



Sino Biological  
Biological Solution Specialist

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# Human Angiopoietin-2/Ang2 ELISA Kit

**Catalog Number: KIT10691**

Please read this instruction manual carefully before using the product.

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**For Research Use Only. Not for use in diagnostic or therapeutic procedures.**

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## **BACKGROUND**

Angiopoietin-2 (ANG 2, or ANGPT2), is a member of the ANG family, which plays an important role in angiogenesis during the development and growth of human cancers. Both ANGPT-1 and ANGPT-2 appear to bind to the tyrosine kinase receptor, Tie-2, found primarily on the luminal surface of endothelial cells. ANG-2's role in angiogenesis generally is considered as an antagonist for ANG1, inhibiting ANG1-promoted Tie2 signaling, which is critical for blood vessel maturation and stabilization. ANG-2 modulates angiogenesis in a cooperative manner with another important angiogenic factor, vascular endothelial growth factor A. Genetic studies have revealed that ANG-2 also is critical in lymphangiogenesis during development. ANG-2 has multiple physiologic effects that regulate vascular tone, hormone secretion, tissue growth and neural activity. Several reports indicate that ANG-2 can induce neovascularization in experimental systems due to the expression of different growth factors such as angiopoietin 2, vascular endothelial factor, and its receptor, fibroblast growth factor, platelet derived growth factor, transforming growth factor beta and epidermal growth factor. In addition, ANG-2 is strongly expressed in the vasculature of many tumors and it has been suggested that ANG-2 may act synergistically with other cytokines such as vascular endothelial growth factor to promote tumor-associated Angiogenesis and tumor progression.

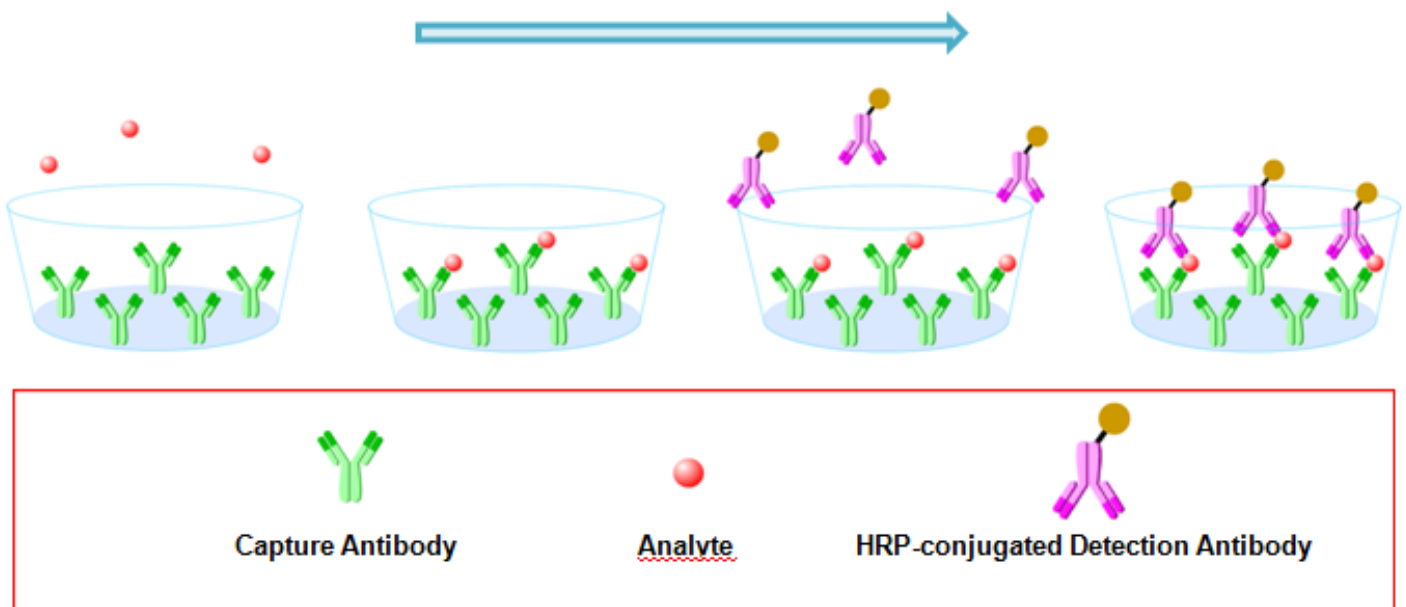
## **INTENDED USE**

For the quantitative determination of Human Angiopoietin-2/Ang2 concentration in serum and plasma.

