

**(FOR RESEARCH USE ONLY. DO NOT USE IT IN CLINICAL DIAGNOSTICS !)**

## **Rat TGF- $\beta$ 2(Transforming Growth Factor Beta 2) CLIA Kit**

Catalog No: E-CL-R0664

96T/48T/24T

This manual must be read attentively and completely before using this product.

If you have any problems, please contact our Technical Service Center for help (info in the header of each page).

Phone: 240-252-7368(USA) 240-252-7376(USA)

Email: [techsupport@elabscience.com](mailto:techsupport@elabscience.com)

Website: [www.elabscience.com](http://www.elabscience.com)

Please refer to specific expiry date from label on the side of box.

Please kindly provide us with the lot number (on the outside of the box) of the kit for more efficient service.

## **Intended use**

This CLIA kit applies to the in vitro quantitative determination of Rat TGF- $\beta$ 2 concentrations in serum, plasma and other biological fluids.

## **Specification**

- Sensitivity: 4.69pg/mL.
- Detection Range: 7.81-500pg/mL
- Specificity: This kit recognizes Rat TGF- $\beta$ 2 in samples. No significant cross-reactivity or interference between Rat TGF- $\beta$ 2 and analogues was observed.
- Repeatability: Coefficient of variation is < 15%.

## **Test principle**

This CLIA kit uses the Sandwich-CLIA principle. The micro CLIA plate provided in this kit has been pre-coated with an antibody specific to Rat TGF- $\beta$ 2. Standards or samples are added to the micro CLIA plate wells and combined with the specific antibody. Then a biotinylated detection antibody specific for Rat TGF- $\beta$ 2 and Avidin-Horseradish Peroxidase (HRP) conjugate are added successively to each micro plate well and incubated. Free components are washed away. The substrate solution is added to each well. Only those wells that contain Rat TGF- $\beta$ 2, biotinylated detection antibody and Avidin-HRP conjugate will appear fluorescence. The Relative light unit (RLU) value is measured by the Chemiluminescence immunoassay analyzer. The RLU value is positively associated with the concentration of Rat TGF- $\beta$ 2. You can calculate the concentration of Rat TGF- $\beta$ 2 in the samples by comparing the RLU value of the samples to the standard curve.

## Kit components & Storage

An unopened kit can be stored at 4°C for 1 month. If the kit is not used within 1 month, store the items separately according to the following conditions once the kit is received

Item	Specifications	Storage
Micro CLIA Plate	96T: 8 wells ×12 strips 48T: 8 wells ×6 strips 24T: 8 wells ×3 strips	-20°C, 6 months
Reference Standard	96T: 2 vials 48T: 1 vial 24T: 1 vial	
Concentrated Biotinylated Detection Ab(100×)	96T: 1vial, 120μL 48T: 1vial, 60μL 24T: 1vial, 60μL	
Concentrated HRP Conjugate(100×)	96T: 1vial, 120μL 48T: 1vial, 60μL 24T: 1vial, 60μL	-20°C(Protect from light), 6 months
Reference Standard & Sample Diluent	1vial, 20mL	4°C, 6 months
Biotinylated Detection Ab Diluent	1vial, 14mL	
HRP Conjugate Diluent	1vial, 14mL	
Concentrated Wash Buffer (25×)	1vial, 30mL	
Substrate Reagent A	1vial, 5mL	4°C(Protect from light)
Substrate Reagent B	1vial, 5mL	4°C(Protect from light)
Desiccant	1 copy	
Plate Sealer	5pieces	
Manual	1 copy	
Certificate of Analysis	1 copy	

**Note:** All reagent bottle caps must be tightened to prevent evaporation and microbial pollution. The volume of reagents in partial shipments is a little more than the volume marked on the label, please use accurate measuring equipment instead of directly pouring into the vial(s).

## Other supplies required

Chemiluminescence immunoassay analyzer

High-precision transfer pipette, EP tubes and disposable pipette tips

Incubator capable of maintaining 37°C  
Deionized or distilled water  
Absorbent paper  
Loading slot for Wash Buffer  
Reagents for acid activation: HCL, NaOH, HEPES

## Note

1. Please wear lab coats, eye protection and latex gloves for protection. Please perform the experiment following the national security protocols of biological laboratories, especially when detecting blood samples or other bodily fluids.
2. A freshly opened CLIA Plate may appear to have a water-like substance, which is normal and will not have any impact on the experimental results.
3. Do not reuse the reconstituted standard, biotinylated detection Ab working solution, concentrated HRP conjugate working solution. The unspent undiluted concentrated biotinylated detection Ab (100×) and other stock solutions should be stored according to the storage conditions in the above table.
4. Do not mix or use components from other lots.
5. Change pipette tips in between adding standards, in between sample additions, and in between reagent additions. Also, use separate reservoirs for each reagent.

