

Human Granzyme B ELISA Kit

Catalog No:	CDK055A 1 x 96 tests CDK055B 2 x 96 tests
Specificity:	Recognizes both native and recombinant human Granzyme B
Range:	31.25 pg/ml - 1000 pg/ml
Sensitivity:	<20 pg/ml
Incubation:	From sample to end: 3 hr 45 min
Sample Types:	Serum, Plasma, Cell culture supernatant
Sample Size:	100 µl
Cross-reactivity:	No cross reactivity with Trail, TNFα, IFNγ, Fas, IL-1α, IL-4, IL-6, IL-8, IL-13

1. INTENDED USE

The Human Granzyme B ELISA is to be used for the *in vitro* quantitative determination of Granzyme B in human serum, plasma, buffered solutions or cell culture medium. **This kit has been configured for research use only.**

2. PRINCIPLE OF THE METHOD

The Human Granzyme B Kit is a solid phase sandwich Enzyme Linked-Immuno-Sorbent Assay (ELISA). A monoclonal antibody specific for Granzyme B has been coated onto the wells of the microtiter strips provided. Samples, including standards of known Granzyme B concentrations and unknowns are pipetted into these wells. During the first incubation, the Granzyme B antigen and a biotinylated monoclonal antibody specific for Granzyme B are simultaneously incubated.

After washing, the enzyme (streptavidin-peroxidase) is added. After incubation and washing to remove all the unbound enzyme, a substrate solution which is acting on the bound enzyme is added to induce a colored reaction product. The intensity of this colored product is directly proportional to the concentration of Granzyme B present in the samples.

3. REAGENTS PROVIDED AND RECONSTITUTION

PART NUMBER	REAGENTS (Store at 2-4°C)	QUANTITY 1 or 2 plate kit	RECONSTITUTION
CDK055B-P	96-well microtiter plates	1-2	Ready-to-use (Precoated)
CDK055B-Z	Plastic plate covers	2-4	
CDK055B-A	Standard : 1,000 pg/ml	2-4 Vials	Reconstitute with 2.09 ml , prepared Standard Diluent
CDK055B-B	Standard Diluent Buffer	1 Vial	10X Concentrate, Dilute in distilled water.
CDK055B-C	Biotinylated anti-Granzyme B	1-2 Vials (0.4 ml)	Dilute in biotinylated antibody diluent.



CDK055B-D	Biotinylated Antibody Diluent	1 Vial	Ready-to-use
CDK055B-E	Streptavidin-HRP	2-4 Vials (5 µl)	Add 0.5 ml of HRP-Diluent before use.
CDK055B-F	Streptavidin-HRP Diluent	1 Vial	Ready-to-use
CDK055B-G	Washing Buffer	1-2 Vials (10 ml)	200X Concentrate, Dilute in distilled water.
CDK055B-H	TMB Substrate	1 Vial	Ready-to-use
CDK055B-I	Stop Reagent H ₂ SO ₄	1-2 Vials (11 ml)	Ready-to-use

4. MATERIALS REQUIRED BUT NOT PROVIDED

- Microtiter plate reader fitted with appropriate filters (450 nm required with optional 620 nm reference filter)
- Microplate washer or wash bottle
- 10, 50, 100, 200 and 1,000 µl adjustable single channel micropipettes with disposable tips
- 50-300 µl multi-channel micropipette with disposable tips
- Multichannel micropipette reagent reservoirs
- Distilled water
- Vortex mixer
- Miscellaneous laboratory plastic and/or glass, if possible sterile

5. STORAGE INSTRUCTIONS

Store kit reagents between 2 and 8°C. Immediately after use remaining reagents should be returned to cold storage (2-8°C). Expiration of the kit and reagents is stated on the box front labels. The expiration of the kit components can only be guaranteed if the components are stored properly, and if, in case of repeated use of one component, the reagent is not contaminated by the first handling.

Wash Buffer: Once prepared, store at 2-8°C for up to 1 week.

Standard Diluent Buffer: Once prepared, store at 2-8°C for up to 1 week.

Standards: Once prepared, use immediately and do not store.

Biotinylated Secondary Antibody: Once prepared, use immediately and do not store.

Streptavidin-HRP: Once prepared, use immediately and do not store.

6. SPECIMEN COLLECTION, PROCESSING AND STORAGE

Cell culture supernatants, human serum, plasma or other biological samples will be suitable for use in the assay. Remove serum from the clot or red cells, respectively, as soon as possible after clotting and separation.

Cell culture supernatants: Remove particulates and aggregates by spinning at approximately 1000 x g for 10 min.