**The use of this kit for other sample types need be validated by the end user due to the complexity of natural targets and unpredictable interference.**

## PRINCIPLE OF THE ASSAY

The principle of this ELISA kit is based on the solid phase sandwich enzyme immunoassay technique. A monoclonal antibody specific for Human Angiopoietin-2/Ang2 has been pre-coated onto well plate strips. Standards and samples are added to the wells and Human Angiopoietin-2/Ang2 present in the sample is bound by the immobilized antibody. After incubation the wells are washed and a horseradish peroxidase conjugated anti-Human Angiopoietin-2/Ang2 antibody is added, producing an antibody-antigen-antibody "sandwich complex". Following a wash to remove any unbound antibody a TMB substrate solution is loaded and color develops in proportion to the amount of Human Angiopoietin-2/Ang2 bound. The reaction is stopped by the addition of a stop solution and the intensity of the color can be measured at 450 nm (See schematics below).



## **MATERIALS PROVIDED**

Human Angiopoietin-2/Ang2 Microplate - 96 well polystyrene microplate (12 strips of 8 wells) coated with mouse mAb antibody against Human Angiopoietin-2/Ang2.

Human Angiopoietin-2/Ang2 Detection Antibody - 0.2 mg/mL of mouse mAb antibody against Human Angiopoietin-2/Ang2 conjugated to horseradish peroxidase (HRP) with preservatives.

Human Angiopoietin-2/Ang2 Standard - Recombinant Human Angiopoietin-2/Ang2 in a buffer with preservatives, lyophilized. The amount of standard is lot specific and indicated on the label of standard vial.

Wash Buffer Concentrate - 25 mL of a 20-fold concentrated solution of buffered surfactant with preservatives.

Dilution Buffer Concentrate - 8 mL of a 20-fold concentrated dilution buffer with preservatives.

Color Reagent A - 13 mL of stabilized hydrogen peroxide.

Color Reagent B - 13 mL of stabilized chromogen (tetramethylbenzidine).

Stop Solution - 8 mL of 2 N sulfuric acid.

## STORAGE

<b>Unopened Kit</b>	Store at 2 - 8°C and the kit is stable for 6 months upon receipt.	
<b>Opened/ Reconstituted Reagents</b>	Diluted Wash Buffer	Stored for up to 1 week at 2 - 8°C
	Diluted Dilution Buffer	
	Conjugate	Stored for up to 1 month at 2 - 8°C
	Stop Solution	
	Unmixed Color Reagent A	
	Unmixed Color Reagent B	
	Standard	After reconstitution, store for up to 1 month at -80°C.  The reconstituted standards should be aliquoted and  <b>avoid repeated freeze-thaw cycles.</b>
	Microplate Wells	Return unused strips to the foil pouch containing the desiccant pack and reseal along entire edge of zip-seal. Stored for up to 1 month at 2 - 8°C



## **OTHER SUPPLIES REQUIRED**

Microplate reader capable of measuring absorbance at 450 nm

Pipettes and pipette tips

Deionized or distilled water

Multi -channel pipette, squirt bottle, manifold dispenser, or automated microplate washer

500 mL graduated cylinder

Tubes for standard dilution

Well plate cover or seals

## **PRECAUTIONS**

1. This kit is **for research use only** and is not for use in diagnostic or therapeutic procedures.
2. The kit should not be used beyond the expiration date.
3. Do not mix reagents from different lots.
4. The kit is designed and tested to detect the specific targets and samples shown in the manual. The use of this kit for other purpose should be verified carefully by the end user.

## **SAFETY INSTRUCTIONS**

5. The Stop Solution provided with this kit is an acid solution. Take care when using the reagent to avoid the risk.
6. All biological materials should be handled and discarded as potentially hazardous following local laws and regulations.
7. Personal protective equipments such as lab coats, gloves, surgical masks and goggles are necessary in experiments for safety reasons.

## **TECHINICAL TIPS**

8. Bring all reagents and samples to room temperature before use.
9. Samples should be thawed completely and mixed well prior to analysis. Avoid repeated freeze-thaw cycles of frozen samples.
10. A standard curve should be generated for each set of sample assayed. **DO NOT USE** the standard curves from other plates or other days.
11. Use a new disposable reagent reservoir and new disposable pipette tips for each transfer to avoid cross-contamination.
12. Read the absorbance of each well within 20 minutes after adding the stop solution.

## SAMPLE COLLECTION AND STORAGE

**Serum** - Use a serum separator tube and allow samples to clot for 30 minutes before centrifugation for 15 minutes at 1000 x g. Remove serum and assay immediately or aliquot and store samples at -20°C or lower temperature. **Avoid repeated freeze-thaw cycles.**

**Plasma** - Collect plasma using heparin or EDTA as an anticoagulant. Centrifuge for 15 minutes at 1000 x g within 30 minutes of collection. Assay immediately or aliquot and store samples at -20 °C. **Avoid repeated freeze-thaw cycles.**

### Note:

The sample should be diluted to within the working range of the assay in 1 × dilution buffer. The exact dilution must be determined based on the concentration of specific target in individual samples.

## REAGENT PREPARATION

**Bring all reagents to room temperature before use. If crystals have formed in buffer solution, warm to room temperature and mix gently until the crystals have completely dissolved.**

**Wash Buffer** - Prepare 1 × wash buffer by adding 20 mL of Wash Buffer Concentrate to deionized or distilled water to prepare 400 mL of Wash Buffer.