## Sample collection

**Serum:** Allow samples to clot for 2 hours at room temperature or overnight at 4°C before centrifugation for 15 minutes at 1000×g at 2~8°C. Collect the supernatant to carry out the assay. Blood collection tubes should be disposable, non-endotoxin.

**Plasma:** Allow samples to clot for 2 hours at room temperature or overnight at 4°C before centrifugation for 15 min at 1000×g at 2~8°C. Collect the supernatant to carry out the assay. Blood collection tubes should be disposable and be non-endotoxin.

**Cell lysates:** For adherent cells, gently wash the cells with moderate amount of pre-cooled PBS and dissociate the cells using trypsin. Collect the cell suspension into a centrifuge tube and centrifuge for 5 min at 1000×g. Discard the medium and wash the cells 3 times with pre-cooled PBS. For each  $1 \times 10^6$  cells, add 150-250 μL of pre-cooled PBS to keep the cells suspended. Repeat the freeze-thaw process several times until the cells are fully lysed. Centrifuge for 10min at 1500×g at 4°C. Remove the cell fragments, collect the supernatant to carry out the assay. Avoid repeated freeze-thaw cycles.

**Tissue homogenates:** It is recommended to get detailed references from the literature before analyzing different tissue types. For general information, hemolysed blood may affect the results, so the tissues should be minced into small pieces and rinsed in ice-cold PBS (0.01M, pH=7.4) to remove excess blood thoroughly. Tissue pieces should be weighed and then homogenized in PBS (tissue weight (g): PBS (mL) volume=1:9) with a glass homogenizer on ice. To further break down the cells, you can sonicate the suspension with an ultrasonic cell disrupter or subject it to freeze-thaw cycles. The homogenates are then centrifuged for 5 min at 5000×g to get the supernatant.

**Cell culture supernatant or other biological fluids:** Centrifuge samples for 20 minutes at 1000×g at 2~8°C. Collect the supernatant and carry out the assay immediately.

### **Sample Activation**

TGF-β in biological samples usually exist in unactivated forms. So it must be activated before testing.

#### **Acid activation:**

**Serum/ Plasma:** Add 20uL of 1M HCL to 40uL samples, mix well, incubate 10-30 minutes at room temperature. Neutralize the acidified sample by adding 20 μL of 1.2 M NaOH/0.5 M HEPES, mix well. At last, add 320uL Reference Standard & Sample Diluent, mix well and test.

**Note: Sample is diluted 10 times.**

**Cell Culture Supernates:** Add 20uL of 1M HCL to 100uL samples, mix well, incubate 10-30 minutes at room temperature. Neutralize the acidified sample by adding 20 μL of 1.2 M NaOH/0.5 M HEPES, mix well, add 60uL Reference Standard & Sample Diluent and test.

**Note: Sample is diluted 2 times.**

### **Note for sample**

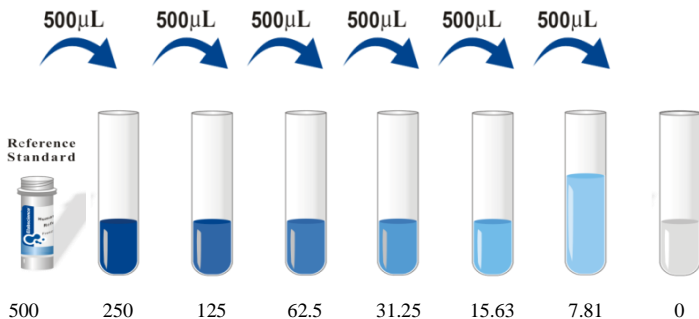
1. Samples should be used within 7 days when stored at 4°C, otherwise samples must be divided up and stored at -20°C (≤1month) or -80°C (≤3months). Avoid repeated freeze-thaw cycles.
2. Please predict the concentration before assaying. If the sample concentration is not within the range of the standard curve, users must determine the optimal sample dilutions for their particular experiments.
3. If the sample type is not included in the manual, a preliminary experiment is suggested to verify the validity.

4. If a lysis buffer is used to prepare tissue homogenates or cell culture supernatant, there is a possibility to cause a deviation due to the introduced chemical substance.
5. Some recombinant protein may not be detected due to a mismatching with the coated antibody or detection antibody.

