

KAMIYA BIOMEDICAL COMPANY

Human Adrenocorticotrophic Hormone (ACTH) ELISA

**For the quantitative determination of human ACTH in
serum, plasma and other biological fluids**

Cat. No. KT-6008

For Research Use Only. Not for use in diagnostic procedures.

Product Information
Human Adrenocorticotrophic Hormone (ACTH) ELISA
Cat. No. KT-6008

INTENDED USE

The kit is a competitive inhibition enzyme immunoassay technique for the *in vitro* quantitative measurement of human ACTH in serum, plasma and other biological fluids. For research use only. Not for use in diagnostic procedures.

COMPONENTS

Reagents	Quantity
Pre-coated, ready to use 96-well strip plate	1
Calibrator (lyophilized)	2
Calibrator Diluent	1 × 20 mL
Detection Reagent A	1 × 120 µL
Detection Reagent B	1 × 120 µL
Assay Diluent A (2X concentrate)	1 × 6 mL
Assay Diluent B (2X concentrate)	1 × 6 mL
TMB Substrate	1 × 9 mL
Stop Solution	1 × 6 mL
Wash Buffer (30X concentrate)	1 × 20 mL
Plate sealer for 96 wells	4

MATERIALS REQUIRED BUT NOT SUPPLIED

1. Microplate reader with 450 ± 10 nm filter.
2. Precision single and multi-channel pipettes and disposable tips.
3. Eppendorf Tubes for diluting samples.
4. De-ionized or distilled water.
5. Absorbent paper for blotting the microtiter plate.
6. Container for Wash Solution.

STORAGE

All the reagents should be kept according to the labels on vials. The **Calibrator**, **Detection Reagent A**, **Detection Reagent B** and the **96-well strip plate** should be stored at -20°C upon being received. The unused strips should be kept in a sealed bag with the desiccant provided to minimize exposure to damp air. Opened test kits will remain stable until the expiration date shown, provided it is stored as prescribed above.

PRINCIPLE

This assay employs the competitive inhibition enzyme immunoassay technique. A polyclonal antibody specific for human ACTH has been pre-coated onto a microplate. A competitive inhibition reaction is launched between HRP labeled human ACTH and unlabeled human ACTH (Calibrators or samples) with the pre-coated antibody specific for human ACTH. The more the amount of human ACTH in samples, the less the HRP labeled human ACTH bound by pre-coated antibody. The substrate solution is added to

each well, respectively. And the color develops opposite to the amount of human ACTH bound in the initial step. The color development is stopped and the intensity of the color is measured.

SAMPLE COLLECTION AND STORAGE

Serum

Use a serum separator tube and allow samples to clot for two hours at room temperature or overnight at 4°C before centrifugation for 20 minutes at approximately 1,000 x g. Assay freshly prepared serum immediately or store samples in aliquot at -20°C or -80°C for later use. Avoid repeated freeze/thaw cycles.

Plasma

Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge samples for 15 minutes at 1,000 x g at 4°C within 30 minutes of collection. Remove plasma and assay immediately or store samples in aliquot at -20°C or -80°C for later use. Avoid repeated freeze/thaw cycles.

Other biological fluids

Centrifuge samples for 20 minutes at 1,000 x g. Remove particulates and assay immediately or store samples in aliquot at -20°C or -80°C for later use. Avoid repeated freeze/thaw cycles.



Note:

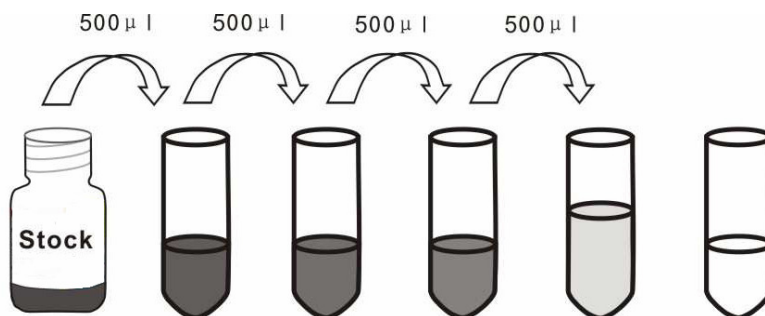
1. Samples to be used within 5 days may be stored at 4°C, otherwise samples must be stored at -20°C (≤1 month) or -80°C (≤2 months) to avoid loss of bioactivity and contamination.
2. When performing the assay slowly bring samples to room temperature.
3. Sample hemolysis will influence the result, so hemolytic specimen can not be detected.