**Dilution Buffer** - Prepare 1 × dilution buffer by adding 5 mL of Dilution Buffer Concentrate to deionized or distilled water to prepare 100 mL of Dilution Buffer.

**Detection Antibody** - Centrifuge at 10,000 x g for 20 seconds. Dilute to **work concentration** of 0.25 µg/mL in Dilution Buffer before use.

**Substrate Solution** - Color Reagents A and B should be mixed together in equal volumes within 15 minutes of use. Protect from light. 200 µL of the resultant mixture is required per well. **Take care not to contaminate the Color Reagent. If the mixed color reagent is blue. DO NOT USE.**

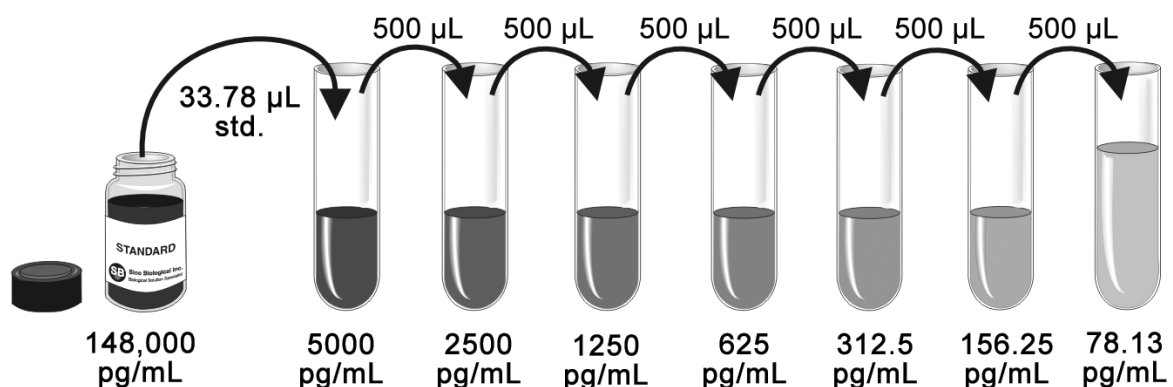
**Human Angiopoietin-2/Ang2 Standard** - Reconstitute the Human Angiopoietin-2/Ang2 Standard with 1 mL of Dilution Buffer to make stock solution.

Shake the vial gently until the lyophilized powder totally dissolved (**Do not turn the vial upside down**). Mix the standard to ensure complete reconstitution prior to making dilutions.

Prepare serially diluted standards as described in the following step:

Pipette 1000  $\mu\text{L}$  of Dilution Buffer into the 5000 pg/mL tube. Pipette 500  $\mu\text{L}$  of Dilution Buffer into the remaining tubes. Use the stock solution to produce a dilution series as the following figure. Mix each tube thoroughly before the next transfer. The 5000 pg/mL standard serves as the high standard. The Dilution Buffer serves as the zero standard (0 pg/mL). **Ensures each assay has a standard curve. DO NOT USE the standard curve on other plates or other days.**

The following graph is only for demonstration purposes. The concentration of stock solution is lot specific and need be calculated with the actual amount of standard labeled on the standard vial.



## ASSAY PROCEDURE

**Bring all reagents and samples to room temperature before use. It is recommended that all samples and standards be assayed in duplicate.**

1. Prepare all reagents, working standards, and samples as directed in the previous sections.
2. Remove unused microplate strips from the plate frame, return them to the foil pouch containing the desiccant pack, and reseal.
3. Wash each well three times with Wash Buffer (300  $\mu\text{L}$ /well) using a squirt bottle, multi-channel pipette, manifold dispenser or autowasher. **Complete removal of liquid at each step is essential to good performance. Remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.**
4. Add 100  $\mu\text{L}$  of each serially diluted protein standard or test sample per well including a zero standard. **Ensure reagent addition is uninterrupted and completed within 15 minutes.** Cover/seal the plate and incubate for 2 hours at room temperature.
5. Repeat the aspiration/wash as in Step 3.
6. Add 100  $\mu\text{L}$  of Detection Antibody in working concentration to each well. Cover/seal the plate and incubate for 1 hour at room temperature.
7. Repeat the aspiration/wash as in Step 3.
8. Add 200  $\mu\text{L}$  of Substrate Solution to each well. Incubate for 20 minutes at room temperature. **Protect from light.**
9. Add 50  $\mu\text{L}$  of Stop Solution to each well. If color change does not appear uniform, gently tap the plate to ensure thorough mixing.
10. **Determine the optical density of each well within 20 minutes**, using a microplate reader set to 450 nm.

## **CALCULATION OF RESULTS**

**If samples generate values higher than the highest standard, dilute the samples and repeat the assay.**

Calculate the mean absorbance for each standard, control and sample and subtract average zero standard optical density (O.D.) .

