



Human FGF-21 ELISA Kit

Catalog Number: CEA-B268

Assay Tests: 96 tests

For Research Use Only. Not For Use in Diagnostic or Therapeutic Procedures

IMPORTANT: Please carefully read this user guide before performing your experiment.

Product information

Fibroblast growth factor 21 (FGF21), a core member of the FGF19 subfamily alongside FGF15/19 and FGF23, is primarily synthesized and secreted by the liver. Distinct from other FGF subfamily members, the FGF19 subfamily is characterized by hormone-like biological activities, and their functional exertion is dependent on Klotho family proteins— α Klotho and β Klotho—as essential cofactors that potentiate their binding affinity for fibroblast growth factor receptors (FGFRs). FGF21 exerts its regulatory effects through specific interaction with β Klotho, and is a key modulator of systemic glucose and lipid metabolism: it promotes glucose uptake in adipocytes, augments hepatic fatty acid oxidation, and suppresses de novo lipogenesis in metabolic tissues. This kit is specifically designed for the accurate quantitation of human FGF-21 from cell culture supernates, serum and plasma.

The principle of this assay employs a quantitative sandwich enzyme immunoassay approach. Initially, a microplate is coated with a capture antibody. Then, samples and biotinylated capture antibody are added to the wells. After the removal of any unbound materials through washing, streptavidin-HRP (SA-HRP) conjugate is added to the wells. Streptavidin has a very high affinity for biotin, so it binds to the biotinylated capture antibody that is already bound to the target antigen. After washing, a substrate specific to HRP is added to the wells. HRP catalyzes a reaction that converts the substrate into a detectable signal, often a color change or luminescence, depending on the substrate used. This enzymatic reaction amplifies the signal, allowing for higher sensitivity in detecting the target analyte. The intensity of the signal is measured using a spectrophotometer.

NOTE:

1. This kit is for research use only and is not for use in diagnostic or therapeutic applications.
2. Please do not use the kit after the expiration date indicated on the kit label.
3. Do not mix or substitute reagents with those from other lots or sources.

Manufactured and distributed by
ACRODiagnostics Inc.
TEL: 010-67855298-8147

Distributed by:
ACROBiosystems Inc.
US & Canada TEL: +1 800-810-0816
Asia & Pacific TEL: +86 400-682-252

Contents

The kit contains sufficient reagents for 96 wells.

Catalog	Contents	Amount
CEA268-C01	Pre-coated Anti-FGF-21 Antibody Microplate	1 plate
CEA268-C02	Human FGF-21 Standard	5 µg/mL×2
CEA268-C03	Biotin-Anti-FGF-21 Antibody Con. Solution	100 µL
CEA268-C04	Biotin-Antibody Dilution Buffer	8 mL
CEA268-C05	Streptavidin-HRP Con. Solution	500 µL
CEA268-C06	Streptavidin-HRP Dilution Buffer	15 mL
CEA268-C07	20× Washing Buffer	50 mL
CEA268-C08	Sample Dilution Buffer	15 mL×2
CEA268-C09	Substrate Solution	12 mL
CEA268-C10	Stop Solution	6 mL

NOTE: Bubbles in microplate wells do not affect the experiment and require no action. Proceed with the experimental procedures and methods described below.

Storage

Keep the unopened kit stored at 2-8 °C. Avoid using the kit beyond its expiration date.

For opened kit and reconstituted reagents, with the exception of the two contents listed in following table, others can be stored for up to 30 days at 2-8 °C.

Contents	Storage conditions
Pre-coated Anti-FGF-21 Antibody Microplate	Return unused wells to the foil pouch, reseal along entire edge. May be stored for up to 1 month at 2-8°C.
Human FGF-21 Standard	Avoid repeated freeze-thaw cycles.

NOTE: Streptavidin-HRP Con. Solution and Substrate Solution should avoid light.