REAGENT PREPARATION

Bring all kit components and samples to room temperature (18-25°C) before use.

Calibrator

Reconstitute the **Calibrator** with 0.8 mL of **Calibrator Diluent**, kept for 10 minutes at room temperature, shake gently (not to foam). The concentration of the calibrator in the stock solution is 1,000 pg/mL. Prepare 5 tubes containing 1 mL Calibrator Diluent and produce a triple dilution series according to the picture shown below. Mix each tube thoroughly before the next transfer. Set up 5 points of diluted calibrator such as 1,000 pg/mL, 333.3 pg/mL, 111.1 pg/mL, 37.0 pg/mL, 12.3 pg/mL, and the last EP tubes with **Calibrator Diluent** is the blank as 0 pg/mL.



Tube	1	2	3	4	5	6
pg/mL	1,000	333.3	111.1	37.0	12.3	0

Assay Diluent A and B

Dilute 6 mL of Assay Diluent A or B Concentrate (2X) with 6 mL of de-ionized or distilled water to prepare 12 mL of Assay Diluent A or B. **The prepared working dilution can't be frozen.**

Detection Reagent A and B

Briefly spin or centrifuge the stock Detection Reagent A and Detection Reagent B before use. Dilute to the working concentration with working **Assay Diluent A or B**, respectively (1:100).

Wash Solution

Dilute 20 mL of Wash Solution Concentrate (30X) with 580 mL of deionized or distilled water to prepare 600 mL of Wash Solution (1X).

TMB Substrate

Aspirate the needed dosage of the solution with sterilized tips and do not return the residual solution to the vial.

**Note:**

1. Prepare the calibrators within 15 minutes of beginning the assay. Do not dissolve the reagents at 37°C.
2. Do not perform your serial dilutions directly in the wells.
3. Carefully reconstitute Calibrators or working Detection Reagent A and B according to the instruction. Avoid foaming and mix gently until the crystals have completely dissolved. To minimize imprecision caused by pipetting, use small volumes and ensure that pipettors are calibrated. It is recommended to draw more than 10 µl for pipetting.
4. The reconstituted Calibrators, Detection Reagent A and Detection Reagent B can be **used only once**.
5. If crystals have formed in the Wash Solution concentrate (30X), warm to room temperature and mix gently until the crystals have completely dissolved.

ASSAY PROCEDURE

Estimate the sample ACTH concentration before assaying. If the estimated values are not within the range of the calibration curve, users must determine the optimal sample dilutions for their particular experiments.

1. Determine wells to be used for diluted calibrators, blank and samples. Prepare 5 wells for calibrators, 1 well for blank. Add 50 µL each of dilutions of calibrators (see Reagent Preparation), blank and samples into the appropriate wells. Then immediately add 50 µL **Detection Reagent A** working solution to each well. Shake the plate gently. Cover with the Plate sealer. Incubate for 1 hour at 37°C. Detection reagent A may appear cloudy. Warm to room temperature and mix gently until solution appears uniform.
2. Aspirate the solution and wash each well with 350 µL of 1X Wash Solution using a squirt bottle, multi-channel pipette, manifold dispenser or auto-washer, and let sit for 1~2 minutes. Remove the remaining liquid from all wells completely by sharply striking the plate on absorbent paper. Repeat wash 3 times. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against absorbent paper.
3. Add 100 µL of **Detection Reagent B** working solution to each well. Incubate for 30 minutes at 37°C after covering with the Plate sealer.
4. Repeat the aspiration/wash process five times as in step 2.
5. Add 90 µL of **Substrate Solution** to each well. Cover with a new Plate sealer. Incubate for 15 - 25 minutes at 37°C (Do not exceed 30 minutes). Protect from light. The solution will turn blue after the addition of Substrate Solution.
6. Add 50 µL of **Stop Solution** to each well. The liquid will turn yellow after the addition of Stop solution. Mix the liquid by gently tapping the side of the plate. If color change does not appear uniform, gently tap the plate to ensure thorough mixing.