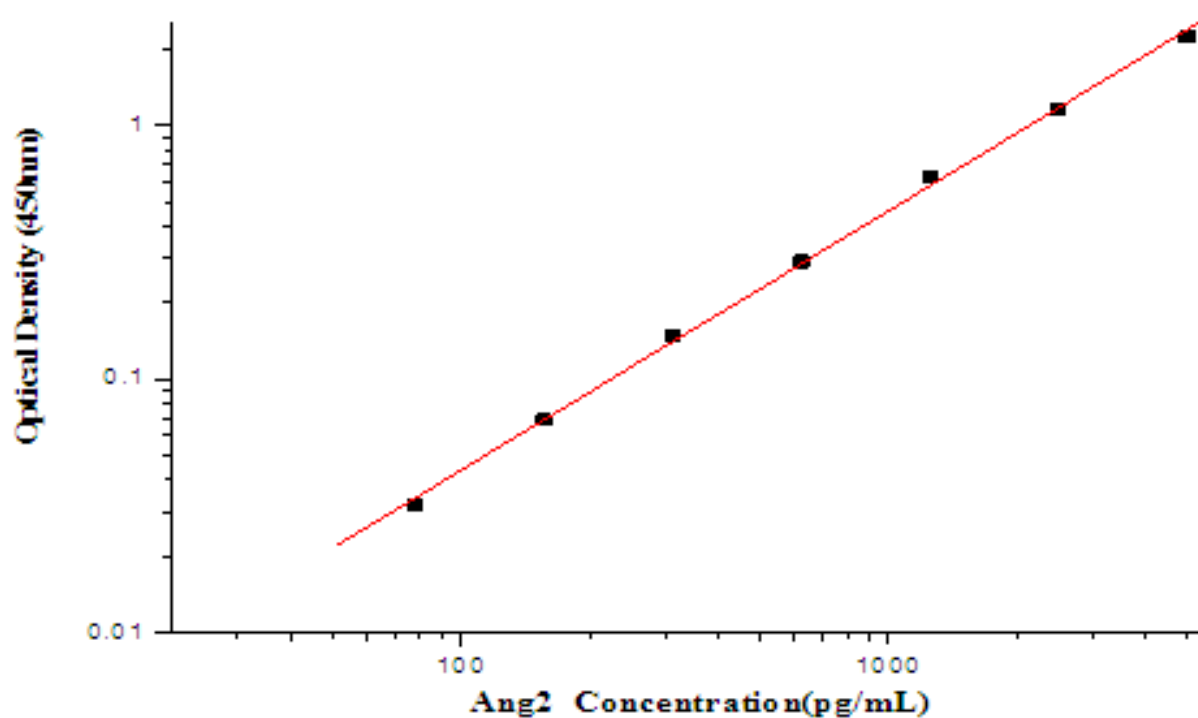
Construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph. Most graphing software can help make the curve and a four parameter logistic (4-PL) usually provide the best fit, though other equations (e.g. linear, log/log) can also be tried to see which provides the most accurate.

Extrapolate the target protein concentrations for unknown samples from the standard curve plotted.

## 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
78.13	0.032
156.25	0.069
312.5	0.147
625	0.291
1250	0.624
2500	1.154
5000	2.223



## PRECISION

### Intra-assay Precision (Precision within an assay)

Three samples of known concentration were tested twenty times on one plate to assess intra-assay precision.

### Inter-assay Precision (Precision between assays)

Three samples of known concentration were tested in five separate assays to assess inter-assay precision.

	Intra -assay Precision			Inter -assay Precision		
Sample	1	2	3	1	2	3
N	20	20	20	3	3	3
Mean (pg/mL)	867	1703	2978	911	1809	3085
SD	53.82	77.59	150.71	38.38	92.60	110.40
CV (%)	6.2%	4.6%	5.1%	4.2%	5.1%	3.6%

## RECOVERY

The recovery of Human Angiopoietin-2/Ang2 spiked to different levels throughout the range of the assay in related matrices was evaluated.

Sample	Average % Recovery	Range
Serum (n=3)	93	87 -103%
EDTA plasma (n=3)	84	81 -87%

## LINEARITY

		Serum	EDTA plasma
1:2	recovery of detected	105%	99%
1:4	recovery of detected	95%	101%
1:8	recovery of detected	92%	95%
1:16	recovery of detected	110%	104%



## **SENSITIVITY**

The minimum detectable dose (MDD) of Human Angiopoietin-2/Ang2 is typically less than 49.41 pg/mL. The MDD was determined by adding three standard deviations to the mean optical density value of twenty zero standard replicates and calculating the corresponding concentration.

## **CALIBRATION**

This immunoassay is calibrated against a highly purified HEK 293-expressed recombinant Human Angiopoietin-2/Ang2 produced at Sino Biological Inc., (Cat# 10691-H02H).

## SAMPLE VALUES

The average concentration of Human Ang2 in 10 normal human serum is 7.73 +/- 1.76 ng/mL ranging from 5.14 to 10.18 ng/mL. The average concentration of Human Ang2 in 10 normal human plasma is 9.68 +/- 3.2 ng/mL ranging from 4.81 to 15 ng/mL.