### Reagent preparation

1. Bring all reagents to room temperature (18~25°C) before use.
2. **Wash Buffer:** Dilute 30 mL of Concentrated Wash Buffer with 720 mL of deionized or distilled water to prepare 750 mL of Wash Buffer. Note: if crystals have formed in the concentrate, warm it in a 40°C water bath and mix it gently until the crystals have completely dissolved.
3. **Standard working solution:** Centrifuge the standard at 10,000×g for 1 min. Add 1.0 mL of Reference Standard & Sample Diluent, let it stand for 10 min and invert it gently several times. After it dissolves fully, mix it thoroughly with a pipette. This reconstitution produces a working solution of 500 pg/mL. Then make serial dilutions as needed. The recommended dilution gradient is as follows: 500、250、125、62.5、31.25、15.63、7.81、0 pg/mL.

Dilution method: Take 7 EP tubes, add 500uL of Reference Standard & Sample Diluent to each tube. Pipette 500µL of the 500pg/mL working solution to the first tube and mix up to produce a 250pg/mL working solution. Pipette 500µL of the solution from the former tube into the latter one according to these steps. The illustration below is for reference. Note: the last tube is regarded as a blank. Don't pipette solution into it from the former tube.



4. **Biotinylated Detection Ab working solution:** Calculate the required amount before the experiment (100  $\mu\text{L}$ /well). In preparation, slightly more than calculated should be prepared. Centrifuge the stock tube before use, dilute the 100 $\times$  Concentrated Biotinylated Detection Ab to 1 $\times$ working solution with Biotinylated Detection Ab Diluent.
5. **Concentrated HRP Conjugate working solution:** Calculate the required amount before the experiment (100  $\mu\text{L}$ /well). In preparation, slightly more than calculated should be prepared. Dilute the 100 $\times$  Concentrated HRP Conjugate to 1 $\times$  working solution with Concentrated HRP Conjugate Diluent.
6. **Substrate Mixture Solution:** Calculate the required amount before the experiment (100 $\mu\text{L}$ /well). In preparation, slightly more than calculated should be prepared. Mix the Substrate Reagent A and B with equal volumes before use. Note: don't open the vial until you need it.

**Assay procedure** (A brief assay procedure is on the 12<sup>th</sup> page)

1. Add the **Standard working solution** to the first two columns: Each concentration of the solution is added in duplicate, to one well each, side by side (100  $\mu\text{L}$  for each well). Add the samples to the other wells (100  $\mu\text{L}$  for each well). Cover the plate with the sealer provided in the kit. Incubate for 90 min at 37 $^{\circ}\text{C}$ . Note: solutions should be added to the bottom of the micro CLIA plate well, avoid touching the inside wall and causing foaming as much as possible.
2. Remove the liquid out of each well, don't wash. Immediately add 100 $\mu\text{L}$  of **Biotinylated Detection Ab working solution** to each well. Cover with the Plate sealer. Gently mix up. Incubate for 1 hour at 37 $^{\circ}\text{C}$ .
3. Aspirate or decant the solution from each well, add 350 $\mu\text{L}$  of **wash buffer** to each well. Soak for 1~2 minutes and aspirate or decant the solution from each well and pat it dry against clean absorbent paper. Repeat this wash step 3 times in total. Note: a microplate washer can be used in this step and other wash steps.
4. Add 100 $\mu\text{L}$  of **HRP Conjugate working solution** to each well. Cover with the Plate sealer. Incubate for 30 minutes at 37 $^{\circ}\text{C}$ .
5. Aspirate or decant the solution from each well, repeat the wash process for five times as conducted in step 3.
6. Add 100 $\mu\text{L}$  of **Substrate Mixture Solution** to each well. Cover with a new plate sealer. Incubate for not more than 5 minutes at 37 $^{\circ}\text{C}$ . Protect the plate from light.
7. Determine the RLU value of each well at once.

## Calculation of results

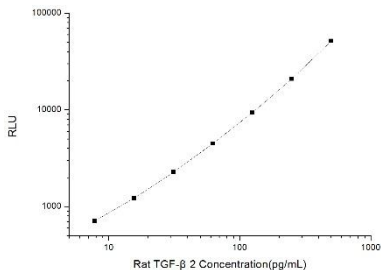
Average the duplicate readings for each standard and samples, then subtract the average zero standard RLU. Plot a four parameter logistic curve on log-log graph paper, with standard concentration on the x-axis and RLU values on the y-axis.

If the samples have been diluted, the concentration calculated from the standard curve must be multiplied by the dilution factor. If the RLU of the sample surpasses the upper limit of the standard curve, you should re-test it with an appropriate dilution. The actual concentration is the calculated concentration multiplied by the dilution factor.

## Typical data

As the RLU values of the standard curve may vary according to the conditions of the actual assay performance (e.g. operator, pipetting technique, washing technique or temperature effects), the operator should establish a standard curve for each test. Typical standard curve and data is provided below for reference only.