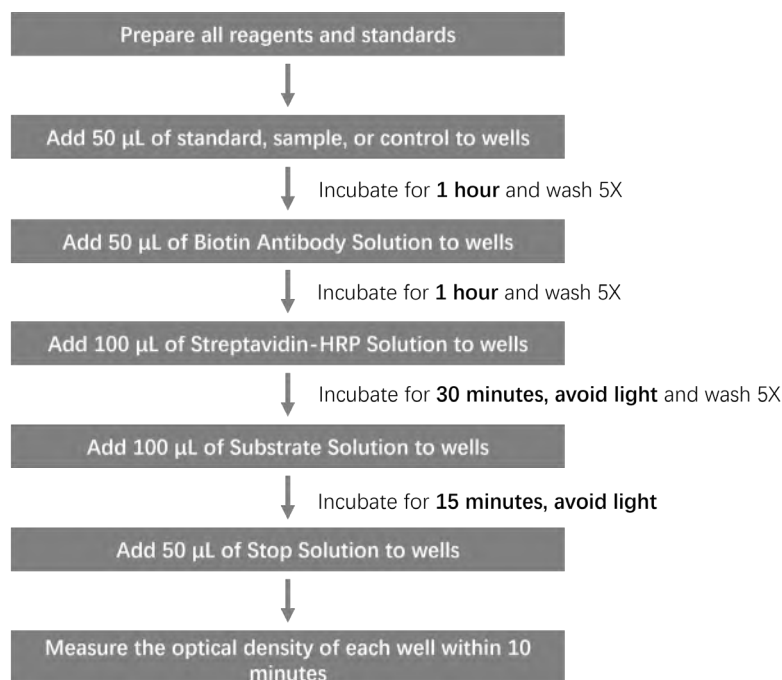
IMPORTANT: Bring all reagents to room temperature before use. If crystals have formed in buffer solution, place the buffer solution in an 37°C incubator until the crystals have completely dissolved and bring the solution back to room temperature before use.

Required materials not supplied.

Instrument	Microplate reader capable of measuring absorbance at 450 nm
Reagents	Deionized, ultrapure or distilled water
Consumables	50 mL and 500 mL graduated cylinders
	Pipettes and pipette tips
	Tubes to prepare standard dilutions.

Workflow

Analyte: FGF-21



NOTE: Incubation temperature is 18–25°C

Prepare the working buffers and standard dilutions.

Prepare the working buffers.

1. 1×Washing Buffer: Dilute 50 mL 20×Washing Buffer with deionized or distilled water to 1000 mL.
2. Biotin Antibody Solution: Add 60 µL of Biotin-Anti-FGF-21 Antibody Con. Solution to 6 mL Biotin-Antibody Dilution Buffer, thoroughly mix. The solution was freshly prepared just before use.
3. Streptavidin-HRP Solution: Add 240 µL of Streptavidin-HRP Con. Solution to 12 mL of Streptavidin-HRP Dilution Buffer, thoroughly mix. The solution was freshly prepared just before use.

Prepare the reconstituted standard.

Reconstitute the provided lyophilized product (CEA268-C02) with deionized or distilled water (**Refer to the vial label for reconstitution volume**), dissolve at room temperature for 15-30 minutes, and mix by gently pipetting. The concentration of reconstituted HSA Standard is 5 µg /mL.

NOTE: Avoiding vigorous shaking or vortexing. Avoid freeze-thaw cycles.

Prepare the standard serial dilutions.

1. Label a tube "**Cm**". Add 10 µL of the reconstituted human FGF-21 Standard and 490 µL of Sample Dilution Buffer to tube Cm, gently mix well.
2. Label 7 tubes, one for each standard point: Std.-1, Std.-2, Std.-3, Std.-4, Std.-5, Std.-6, Std.-7.
3. Add 20 µL of the liquid from **Cm** and 980 µL of Sample Dilution Buffer to tube Std.-1, thoroughly mix (Std.-1 =2000 pg/mL).
4. Prepare serial dilutions for the standard curve as follows: Add 500 µL of Sample Dilution Buffer to each tube (Std.-2, Std.-3, Std.-4, Std.-5, Std.-6, Std.-7).
5. Transfer 500 µL of liquid from Std.-1 to the tube Std.-2, and thoroughly mix (Std.-2 = 1000 pg/mL).
6. Continue to transfer 500 µL of liquid from previous dilution tube to the next dilution tube until add liquid to tube Std.-7.
7. Sample Dilution Buffer serves as zero standard (blank).