Serum: Use pyrogen/endotoxin free collecting tubes. Serum should be removed rapidly and carefully from the red cells after clotting. Following clotting, centrifuge at approximately 1000 x g for 10 min and remove serum.



Plasma: EDTA, citrate and heparin plasma can be assayed. Spin samples at 1000 x g for 30 min to remove particulates. Harvest plasma.

Storage: If not analyzed shortly after collection, samples should be aliquoted (250-500 µl) to avoid repeated freeze-thaw cycles and stored frozen at -70°C. Avoid multiple freeze-thaw cycles of frozen specimens.

Recommendation: Do not thaw by heating at 37°C or 56°C. Thaw at room temperature and make sure that sample is completely thawed and homogeneous before use. When possible avoid use of badly hemolyzed or lipemic sera. If large amounts of particles are present, these should be removed prior to use by centrifugation or filtration.

7. SAFETY AND PRECAUTIONS FOR USE

- Handling of reagents, serum or plasma specimens should be in accordance with local safety procedures, e.g.CDC/NIH Health manual: "Biosafety in Microbiological and Biomedical Laboratories" 1984.
- Laboratory gloves should be worn at all times.
- Avoid any skin contact with H₂SO₄ and TMB. In case of contact, wash thoroughly with water.
- Do not eat, drink, smoke or apply cosmetics where kit reagents are used.
- Do not pipette by mouth.
- When not in use, kit components should be stored refrigerated or frozen as indicated on vials or bottle labels.
- All reagents should be warmed to room temperature before use. Lyophilized standards should be discarded after use.
- Once the desired number of strips has been removed, immediately reseal the bag to protect the remaining strips from deterioration.
- Cover or cap all reagents when not in use.
- Do not mix or interchange reagents between different lots.
- Do not use reagents beyond the expiration date of the kit.
- Use a clean disposable plastic pipette tip for each reagent, standard, or specimen addition in order to avoid cross contamination. For the dispensing of H₂SO₄ and substrate solution, avoid pipettes with metal parts.
- Use a clean plastic container to prepare the washing solution.
- Thoroughly mix the reagents and samples before use by agitation or swirling.
- All residual washing liquid must be drained from the wells by efficient aspiration or by decantation followed by tapping the plate forcefully on absorbent paper. Never insert absorbent paper directly into the wells.
- The TMB solution is light sensitive. Avoid prolonged exposure to light. Also, avoid contact of the TMB solution with metal to prevent color development. Warning TMB is toxic avoid direct contact with hands. Dispose of properly.
- If a dark blue color develops within a few minutes after preparation, this indicates that the TMB solution has been contaminated and must be discarded. Read absorbance within 1 hour after completion of the assay.
- When pipetting reagents, maintain a consistent order of addition from well-to-well. This will ensure equal incubation times for all wells.
- Follow incubation times described in the assay procedure.
- Dispense the TMB solution within 15 min of the washing of the microtiter plate.



8. ASSAY PREPARATION

Bring all reagents to room temperature before use.

8.1 Assay Design

Determine the number of microwell strips required to test the desired number of samples plus appropriate number of wells needed for running zeros and standards. Each sample, standard, zero and control should be tested in duplicate. Remove sufficient Microwell Strips for testing from the aluminum pouch immediately prior to use. Return any wells not required for this assay with desiccant to the pouch. Seal tightly and return to 2-8°C storage.

Example plate layout (example shown for a 6 point standard curve)

	Standards (pg/mL)		Sample Wells									
	1	2	3	4	5	6	7	8	9	10	11	12
A	1000	1000										
B	500	500										
C	250	250										
D	125	125										
E	62.5	62.5										
F	31.25	31.25										
G	zero	zero										
H												

All remaining empty wells can be used to test samples in duplicate

8.2 Preparation of Wash Buffer

Dilute the (200x) wash buffer concentrate 200 fold with distilled water to give a 1x working solution. Pour entire contents (10 ml) of the Washing Buffer Concentrate into a clean 2,000 ml graduated cylinder. Bring final volume to 2,000 ml with glass-distilled or deionized water. Mix gently to avoid foaming. Transfer to a clean wash bottle and store at 2-8°C for up to 1 week.

8.3 Preparation of Standard Diluent Buffer

Add the contents of the vial (10x concentrate) to 225ml of distilled water before use. This Solution can be stored at 2-8°C for up to 1 week.

8.4 Preparation of Standard

Standards are reconstituted with **lot specific** volume of standard buffer diluent, **2.09 ml**, prior to use. This reconstitution produces a stock solution of 1000 pg/ml Granzyme B. **Mix the reconstituted standard gently by inversion only.** Serial dilutions of the standard are made directly in the assay plate to provide the concentration range from 1000 to 31.25 pg/ml. A fresh standard curve should be produced for each new assay.