7. Remove any drops of solution or fingerprints on the bottom of the plate and confirm there are no bubbles on the surface of the liquid. Then, run the microplate reader and conduct measurements at 450 nm immediately.

**Note:**

1. **Assay preparation:** Keep appropriate numbers of strips for 1 experiment and remove extra strips from microtiter plate. Unused strips should be resealed and stored at -20 °C until the expiration date.
2. **Sample or reagent additions:** Use freshly prepared Calibrators. Carefully add samples to wells and mix gently to avoid foaming. Do not touch the well walls if possible. For each step in the procedure, total dispensing time for addition of reagents or samples to the assay plate should not exceed 10 minutes. This will ensure equal elapsed time for each pipetting step, without interruption. Duplication of all calibrators and samples, although not required, is recommended. To avoid cross-contamination, change pipette tips between additions of each calibrator level, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.
3. **Incubation:** To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary. Do not allow wells to sit uncovered for extended periods between incubation steps. After reagents have been added to the well strips, DO NOT let the strips DRY at any time during the assay. Incubation time and temperature must be observed.
4. **Washing:** The wash procedure is critical. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Solution by aspirating or decanting and remove any drops of solution or fingerprints on the bottom of the plate. Insufficient washing will result in poor precision and falsely elevated absorbance reading.
5. **Controlling of reaction time:** Observe the change of color after adding **TMB Substrate** (e.g. observation once every 10 minutes), if the color is too dark, add **Stop Solution** in advance to avoid excessively strong reaction which will result in inaccurate absorbance reading.
6. **TMB Substrate** is easily contaminated. Protect from light.

CALCULATION OF RESULTS

This assay employs the competitive enzyme immunoassay techniques, so there is an inverse correlation between ACTH concentration in the sample and the assay signal intensity. Low levels of ACTH result in a high O.D. value, while a high concentration of ACTH results in a low signal.

Average the duplicate readings for each calibrator, control, and sample. Create a calibration curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, the data may be linearized by plotting the log of the ACTH concentrations versus the O.D. of the standard and the best fit line can be determined by regression analysis. If samples have been diluted, the concentration read from the calibration curve must be multiplied by the dilution factor.

PERFORMANCE

Detection Range

The detection range is: 12.3-1,000 pg/mL.

The calibration curve concentrations used for the ELISA's were 1,000, 333.3, 111.1, 37.0, 12.3 pg/mL.

Sensitivity

The minimum detectable dose of Human ACTH is typically less than 3.2 pg/mL. The sensitivity of this assay, or Lower Limit of Detection (LLD) was defined as the lowest protein concentration that could be differentiated from zero. It was determined by the mean O.D. value of 20 replicates of the zero calibrator plus three standard deviations.

Specificity

This assay has high sensitivity and excellent specificity for detection of Human ACTH. No significant cross-reactivity or interference was observed.

IMPORTANT NOTES

1. The final experimental results will be closely related to the operative skills of the end users and the experimental environments. Please make sure that sufficient samples are available.
2. This assay is designed to eliminate interference by soluble receptors, ligands, binding proteins, and other factors present in biological samples. However, until all factors have been tested the possibility of interference cannot be eliminated.
3. Do not mix or substitute reagents from one kit lot to another. Use only the reagents supplied by manufacturer.
4. Protect all reagents from strong light during storage and incubation. All the bottle caps of reagents should be tightly closed to prevent the evaporation or contamination by microorganisms.
5. There may be some foggy substance in the plate wells when first opened. This will have no effect on the final assay results. Do not remove microtiter plate from the storage bag until needed.
6. A microtiter plate reader with a bandwidth of 10 nm or less and an optical density range of 0-3 O.D. or greater at 450nm wavelength is acceptable for use in absorbance measurement.
7. The Stop Solution used with this kit is an acid. Wear eye, hand, face, and clothing protection when using this material.

FOR RESEARCH USE ONLY. Not for use in diagnostic procedures.

KAMIYA BIOMEDICAL COMPANY

12779 Gateway Drive, Seattle, WA 98168
Tel: (206) 575-8068 Fax: (206) 575-8094
Email: LifeScience@k-assay.com
www.k-assay.com