VIDAS® FT3 (FT3)

IVD

VIDAS FT3 is an automated quantitative test for use on the VIDAS family instruments, for the quantitative measurement of free triiodothyronine (FT3) in human serum or plasma (lithium heparin) using the ELFA technique (Enzyme Linked Fluorescent Assay).

SUMMARY AND EXPLANATION

Triiodothyronine (T3) is a hormone produced by thyroidal secretion (20%) and from the peripheral deiodination mechanism which converts T4 to T3 (1).
T3 circulates as a free hormone (0.3%) or bound to carrier proteins (> 99.7%) such as TBG, albumin or prealbumin. The free form is the physiologically active fraction which appears to have the most effect on metabolism control (2). FT3 does not contribute to the diagnosis of hypothyroidism.
FT3 plays an important diagnostic role in the following cases:

- Hyperthyroidism: Basedow's disease or toxic adenoma
- Monitoring of patients with hypothyroidism treated with Thyroxine and antithyroid agents.
- Low-T3 syndrome (3).

The FT3 assay must be used in conjunction with other tests, such as TSH and FT4 as well as a clinical examination of the patient (4).

PRINCIPLE

The assay principle combines an enzyme immunoassay competition method with a final fluorescent detection (ELFA).
The Solid Phase Receptacle (SPR®) serves as the solid phase as well as the pipetting device for the assay. Reagents for the assay are ready-to-use and pre-dispensed in the sealed reagent strips.
All of the assay steps are performed automatically by the instrument. The reaction medium is cycled in and out of the SPR several times.
During the final detection step, the substrate (4-Methyl-umbelliferyl phosphate) is cycled in and out of the SPR. The conjugate enzyme catalyzes the hydrolysis of this substrate into a fluorescent product (4-Methyl-umbelliferone) the fluorescence of which is measured at 450 nm. The intensity of the fluorescence is inversely proportional to the concentration of free triiodothyronine present in the sample. At the end of the assay, the results are automatically calculated by the instrument in relation to the calibration curve stored in memory, and then printed out.

CONTENT OF THE KIT (60 TESTS):

60 FT3 strips	STR	Ready-to-use.
60 FT3 SPRs 2 x 30	SPR	Ready-to-use. SPRs sensitized with triiodothyronine.
FT3 Control 1 x 2 ml (liquid)	C1	Ready-to-use. Human serum* + L-triiodothyronine + 1 g/l sodium azide. MLE data indicate the confidence interval in pmol/L (“Control C1 Dose Value Range”).
FT3 Calibrator 1 x 2 ml (liquid)	S1	Ready-to-use. Human serum* + L-triiodothyronine + 1 g/l sodium azide. MLE data indicate the concentration in pmol/L (“Calibrator (S1) Dose Value”) and the confidence interval in "Relative Fluorescence Value” (“Calibrator (S1) RFV Range”).
Specifications for the factory master data required to calibrate the test: • MLE data (Master Lot Entry) provided in the kit, or • MLE bar code printed on the box label.		
1 Package insert provided in the kit or downloadable from www.biomerieux.com/techlib.		

* This product has been tested and shown to be negative for HBs antigen, antibodies to HIV1, HIV2 and HCV. However, since no existing test method can totally guarantee their absence, this product must be treated as potentially infectious. Therefore, usual safety procedures should be observed when handling.

The SPR

The interior of the SPR is coated during production with triiodothyronine. Each SPR is identified by the FT3 code. Only remove the required number of SPRs from the pouch and **carefully reseal the pouch after opening**.

The strip

The strip consists of 10 wells covered with a labeled, foil seal. The label comprises a bar code which mainly indicates the assay code, kit lot number and expiration date. The foil of the first well is perforated to facilitate the introduction of the sample. The last well of each strip is a cuvette in which the fluorometric reading is performed. The wells in the center section of the strip contain the various reagents required for the assay.

