

TISENC

Free Thyroxine (CLIA) PACKAGE INSERT



INTENDED USE

Free Thyroxine (CLIA) is a chemiluminescence immunoassay test for the quantitative measurement of circulating Free Thyroxine (FT4) in human serum or plasma, which is intended as an aid to diagnosis of thyroid function.

The assay can be used for samples over the range of 2.0 pmol/L~77.2 pmol/L

The test must be performed on the ACCRE series analyzers (including ACCRE 6, ACCRE 8, ACCRE 90, ACCRE 100, ACCRE 120 and other ACCRE series analyzers).

For *in vitro* diagnostic use only. For professional use only.

SUMMARY

Thyroxine (T4) and Triiodothyronine (T3) are thyroid hormones synthesized and secreted by the thyroid gland. Thyroid hormone plays an important role in the body, regulating growth and development, energy metabolism, and nervous system development¹. T4 is reversibly bound to the binding protein immediately after secretion into the blood by the thyroid gland, and only about 0.03% of T4 is in a free state, that is, free thyroxine (FT4). Thyroid-binding globulin (TBG) is the major binding protein of thyroid hormones in the blood circulation, followed by thyroxine-binding prealbumin (TBPA) and albumin (HAS). Binding T4 is a form of storage and transport of hormones in the blood circulation. FT4 truly exerts the physiological activity of T4. Its measurement is not affected by changes in binding protein concentration and binding force, and can directly reflect thyroid function status^{2,3}. Therefore, FT4 detection is important in the auxiliary evaluation of thyroid function. When clinical factors affecting thyroid hormone binding protein are present, such as the effect of serum TBG concentration, the total T4 level is increased when estrogen is used. At this time, the determination of FT4 is more conducive to the judgment of thyroid function. FT4 and TSH are important indicators for the diagnosis of primary hyperthyroidism, hypothyroidism, and efficacy evaluation^{4,5}.

ASSAY PRINCIPLES

The principle of Free Thyroxine (CLIA) hereinafter also referred to as the "FT4"combines a competitive immunoassay method with enzyme catalytic chemiluminescence detection (CLIA). The principle is described as following: Reagents for the assay are ready-to-use and pre-dispensed in the sealed reagent cartridges. All the assay steps are performed automatically by the ACCRE analyzer. The sample is manually pipetted into the sample well of reagent cartridge. The sample and the alkaline phosphatase-labeled T4 antibody are mixed and incubated, and the antigen in the sample is released by the release agent and combined with the alkaline phosphatase-labeled antibody to form an antibody-antigen complex. The biotin-labeled T4 complex and the sample enzyme-labeled complex are added to the SA-labeled magnetic beads, and the mixture is incubated, and the biotin-labeled T4 complex competes with the antigen in the sample to bind the enzyme-labeled antibody. It is bound to the surface of the magnetic beads by the action of biotin-streptavidin.

After the reaction is completed, the magnetic field adsorbs the magnetic beads and the unbound material is removed by three washings. After the reaction substrate is added, the luminescence intensity is measured by a photomultiplier tube. The concentration of the substance to be detected in the sample is inversely proportional to the intensity of the luminescence. At the end, the results were automatically calculated by the ACCRE analyzer in relation to the calibration curve stored.

CONTENT OF THE KIT

Package: 60 tests/kit with quality controls, 36 tests/kit with quality controls, 60 tests/kit without quality controls, 36 tests/kit without quality controls

The calibrator in the kit has been traced to Roche fully automated chemiluminescence immunoassay analyzer cobas e411 and Elecsys Free Thyroxine. For specific calibrator concentration values, see the Calibrator Barcode Sheet for each lot.