## SPECIFICITY

This assay recognizes both recombinant and natural Human Ang2. The factors listed below were prepared at 50 ng/mL in dilution buffer and assayed for cross-reactivity. No cross-reactivity was observed.

Recombinant human			
IL-1	IL-2	IL-33	IL-10
IL-8	TNF- $\alpha$	IL-4	IL-6
IFN- $\gamma$	MIP-1 $\beta$	TIMP-1	TIMP-2
GM-CSF	SCF	PDGF	VEGF
Tie-2	VEGF121	VEGF165	

Preparations of the factors listed below at 50 ng/mL in a mid-range recombinant human Ang2 control were assayed for interference. No significant interference was observed.

Recombinant human		
Tie-2	VEGF121	VEGF165

## TROUBLE SHOOTING

Problems	Possible Sources	Solutions
<b>No signal</b>	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
<b>Poor Standard Curve</b>	Standard was incompletely reconstituted or was inappropriately stored	Aliquot reconstituted standard and store at $-80^{\circ}\text{C}$ . The reconstituted standards should be aliquoted and avoid repeated freeze-thaw cycles.
	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
<b>Poor detection value</b>	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
<b>High Background</b>	Insufficient washes	Use multichannel pipettes without touching the reagents on the plate
		Increase cycles of washes and soaking time between washes
	Color Reagent should be clear and colorless prior to addition to wells	Color Reagent should be clear and colorless prior to addition to wells
	Use clean tubes and pipettes tips	Use clean plates, tubes and pipettes tips
<b>Non-specificity</b>	Samples were contaminated	Avoid cross contamination of samples
	The concentration of samples was too high	Try higher dilution rate of samples

## **PRECAUTIONS\_中文版**

### **注意事项:**

1. 本产品仅用于研究，不能用于临床诊断或治疗。
2. 试剂盒必须在保质期内使用。
3. 不允许混用来自不同试剂盒和不同CW12JL0203的试剂。
4. 本产品仅能够应用于检测说明书中标注的靶点抗原与样本。其它应用需经使用者设计验证后，根据结果评估使用的可靠性与准确性。

## **SAFETY INSTRUCTIONS\_中文版**

### **安全提示:**

1. 本试剂盒中的终止液为酸溶液,应注意小心操作。
2. 所有生物样本均具有潜在生物安全风险，使用者应严格按照当地法律和相关规定操作处理和丢弃样本。
3. 出于安全原因，操作者应穿戴个人防护装备，如实验服，手套，口罩和护目镜。

## **TECHINICAL TIPS\_中文版**

### **应用技巧:**

1. 使用前应将试剂盒的所有组分和待检样本温度恢复到室温。
2. 冻存样本检测前应彻底化冻并混匀，并注意避免反复冻融。
3. 每次试验均需制备相应的标准曲线，不同试剂盒以及不同天的标准曲线不能混用。
4. 注意在不同样本和步骤间及时更换加样槽和枪头，避免交叉污染。
5. 读取光吸收值应在加入终止液后二十分钟内完成。

# REAGENT PREPARATION\_中文版

## 试剂准备:

使用前应将试剂盒的所有组分和待检样本温度恢复到室温。

1×洗涤缓冲液配制 - 如浓缩洗涤缓冲液中已形成结晶，请平衡到室温至结晶完全溶解，混匀后取 20 mL 20×浓缩洗涤缓冲液至去离子水或超纯水中，定容至 400 mL。

1×稀释缓冲液的配制 - 如果浓缩稀释缓冲液中已形成结晶，请平衡到室温至结晶完全溶解，混匀后取 5 mL 20×浓缩稀释缓冲液至去离子水或超纯水中，定容至 100 mL。

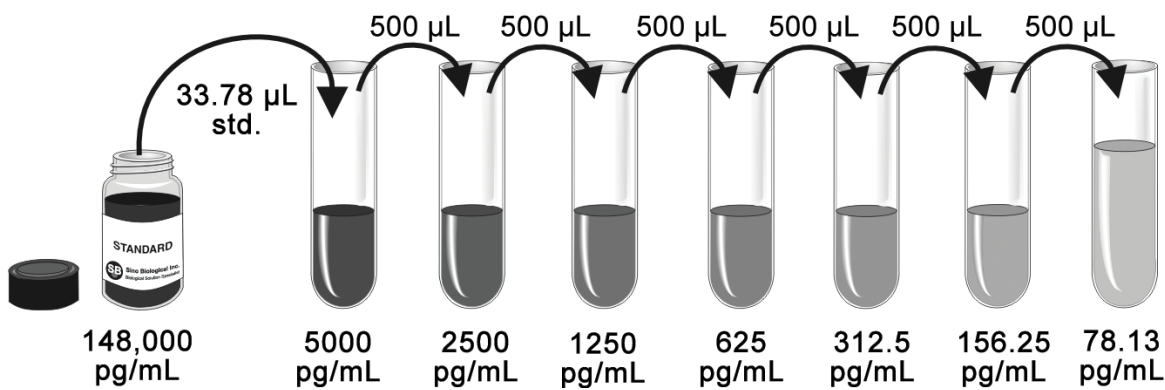
检测抗体的配制 - 使用前 10,000g 离心 20 秒，然后用 1×稀释缓冲液将酶标检测抗体稀释至工作浓度，0.25 μg/mL。