PROCEDURE OF ASSAY

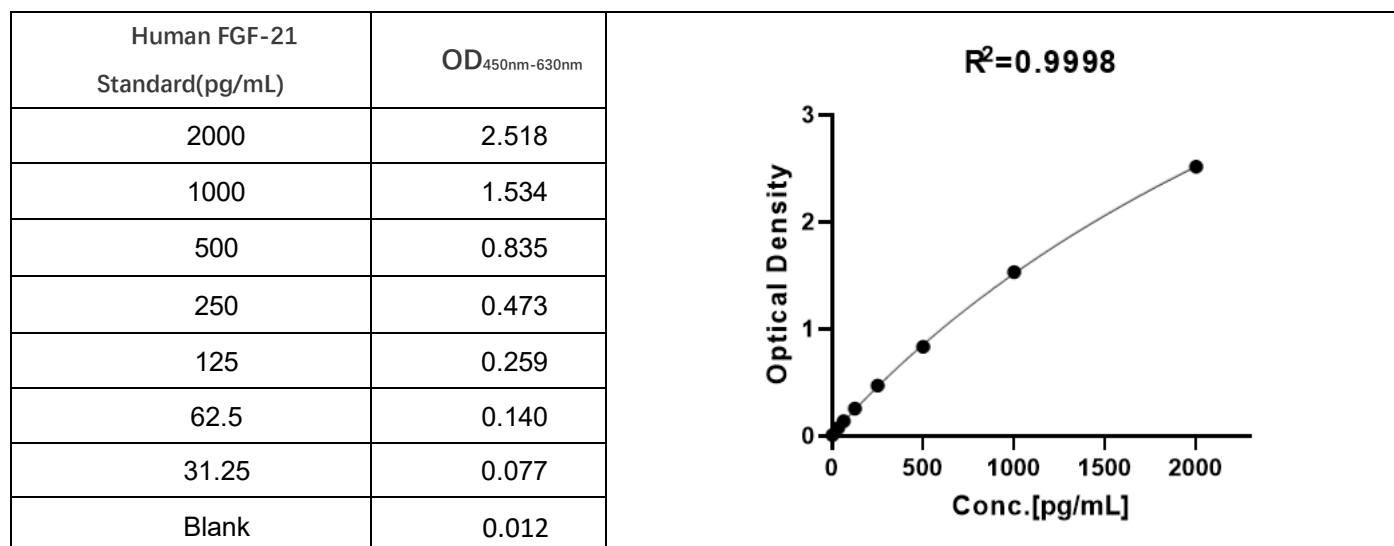
1. Add 50 μ L of FGF-21 Standard, sample, or control to wells. Incubate at room temperature (18-25 °C) for **1 hour**.
2. Aspirate each well and add 300 μ L of 1 \times Washing Buffer to each well, gently tap the plate for **1 minute**. Remove any remaining Washing Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels. Repeat the wash process four times for a total of five washes.
3. Add 50 μ L Biotin Antibody Solution to each well, Seal the plate with microplate sealing film. Incubate at room temperature (18-25 °C) for **1 hour**.
4. Repeat step 2.
5. Add 100 μ L of Streptavidin-HRP Solution to each well. Seal the plate with microplate sealing film. Incubate at room temperature (18-25 °C) for **30 minutes, avoid light**.
6. Repeat step 2.
7. Add 100 μ L of Substrate Solution to each well. Seal the plate with microplate sealing film and incubate at room temperature (18-25 °C) for **15 minutes, avoid light**.
8. Add 50 μ L of Stop Solution to each well. Tap the plate gently to ensure thorough mixing. **Note:** *the color in the wells should change from blue to yellow.*
9. Read the absorbance at 450nm and 630nm using Microplate reader within 10minutes. **Note:** *To reduce the background noise, subtract the readings at 630nm from the readings at 450nm.*

CALCULATION OF RESULTS

1. Compute the average of the duplicated readings for every standard, control, and sample. Then, subtract the average optical density (O.D.) of the zero standard(blank).
2. Establish a standard curve by processing the data using computer software capable of executing a **four-parameter logistic (4-PL)** curve fitting.
3. Normal range of Standard curve: $R^2 \geq 0.9900$.
4. If the OD value of the sample to be tested is higher than the highest standard, the sample shall be diluted with dilution buffer and assay repeated.

Typical data

Note: For each experiment, a standard curve needs to be set for each microplate, and the specific OD value may vary depending on different laboratories, testers, or equipment. The following example data is for reference only. The sample concentration was calculated based on the results of the standard curve.



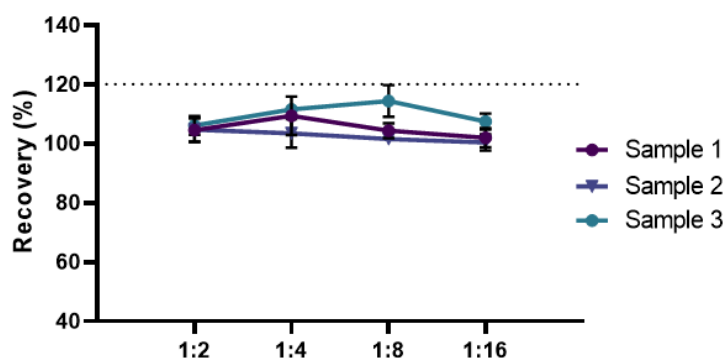
PERFORMANCE CHARACTERISTICS

1. Sensitivity

The minimum detectable concentration (MDC) of FGF-21 is typically less than 20 pg/mL. The MDC was determined by adding two standard deviations to the mean optical density value of twenty zero standard replicates and calculating the corresponding concentration.