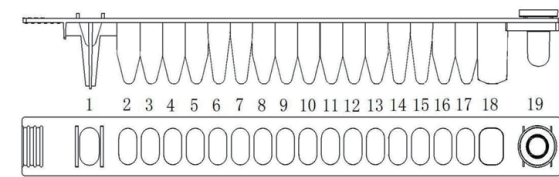
Contents	Quantities				Notice
	W34A	W34C	W39A	W39C	
FT4 reagent cartridge	60 strips	36 strips	60 strips	36 strips	Ready to Use
FT4 Calibrator 1 (CAL1)	1.0 mL x 1 vial	1.0 mL x 1 vial	1.0 mL x 1 vial	1.0 mL x 1 vial	HEPES buffer, 50mM; ProClin300, 0.48g/L; BND, 0.2g/L
FT4 Calibrator 2 (CAL2)	1.0 mL x 1 vial	1.0 mL x 1 vial	1.0 mL x 1 vial	1.0 mL x 1 vial	HEPES buffer, 50mM; ProClin300, 0.48g/L; BND, 0.2g/L; Thyroxine antigen,10pmol/L
FT4 Calibrator 3 (CAL3)	1.0 mL x 1 vial	1.0 mL x 1 vial	1.0 mL x 1 vial	1.0 mL x 1 vial	HEPES buffer, 50mM; ProClin300, 0.48g/L; BND, 0.2g/L; Thyroxine antigen,50pmol/L
FT4 Quality Control Level 1 (QC1)	1.0 mL x 1 vial	1.0 mL x 1 vial	/	/	HEPES buffer, 50mM; ProClin300, 0.48g/L; BND, 0.2g/L;Thyroxine antigen, 10pmol/L Only for the configurations with Quality Controls
FT4 Quality Control Level 2 (QC2)	1.0 mL x 1 vial	1.0 mL x 1 vial	/	/	HEPES buffer, 50mM; ProClin300, 0.48g/L; BND 0.2g/L Thyroxine antigen, 30pmol/L Only for the configurations with Quality Controls
Instruction for Use	1	1	1	1	N/A
Reagent Registration Card	1	1	1	1	N/A
Calibrator Barcode Sheet	1	1	1	1	N/A
Quality Control Sheet	1	1	/	/	Only for the configurations with Quality Controls

Note: Refer to the target value list of the controls from Quality Control Sheet within the kit.

The Reagents Cartridges

The strip consists of 19 wells. The 1st well is the sample well and the last well 19th is the reading well for chemiluminescent signal. From the 2nd to the 18th well are all covered with a label, aluminum foil seal. The label comprises a barcode which mainly indicates the reagent assay information, reagent lot number and expiration date. All reagents components needed for the assay are ready-to-use and pre-dispensed in the cartridges. And please do not interchange integral component from different

reagents or lots.



Description of The Reagent Cartridge

Well	Component	Content	Volume
5	Enzyme Label (R2)	ALP (alkaline phosphatase) labeled anti-T4 antibody (Rat), 0.5mg/mL; HEPES Buffer, 50mmol/L; ProClin300, 0.48g/L; BND, 0.2g/L;	50μL
7	Magnetic Particles(R1)	SA-labeled magnetic particles, 0.2g/L; Tris Buffer, 50mmol/L; ProClin300, 0.48g/L; BND, 0.2g/L	50μL
9	Biotin-Labeled T4 (R3)	Biotin labeled T4, 1ng/mL; PBS buffer, 50mmol/L; ProClin300, 0.48g/L; BND, 0.2g/L;	50μL
10, 11, 12	Wash Solutions	Tris buffer, 50mmol/L; ProClin300, 0.48g/L; BND, 0.2g/L	350μL
16	Substrate	APS-5	100μL

Note: Well 1, 2, 3, 4, 6, 8, 13, 14, 15, 17, 18 are empty.

MATERIALS AND DISPOSABLES REQUIRED BUT NOT PROVIDED

- Pipette with disposable tip to dispense 200 μL.
- Powderless, disposable gloves.
- For other specific materials and disposables, please refer to the Instrument User Manual.
- Instruments of the ACCRE series analyzers.

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- For professional use only by qualified laboratory personnel.
- This kit contains products of animal origin. Certified knowledge of the origin and/or sanitary state of the animals does not totally guarantee the absence of transmissible pathogenic agents. It is therefore recommended that these products be treated as potentially infectious, and handled observing the usual safety precautions (do not ingest; do not inhale).
- Do not use reagents after the expiration date indicated on the box label.
- Do not use if the packaging of reagent cartridge is damaged or leaked.
- Do not use the reagents if the quantity is obviously insufficient.
- If any component adheres to inside wall of wells or aluminum film of the reagent cartridge, please gently switch the reagent cartridge to let the component back the wells.
- Do not reverse the reagent cartridge. Otherwise, the result will be unreliable.
- Do not mix reagents (or disposables) from different lots.
- Package insert instructions must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this package insert.
- Use powderless gloves, as powder has been reported to cause false results for certain enzyme immunoassay tests.

STORAGE

- Store the Free Thyroxine (CLIA) kits including reagent cartridges, calibrators and quality controls **upright** at 2~8°C in the dark place and the kit can be valid for 18 months from manufactured date.
- After the reagent cartridge is on-board in the ACCRE analyzer, the testing should be finished within 2 hours.
- When opened, the calibrators will be stable for 30 days at 2~8°C, stable for 3 months at -20°C and below, and can only be frozen and thawed once. Quality controls will be stable for 30 days at 2~8°C.
- Keep away from sunlight.
- Do not freeze reagent cartridges.