底物液的配制 - 使用前 15 分钟将显色 A 液、显色 B 液等体积混合，避光。确保底物液不被污染，如混合后的底物液已经变蓝，请勿使用。

标准品复溶 - 将 1mL 1×稀释液加入到冻干标准品的安瓶中制备标准品储液，充分溶解，混匀后（勿翻转管子）等体积分装，-80 度保存，复溶后的储液浓度应根据冻干标准品标签上的标注蛋白量进行计算。

标准曲线的制备 - 取 8 个管，按照标准品浓度依次进行标记，移取 1000 μL 1×稀释缓冲液至标记为 5000 pg/mL 的离心管中，其余各管移取 500 μL，根据标准品储液浓度计算 5000 pg/mL 标准品应移取的储液体积，加至离心管中，混匀，取 500 μL 至下一标记浓度的离心管中，混匀…进行一系列倍比稀释；5000 pg/mL 为标准曲线最高点，1×稀释缓冲液为空白（0 pg/mL）。每次试验均需制备相应的标准曲线，不同试剂盒以及不同天的标准曲线不能混用。

下图仅用于标准曲线制备范例展示，由于冻干标准品的批次差异，复溶后标准品储液的蛋白浓度不同，应根据实际浓度计算配制标准曲线所需的储液体积。



## ASSAY PROCEDURE\_中文版

### 试验流程:

使用前应将试剂盒的所有组分和待检样本温度恢复到室温。强烈建议所有的标准品和待检样本进行双复孔测定。

1. 按前述试剂准备项准备好各种试剂、标准品和待测样本。
2. 计算检测样本所需酶标条，将酶标条从铝箔袋取出，剩余的酶标条放回铝箔袋中并封好袋口，低温保存。
3. 洗板：用 1×洗涤缓冲液 (300  $\mu$  L/孔) 洗板三次，拍干酶标板。洗板对试验结果有重要影响，确保最后一次拍板没有洗液残留。
4. 样本孵育：加入标准品和待测样本，100  $\mu$  L/孔, 确保 15 分钟内完成点样，室温孵育 2 小时。
5. 洗板：弃去孔中液体，加入 1×洗涤缓冲液 (300  $\mu$  L/孔) 洗板三次，拍干酶标板。
6. 酶标检测抗体孵育：将预先配制至工作浓度的检测抗体加入酶标板中，100 $\mu$  L/孔，混匀，室温孵育 1 小时。
7. 洗板：弃去孔中液体，加入 1×洗涤缓冲液 (300  $\mu$  L/孔) 洗板三次，拍干酶标板。
8. 显色：将预先配制的底物液加入酶标板中，200  $\mu$  L/孔，混匀，室温避光孵育 20 分钟。
9. 终止：加入 50  $\mu$  L/孔终止液至酶标板中，轻轻震动酶标板至显色均匀。
10. 读值：20 分钟内读取 450nm 的光吸收值。

## CALCULATION OF RESULTS\_中文版

### 结果处理：

如果待测样本 OD 值超出标准曲线最高点 OD 值，需将样本进行稀释后重新测定。

取标准品、空白对照、样本的平均光吸收值，减去空白对照的平均光吸收值，得到标准品、样品的光吸收校准值。以标准品浓度为横坐标，校准后的标准品光吸收值为纵坐标绘制标准曲线。