- Immediately after reconstitution add 200 µl of the reconstituted standard to wells A1 and A2, which provides the highest concentration standard at 1000 pg/ml
- Add 100 µl of Standard Diluent to the remaining standard wells B1 and B2 to F1 and F2
- Transfer 100 µl from wells A1 and A2 to B1 and B2. Mix the well contents by repeated aspirations and ejections taking care not to scratch the inner surface of the wells
- Continue this 1:1 dilution using 100 µl from wells B1 and B2 through to wells F1 and F2 providing a serial diluted standard curve ranging from 1000 pg/ml to 31.25 pg/ml
- Discard 100 µl from the final wells of the standard curve (F1 and F2)

Alternatively these dilutions can be performed in separate clean tubes and immediately transferred directly into the relevant wells.



8.5 Preparation of Biotinylated anti-Granzyme B

It is recommended this reagent is prepared immediately before use. Dilute the biotinylated anti-Granzyme B with the biotinylated antibody diluent in an appropriate clean glass vial using volumes appropriate to the number of required wells. Please see example volumes below:

Number of Wells used	Biotinylated Antibody (μ l)	Biotinylated Antibody Diluent (μ l)
16	40	1060
24	60	1590
32	80	2120
48	120	3180
96	240	6360

8.6 Preparation of Streptavidin-HRP

It is recommended to centrifuge vial for a few seconds in a microcentrifuge to collect all the volume at the bottom.

Dilute the 5 μ l vial with 0.5ml of HRP diluent **immediately before use**. Do-not keep this diluted vial for future experiments. Further dilute the HRP solution to volumes appropriate for the number of required wells in a clean glass vial. Please see example volumes below:

Number of Wells used	Streptavidin-HRP (μ l)	Streptavidin-HRP Diluent (ml)
16	30	2
24	45	3
32	60	4
48	75	5
96	150	10

9. ASSAY METHOD

We strongly recommend that every vial is mixed thoroughly without foaming prior to use except the standard vial which must be mixed gently by inversion only.

Prepare all reagents as shown in section 8.

Note: Final preparation of Biotinylated anti-Granzyme B (section 8.5) and Streptavidin-HRP (section 8.6) should occur immediately before use.



Assay Step		Details
1.	Addition	Prepare Standard curve as shown in section 8.4
2.	Addition	Add 100µl of each standard, sample and zero in duplicate to appropriate number of wells
3.	Addition	Add 50µl of diluted biotinylated anti-Granzyme B to all wells
4.	Incubation	Cover with a plastic plate cover and incubate at room temperature (18 to 25°C) for 3 hours
5.	Wash	Remove the cover and wash the plate as follows: a) Aspirate the liquid from each well b) Dispense 0.3 ml of 1x washing solution into each well c) Aspirate the contents of each well d) Repeat step b and c another two times
6.	Addition	Add 100µl of Streptavidin-HRP solution into all wells
7.	Incubation	Cover with a plastic plate cover and incubate at room temperature (18 to 25°C) for 30 min
8.	Wash	Repeat wash step 5.
9.	Addition	Add 100µl of ready-to-use TMB Substrate Solution into all wells
10.	Incubation	Incubate in the dark for 10-20 minutes* at room temperature. Avoid direct exposure to light by wrapping the plate in aluminium foil
11.	Addition	Add 100µl of H₂SO₄:Stop Reagent into all wells
Read the absorbance value of each well (immediately after step 11.) on a spectrophotometer using 450 nm as the primary wavelength and optionally 630 nm as the reference wave length (610 nm to 650 nm is acceptable).		

**Incubation time of the substrate solution is usually determined by the ELISA reader performance. Many ELISA readers only record absorbance up to 2.0 O.D. Therefore the color development within individual microwells must be observed by the analyst, and the substrate reaction stopped before positive wells are no longer within recordable range.*

10. DATA ANALYSIS

Calculate the average absorbance values for each set of duplicate standards and samples. Ideally duplicates should be within 20% of the mean.