SAMPLES

The sample volume for Free Thyroxine (CLIA) assay is 50μL, please note that at least 70 μL of sample has to be pipetted manually into the reagent cartridge.

Sample type and collection

Human serum or plasma (Heparin sodium, EDTA-K₂ or EDTA-K₃) are recommended.

Types of tubes:

- Plastic tube with clot activator,
- Plastic tube with clot activator and separation gel,
- Plastic tube with Heparin sodium,
- Plastic tube with EDTA-K₂.
- Plastic tube with EDTA-K₃.

It is recommended to validate collection tubes before using them as some may contain substances which interfere with test results.

Note: Blood sampling tube results may vary from one manufacturer to another depending on the materials and additives used.

It is the responsibility of each laboratory to validate the type of sample tube used and to follow the manufacturer’s recommendations for use.

Sample preparation

The current revision of the WHO/DIL/LAB/99.1 document provides recommendations for the preparation of samples.

For use of the sample tubes, follow the tube manufacturer’s instructions for use.

The pre-analytical step, including the preparation of blood samples, is an essential part of medical analyses. In accordance with Good Laboratory Practice, this step is performed under the responsibility of the laboratory manager.

Insufficient clot time can result in the formation of fibrin with micro-clots that are invisible to the naked eye. The presence of fibrin, red blood cells, or suspended particles can lead to erroneous results.

Samples containing suspended fibrin particles or erythrocyte stroma should be centrifuged before testing.

If there is a lipid layer over the sample after centrifuging, please transfer the clear sample into a new sample tube without transferring the lipid layer.

Severe hemolysis samples (hemoglobin >500mg/dL) or heat-inactivated samples are not recommended for applying on the reagents.

Preparation of frozen-stored samples: after thawing, these samples must be thoroughly mixed before testing.

Mix using with a vortex-type mixer. If necessary, clarify samples by centrifuging before testing.

Sample stability

Samples (serum and plasma) can be stored at 15~30°C for up to 4 hours or at 2~8°C for up to 7 days; if longer storage is required, freeze the serum or plasma at -20°C or below -20°C for up to 3 months, without exceeding 1 freeze/thaw cycle.

INSTRUCTIONS FOR USE

For complete instructions, see the Instrument User Manual.

When using the assay for the first time.Register the assay using the registration code in the reagent kit before any assay is used in the ACCRE analyzer for the first time.

Calibration, QC and sample test are only available after assay was registered successfully.

When opening a new lot of reagents. Each new lot of reagent must be registered by using the registration code in Reagent Registration Card within the reagent kit.

Calibration

Calibration must be performed with the reagents and calibrators from Manufacturer.

Calibration is necessary under the following conditions:

- (1) New reagent lot number applied;
- (2) **Same lot of reagents used more than 4 weeks;**
- (3) Quality Control out of control;
- (4) When necessary, for example: system maintenance or repair that may affect the analytic performance.

Test Procedure

1. Remove the kit from storage at 2-8°C and take out the required number of reagent cartridge. Allow the reagent cartridges, specimens, calibrators, and/or controls to equilibrate to room temperature (15-30°C) prior to testing.
2. Use each assay FT4 strips for each sample, calibrator or control respectively.
3. Place the reagent cartridge into the reagent rack.
4. Manually pipette the Sample, Calibrator, Controls into the sample well of each reagent cartridge.

Please note that at least 70µL of sample has to be pipetted manually into the reagent cartridge and 50µL sample is needed for each test.

(Before pipetting: Mix the calibrator, control and samples (for serum or plasma separated from the pellet) using a vortex-type mixer if necessary, and ensure that the samples and sample diluent (if applicable) DO NOT have any bubbles). The same for calibrators and controls.

5. Put the sample rack into the reagent Chamber of the ACCRE analyzer.
6. Place the assay tips into the reagent Chamber of the ACCRE analyzer.
7. Input Sample ID, sample type etc. into the software as directed in the USER MANUAL.
8. Free Thyroxine (CLIA) assay will be completed within approximately 25 minutes. Assays will be performed automatically by the ACCRE analyzer.
9. After the assay is completed, remove the reagent rack from the ACCRE analyzer. Dispose the used reagent cartridge and assay tips into an appropriate recipient.

Dilution

Samples for FT4 determinations cannot be diluted, as T4 in the blood is present in free and protein-bound forms which are in equilibrium. A change in the concentration of the binding proteins alters this equilibrium.