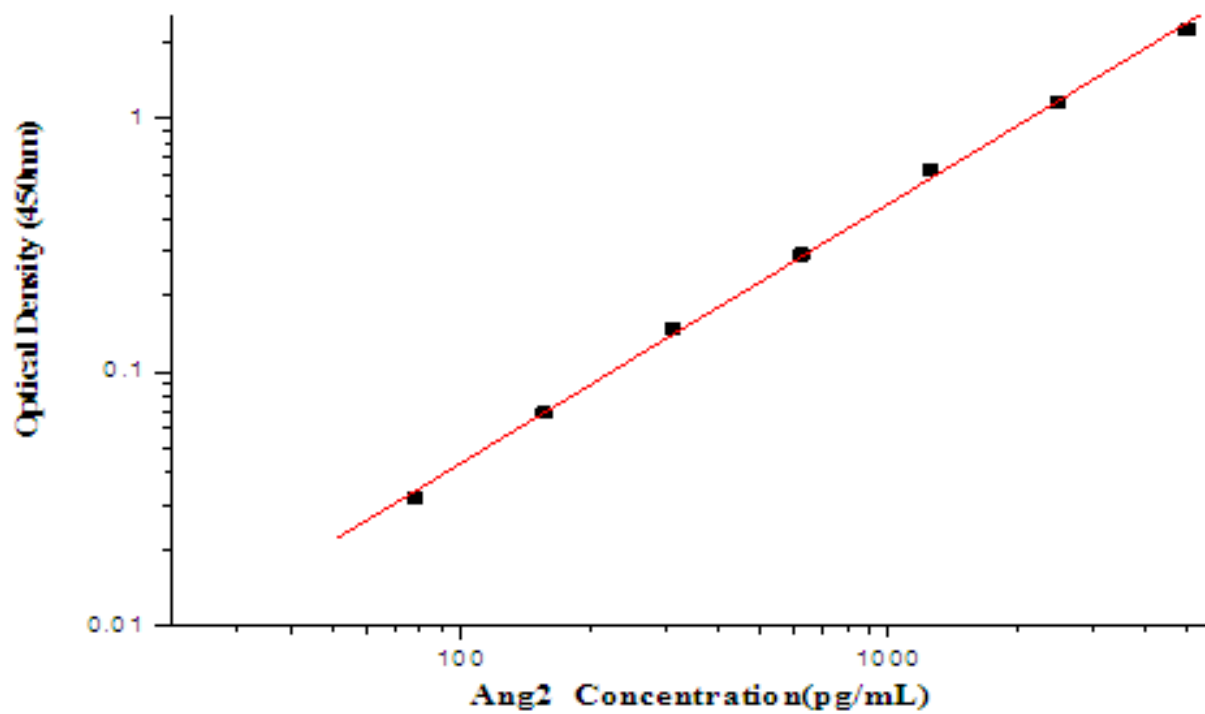
多种绘图和统计学软件可以用于辅助绘制标准曲线并进行未知样本浓度的计算。四参数拟合法往往曲线拟合效果较好，但其它方法如线性，双对数法也可能获得较好拟合结果，需要根据具体实验数据进行分析。