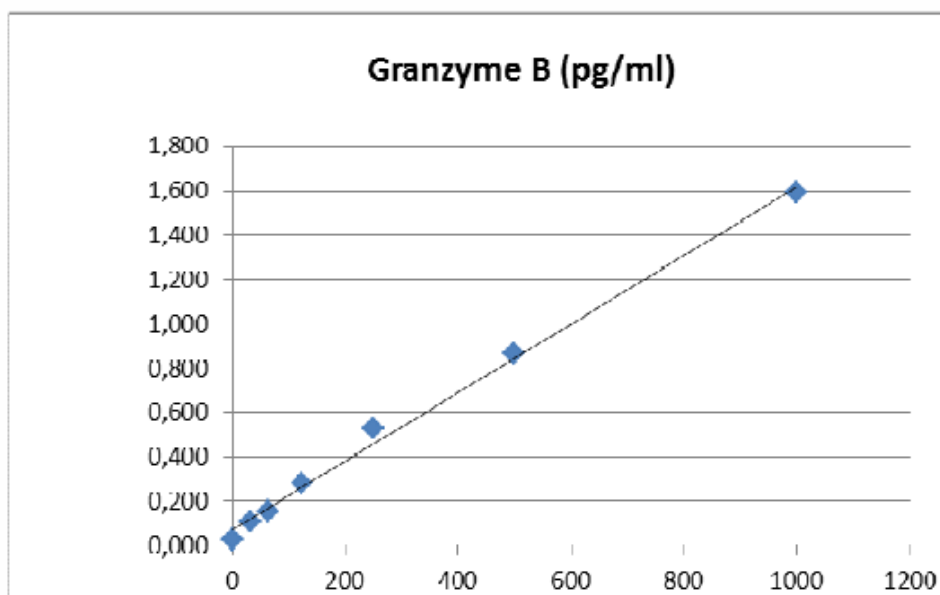
Generate a linear standard curve by plotting the average absorbance of each standard on the vertical axis versus the corresponding Human Granzyme B standard concentration on the horizontal axis.

The amount of Granzyme B in each sample is determined by extrapolating OD values against Granzyme B standard concentrations using the standard curve.



Example Granzyme B Standard curve

Standard	Granzyme B Conc	OD (450nm) Mean	CV (%)
1	1000	1.589	2.6
2	500	0.863	1.5
3	250	0.529	1.1
4	125	0.279	9.4
5	62.5	0.157	5.9
6	31.25	0.110	6.4
Zero	0	0.025	-



Note: curve shown above should not be used to determine results. Every laboratory must produce a standard curve for each set of microwell strips assayed.

11. ASSAY LIMITATIONS

Do not extrapolate the standard curve beyond the maximum standard curve point. The dose-response is non-linear in this region and good accuracy is difficult to obtain. Concentrated samples above the maximum standard concentration must be diluted with Standard diluent or with your own sample buffer to produce an OD value within the range of the standard curve. Following analysis of such samples always multiply results by the appropriate dilution factor to produce actual final concentration.



The influence of various drugs on end results has not been investigated. Bacterial or fungal contamination and laboratory cross-contamination may also cause irregular results.

Improper or insufficient washing at any stage of the procedure will result in either false positive or false negative results. Completely empty wells before dispensing fresh Washing Buffer, fill with Washing Buffer as indicated for each wash cycle and do not allow wells to sit uncovered or dry for extended periods.

Disposable pipette tips, flasks or glassware are preferred, reusable glassware must be washed and thoroughly rinsed of all detergents before use.

As with most biological assays conditions may vary from assay to assay therefore **a fresh standard curve must be prepared and run for every assay.**

12. PERFORMANCE CHARACTERISTICS

12.1. Sensitivity

The sensitivity, minimum detectable dose of Human Granzyme B using this Diaclone Human Granzyme B ELISA kit was found to be **<20 pg/ml**. This was determined by adding 3 standard deviations to the mean OD obtained when the zero standard was assayed 32 times.

12.2. Precision

Intra-Assay

Sample	N	Mean (pg/ml)	SD	CV%
A	15	356	18	5.06
B	15	73	5	7.38

Inter-Assay

Sample	N	Mean (pg/ml)	SD	CV%
A	8	536	30	5.59
B	8	138	9	6.76

12.3. Dilution Parallelism

A sample containing 1000 pg/ml of measured Granzyme B was serially diluted in standard buffer diluent over the range of the assay. Linear regression of samples versus the expected concentration yielded a quote slope of 0.99.

12.4. Spike Recovery

Recovery of Granzyme B added to pooled normal serum was 60 –77 %, 67 –78 % in function of the pool used for concentration ranging from 1000 to 31.25 pg/ml.



ASSAY PROCEDURE SUMMARY

Total procedure length: 3 hours 45 minutes

Add 100 µl of sample or diluted standard
or control



Add 50 µl of diluted biotinylated
detection antibody to all wells



Incubate 3 hours at room temperature



Wash three times



Add 100 µl of streptavidin-HRP to all wells



Incubate 30 min at room temperature



Wash three times



Add 100 µl of ready-to-use TMB
Protect from light. Let the color develop for
10-20 min.



Add 100 µl H₂SO₄



Read Absorbance at 450 nm

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