2. Linearity

Three samples (Serum) spiked with high concentrations of FGF-21 were serially diluted with dilution buffer to produce samples with values within the dynamic range of the assay and then assayed. The average recovery of FGF-21 for serum samples is 105.8%.



3. Intra-Assay Precision

Ten replicates of each of 3 samples containing different FGF-21 concentrations were tested in one assay. Acceptable criteria: CV < 10%.

Sample Concentration (pg/mL)	Mean (pg/mL)	SD	Numbers	CV (%)
1000	1039.8	35.9	10	3.4
500	513.2	12.4	10	2.4
250	256.6	10.9	10	4.2

4. Inter-Assay Precision

3 samples containing different concentrations of FGF-21 were tested in independent assays. Acceptable criteria: CV < 15%.

Sample Concentration (pg/mL)	Mean (pg/mL)	SD	Numbers	CV (%)
1000	1000.4	31.2	9	3.1
500	498.3	14.7	9	3.0
250	252.9	13.5	9	5.4

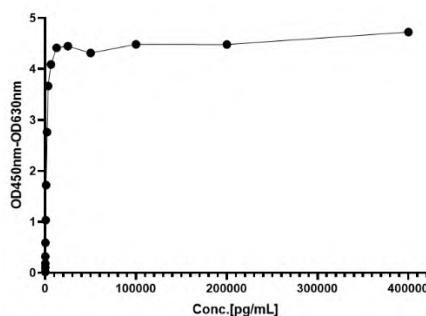
5. Recovery

Recombinant FGF-21 was spiked into 3 human serum samples, and then analyzed. The average recovery of FGF-21 for serum samples is 96.7%.

Sample ID	Conc Measured (pg/mL)	Conc Added (pg/mL)	Conc Recovered (pg/mL)	Recovery (%)
1	1313.3	1000	968.8	96.9
	826.1	500	481.6	96.3
	582.0	250	237.5	95.0
	382.7	-		
2	1312.8	1000	967.0	96.7
	861.7	500	515.9	103.2
	593.6	250	247.9	99.1
	384.2	-		
3	1340.3	1000	969.1	96.9
	837.5	500	466.3	93.3
	604.3	250	233.1	93.2
	412.5	-		

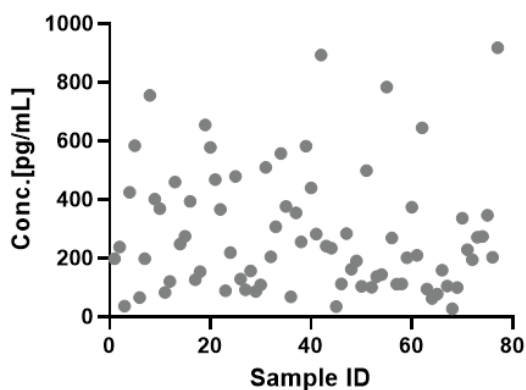
6. Hook Effect

Not be affected by the concentration of FGF-21 up to 12500 pg/ml.



7. Sample Values

Healthy donor serum samples (n=77) were evaluated for the concentrations of human FGF-21 in the assay. The detectability rate of the samples was 96%, with a mean detectable concentration of 282 pg/mL and a concentration range of 26.8 to 918.2 pg/mL.



TROUBLESHOOTING GUIDE

Problem	Cause	Solution
Poor standard curve	* Inaccurate pipetting	* Check pipettes
Large CV	* Inaccurate pipetting * Air bubbles in wells	* Check pipettes * Remove bubbles in wells
High background	* Plate is insufficiently washed * Contaminated wash buffer	* Review the manual for proper wash. * Make fresh wash buffer
Very low readings across the plate	* Incorrect wavelengths * Insufficient development time	* Check filters/reader * Increase development time
Samples are reading too high, but standard curve looks fine	* Samples contain cytokine levels above assay range	* Dilute samples and run again
Drift	* Interrupted assay set-up * Reagents not at room temperature	* Assay set-up should be continuous - have all standards and samples prepared appropriately before commencement of the assay * Ensure that all reagents are at room temperature before pipetting into the wells unless otherwise instructed in the antibody inserts