TYPICAL DATA\_中文版

示例数据

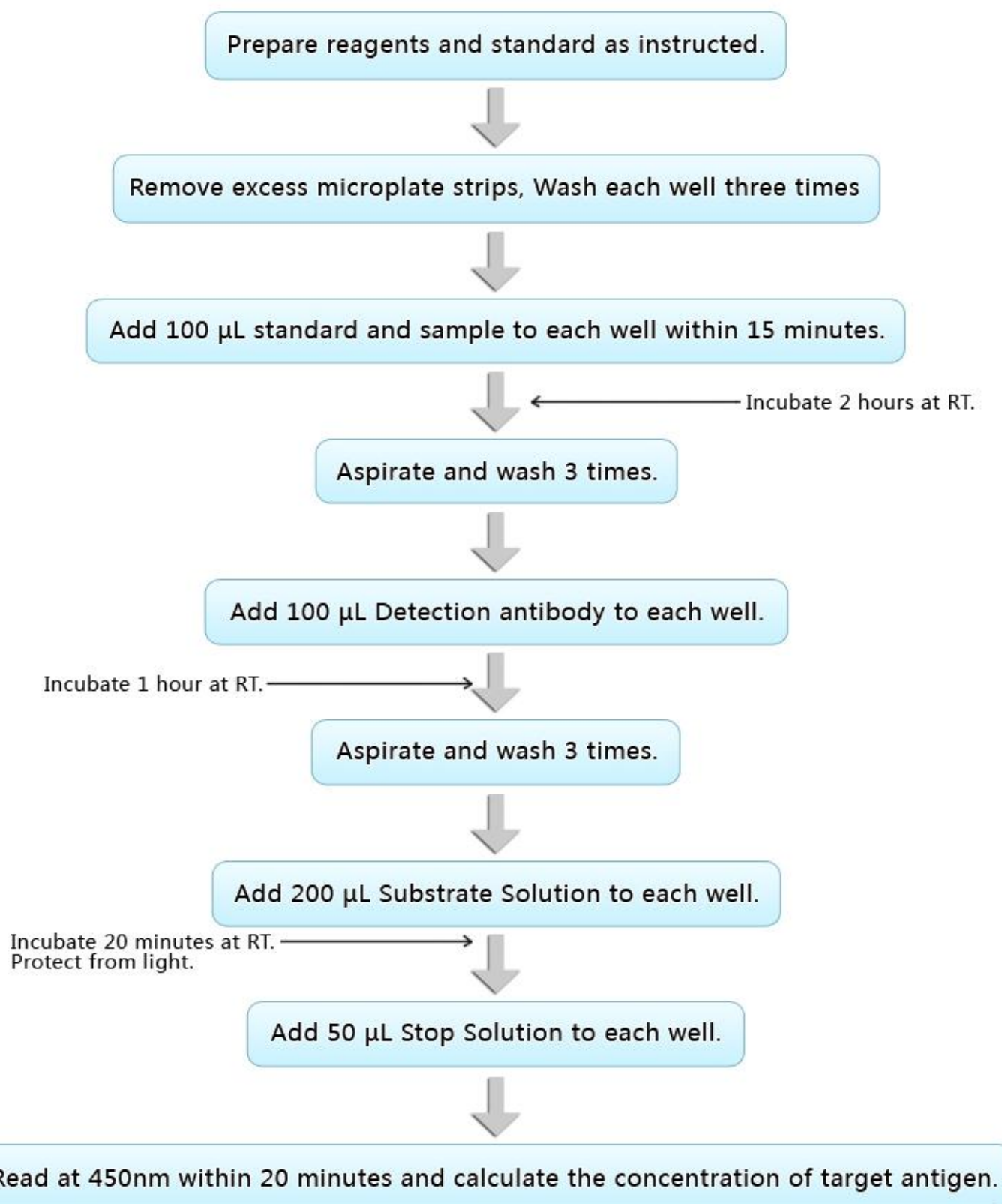
以下标准曲线图仅供参考，应以同次实验标准品所绘标准曲线计算标本含量。

Concentration ( pg/mL)	Zero standard subtracted OD
0	0
78.13	0.032
156.25	0.069
312.5	0.147
625	0.291
1250	0.624
2500	1.154
5000	2.223



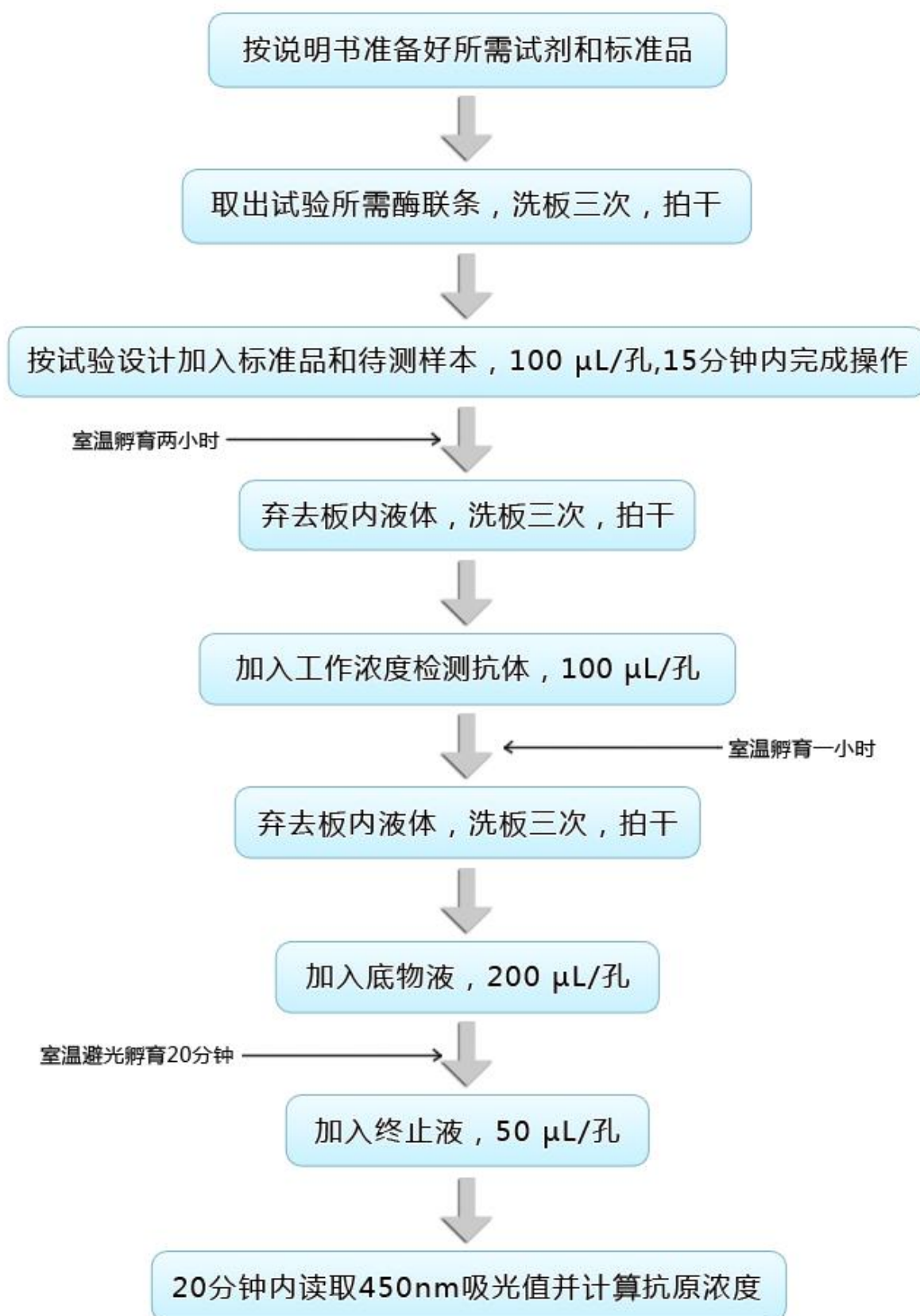


## ASSAY SUMMARY



## ASSAY SUMMARY\_中文版

### 实验流程汇总简图







<http://www.sinobiological.com>



Face book



Twitter



微信