Concentration(pg/mL)	500	250	125	62.5	31.25	15.63	7.81	0
RLU 1	50502	21717	10207	4366	2385	1404	758	31
RLU 2	58484	24147	8607	5144	2317	1284	812	33
Average RLU	54493	22932	9407	4755	2351	1344	785	32
Corrected RLU	54461	22900	9375	4723	2319	1312	753	---





## Precision

Intra-assay Precision (Precision within an assay): 3 samples with low, mid range and high level Rat TGF- $\beta$ 2 were tested 20 times on one plate, respectively.

Inter-assay Precision (Precision between assays): 3 samples with low, mid range and high level Rat TGF- $\beta$ 2 were tested on 3 different plates, 20 replicates in each plate.

Sample	Intra-assay Precision			Inter-assay Precision		
	1	2	3	1	2	3
n	20	20	20	20	20	20
Mean(pg/mL)	25.94	48.58	232.06	27.05	49.1	219.13
Standard deviation	2.46	3.51	17.89	2.62	3.76	19.13
CV (%)	9.48	7.23	7.71	9.69	7.66	8.73

## Recovery

The recovery of Rat TGF- $\beta$ 2 spiked at three different levels in samples throughout the range of the assay was evaluated in various matrices.

Sample Type	Range (%)	Average Recovery (%)
Serum (n=5)	93-107	100
EDTA plasma (n=5)	93-107	100
Cell culture media (n=5)	86-99	92

## Linearity

Samples were spiked with high concentrations of Rat TGF- $\beta$ 2 and diluted with Reference Standard & Sample Diluent to produce samples with values within the range of the assay.

		Serum (n=5)	EDTA plasma (n=5)	Cell culture media (n=5)
1:2	Range (%)	96-111	85-98	90-101
	Average (%)	103	92	96
1:4	Range (%)	94-109	99-115	94-112
	Average (%)	102	106	102
1:8	Range (%)	92-107	89-101	95-111
	Average (%)	99	95	103
1:16	Range (%)	86-101	101-119	93-108
	Average (%)	93	109	100

## Troubleshooting

Problem	causes	solutions
Poor standard curve	Inaccurate pipetting	Check pipettes.
	Improper standard dilution	Ensure briefly spin the vial of standard and dissolve the powder thoroughly by gentle mixing.
	Wells are not completely aspirated	Completely aspirate wells between steps.
Low fluorescence	Insufficient incubation time	Ensure sufficient incubation time.
	Incorrect assay temperature	Use recommended incubation temperature. Bring substrate to room temperature before use.
	Inadequate reagent volumes	Check pipettes and ensure correct preparation.
	Improper dilution	
Large CV	Inaccurate pipetting	Check pipettes
High background	Concentration of target protein is too high	Use recommended dilution factor.
	Plate is insufficiently washed	Review the manual for proper wash. If using a plate washer, check that all ports are unobstructed.
	Contaminated wash buffer	Prepare fresh wash buffer.
Low sensitivity	Improper storage of the CLIA kit	All the reagents should be stored according to the instructions.
	Too long incubation time	Ensure precise incubation time.

## SUMMARY

1. Add 100 $\mu$ L standard or sample to each well. Incubate 90 minutes at 37°C
2. Remove the liquid. Add 100 $\mu$ L Biotinylated Detection Ab. Incubate 1 hour at 37°C
3. Aspirate and wash 3 times
4. Add 100 $\mu$ L HRP Conjugate. Incubate 30 minutes at 37°C
5. Aspirate and wash 5 times
6. Add 100 $\mu$ L Substrate Mixture Solution. Incubate 5 minutes at 37°C
7. Determine the RLU value
8. Calculation of results

## **Declaration**

1. Limited by current conditions and scientific technology, we can't conduct comprehensive identification and analysis on all the raw material provided. So there might be some qualitative and technical risks for users using the kit.
2. The final experimental results will be closely related to the validity of products, operational skills of the operators and the experimental environments. Please make sure that sufficient samples are available.
3. To get the best results, please only use the reagents supplied by the manufacturer and strictly comply with the instructions!
4. Incorrect results may occur because of incorrect operations during the reagents preparation and loading, as well as incorrect parameter settings of the Chemiluminescence immunoassay analyzer. Please read the instructions carefully and adjust the instrument prior to the experiment.
5. Even the same operator might get different results in two separate experiments. In order to get reproducible results, the operation of every step in the assay should be controlled.
6. Every kit has strictly passed QC test. However, results from end users might be inconsistent with our data due to some variables such as transportation conditions, different lab equipments, and so on. Intra-assay variance among kits from different batches might arise from the above reasons, too.