standard, control, and sample. All O.D. values are subtracted by the mean value of blank control before result interpretation.
3. Construct a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, 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.
4. The data may be linearized by plotting the log of the IgE concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.
5. This standard curve is provided for demonstration only. A standard curve should be generated for each set of samples assayed.



**Typical data using the IgE ELISA**

Std (ng/mL)	O.D.1	O.D.2	Averag	Correct
0	0.031	0.035	0.033	---
0.234	0.095	0.097	0.096	0.063
0.468	0.159	0.171	0.165	0.132
0.937	0.26	0.249	0.254	0.221
1.875	0.482	0.465	0.473	0.440
3.75	0.849	0.864	0.856	0.823
7.5	1.359	1.373	1.366	1.333
15	2.598	2.576	2.587	2.554


**Representative standard curve for IgE ELISA.**

## Performance Characteristics

**SENSITIVITY:** The minimum detectable dose was 10pg/mL.

**SPECIFICITY:** This assay recognizes both natural and recombinant porcine IgE. The factors listed below were prepared at 10ng/ml in Standard /sample Diluent and assayed for cross-reactivity and no significant cross-reactivity or interference was observed.

**BMP1, BMP2, BMP4, HGF, IL-1 $\beta$ , IL-1RA, IL-2, IL-5, IL-6, IL-8, IL-10, IL-12, IL-13, IL-15, IFN $\gamma$ , MMP-2, MMP-9, sIL-2R, sIL-6R, TGF $\beta$ 1, TGF $\beta$ 2, TGF $\beta$ 3, TLR1, TLR2, TLR3, TNF- $\alpha$ , TNF RI, TNF RII, VEGF.**

**REPEATABILITY:** The coefficient of variation of both intra-assay and inter-assay were less than 10%.

**RECOVERY:** The recovery of IgE spiked to three different levels in four samples throughout the range of the assay in various matrices was evaluated.

**Recovery of IgE in two matrices**

Sample Type	Average % of Expected Range (%)	Range (%)
Citrate plasma	94	86-103
Cell culture supernatants	96	89-106

**LINEARITY:** To assess the linearity of the assay, three samples were spiked with high concentrations of IgE in various matrices and diluted with the appropriate Sample Diluent to produce samples with values within the dynamic range of the assay. (The plasma samples were initially diluted 1:1)

Dilution ratio	Recovery (%)	Citrate plasma	Cell culture supernatants
1:2	Average% of Expected	92	103
	Range (%)	84-103	96-112
1:4	Average% of Expected	90	106
	Range (%)	80-99	97-115

## REFERENCES

1. Erb KJ (2007). *Eur J Immunol* **37** (5): 1170–1173.
2. Fitzsimmons C, McBeath R, Joseph S, et al. (2007). *Int. Arch. Allergy Immunol.* **142** (1): 40–50.
3. Watanabe N, Bruschi F, Korenaga M (2005). *Trends Parasitol.* **21** (4): 175–178.
4. Pfister K, Turner K, Currie A, et al. (1983). *Parasite Immunol* **5** (6): 587–593.
5. Gould H et al. (2003). *Annu Rev Immunol* **21**: 579–628.
6. Winter, WE; Hardt, NS; Fuhrman, S (2000). *Archives of pathology & laboratory medicine* **124** (9): 1382–5.
7. Ishizaka K, Ishizaka T, Hornbrook MM (1966). *J. Immunol.* **97** (1): 75–85.