Quality Control

Quality control can be performed in accordance with local regulations or requirements related to accreditation, as well as requirements defined in the laboratory's quality control procedure.

RESULTS AND INTERPRETATION

Calculation of Results

The results are automatically calculated by the ACCRE analyzer using stored calibration curve which generate by 3-point calibration, and calculated according to a predefined mathematical model, the results expressed in pmol/L. The results can be converted as the unit of ng/dL or pg/mL by manually through below conversion factors.

Conversion factors:
pmol/L×0.077688=ng/dL, ng/dL×12.872= pmol/L, pg/mL×0.1=ng/dL

Interpretation of Results

The detection range is from 2 pmol/L to 77.2 pmol/L. For samples with FT4 below the upper limit of detection, quantitative determination can be performed; if the sample is lower than the lower limit of detection, the reported result is <2pmol/L; if the sample is higher than the upper limit of detection, the reported result is >77.2pmol/L.

Results of Free Thyroxine (CLIA) assays are determined by testing serum

specimens from a study in clinical centers with group of totally 263 healthy adult individuals in China (132 males and 131 females). The 2.5th percentile value and 97.5th percentile value are 10.53pmol/L and 21.16pmol/L.

** Please note that results may differ between laboratories due to variations in population and test method. If necessary, each laboratory should establish its own reference range.*

In interpreting the results, patient's clinical condition including symptoms, diseases history, and other relevant data and information should be considered.

LIMITATIONS

1. If the test results are inconsistent with clinical evidence, additional testing is suggested to confirm the result.
2. For diagnostic purposes, results should be used in conjunction with other data; e.g., symptoms, results of other tests, clinical impressions, etc.
3. Please note that heterophile antibody in human serum or plasma can interfere the test result.
4. High concentration of HAMA can also cause a false positive or false negative result.

PERFORMANCE CHARACTERISTICS

Detection limits

LOB (Limit of Blank) = 2.0 pmol/L.
LOB was determined according to CLSI® EP17-A2 recommendations.

Measurement range

The measurement range is the range of values corresponding to the acceptable performance limits (precision and linearity).

The measurement range of the Free Thyroxine (CLIA) assay is: 2.0pmol/L ~ 77.2pmol/L.

Linearity

Linearity was evaluated according to CLSI® EP06-A recommendations. The Free Thyroxine (CLIA) assay is linear between 2.5pmol/L~77.2pmol/L. The absolute linear correlation coefficient(r) should be bigger than 0.9900.

Precision

A precision study was performed according to CLSI® EP05-A3 recommendations. The Within-lot precision CV% is less than 10%.
The between-lot precision CV% is less than 15%.

Accuracy

The sample with the correctness control product with traceability is used for the detection, and the relative deviation between the detection result and the calibration concentration is within ±10%.

Specificity

The Free Thyroxine (CLIA) is designed to have a mean analytical specificity of ≤ 0.1% cross reactivity with triiodothyronine (T3) at a concentration of 10ng/mL and reverse triiodothyronine (rT3) at a concentration of 10ng/mL

Interference

Potential interference substances were studied according to CLSI® EP07-A3 recommendations. No significant interference was detected up to the maximum concentrations tested.

Substance	Concentration
Hemoglobin	≤500mg/dL
Bilirubin	≤20mg/dL
Triglyceride	≤1500mg/dL
Total Protein	≤10g/dL
Rheumatoid factor	≤1000IU/mL

HAMA

Patient samples containing human anti-mouse antibodies (HAMA) may give falsely elevated or decreased values. Although HAMA-neutralizing agents are added, extremely high HAMA serum concentrations may occasionally influence results.

WASTE DISPOSAL

Dispose used or unused reagents as well as any other contaminated disposable materials following procedures for infectious or potentially infectious products. It is the responsibility of each laboratory to handle waste and effluents produced according to their nature and degree of hazardousness and to treat and dispose of them (or have them treated and disposed of) in accordance with any applicable regulations.

INDEX OF SYMBOLS

Symbol	Meaning	Symbol	Meaning	Symbol	Meaning
	Consult instructions for use		Contains sufficient for <n> tests		Date of manufacture
	In vitro diagnostic medical device		Use-by date		Do not re-use
	Temperature limit		Batch code		Catalogue number
	Keep away from sunlight		Keep dry		Manufacturer
	Authorized representative in the European Community/ European Union		Do not use if package is damaged and consult instructions for use		Contains biological material of animal origin
	Biological risks		Caution		CE marking
	Upright		Fragile, handle with care		Do not roll
	Control				

REFERENCES

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