Description of the FT3 strip

Wells	Reagents
1	Sample well.
2 - 3 - 4	Empty wells.
5	Conjugate: alkaline phosphatase-labeled anti-T3 antibodies (sheep) + 1 g/l sodium azide (600 µl).
6	Wash buffer: Tris (0.05 mol/l), NaCl pH 7.4 + 1 g/l sodium azide (600 µl).
7	Wash buffer: Tris-Tween (0.05 mol/l), NaCl pH 7.4 + 1 g/l sodium azide (600 µl).
8	Wash buffer: diethanolamine* (1.1 mol/l or 11.5%, pH 9.8) + 1 g/l sodium azide (600 µl).
9	Empty well.
10	Cuvette with substrate: 4-Methyl-umbelliferyl phosphate (0.6 mmol/l) + diethanolamine (DEA**) (0.62 mol/l or 6.6%, pH 9.2) + 1 g/l sodium azide (300 µl).

* Signal Word: **DANGER**

Hazard statement

H318 : Causes serious eye damage.
H373 : May cause damage to organs through prolonged or repeated exposure.
H315 : Causes skin irritation.
H302 : Harmful if swallowed.

Precautionary statement

P280 :Wear protective gloves/protective clothing/eye protection/face protection.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P309 + P311 : IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.

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For further information, refer to the Material Safety Data Sheet.

MATERIALS AND DISPOSABLES REQUIRED BUT NOT PROVIDED

- Pipette with disposable tip to dispense 100 µl.
- Powderless, disposable gloves.
- For other specific materials and disposables, please refer to the Instrument User's Manual.
- Instrument of the VIDAS family.

WARNINGS AND PRECAUTIONS

- **For *in vitro* diagnostic use only.**
- **For professional use only.**
- **This kit contains products of human origin. No known analysis method can 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 (see Laboratory Biosafety Manual - WHO - Geneva - latest Edition).**
- 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 or inhale).
- Do not use the SPRs if the pouch is pierced.
- Do not use visibly deteriorated STRs (damaged foil or plastic).
- Do not use reagents after the expiration date indicated on the label.
- Do not mix reagents (or disposables) from different lots.
- Use **powderless** gloves, as powder has been reported to cause false results for certain enzyme immunoassay tests.
- Kit reagents contain sodium azide which can react with lead or copper plumbing to form explosive metal azides. If any liquid containing sodium azide is disposed of in the plumbing system, drains should be flushed with water to avoid build-up.
- The wash buffer (well 8) contains a harmful agent (11.5% diethanolamine). Refer to the hazard statements "H" and the precautionary statements "P" above.
- The optical cuvette with substrate (well 10) contains an irritant agent (6.6% diethanolamine). Refer to the hazard statements "H" and the precautionary statements "P" above.
- Spills should be wiped up thoroughly after treatment with liquid detergent or a solution of household bleach containing at least 0.5% sodium hypochlorite. See the User's Manual for cleaning spills on or in the instrument. Do not autoclave solutions containing bleach.
- The instrument should be regularly cleaned and decontaminated (see the User's Manual).

STORAGE CONDITIONS

- Store the VIDAS FT3 kit at 2-8°C.
- **Do not freeze reagents.**
- **Store all unused reagents at 2-8°C.**
- After opening the kit, check that the SPR pouch is correctly sealed and undamaged. If not, do not use the SPRs.
- **Carefully reseal the pouch with the desiccant inside after use to maintain stability of the SPRs and return the complete kit to 2-8°C.**
- If stored according to the recommended conditions, all components are stable until the expiration date indicated on the label.

SPECIMENS

Specimen type and collection:

Serum or plasma (lithium heparin). **Do not use EDTA tubes.**
It is recommended that each laboratory checks the compatibility of collection tubes used.
None of the following factors have been found to significantly influence this assay.

- hemolysis (after spiking samples with hemoglobin: 0 to 300 µmol/l (monomer)),
- lipemia (after spiking samples with lipids: 0 to 2 gl/l equivalent in triglycerides),
- bilirubinemia (after spiking samples with bilirubin: 0 to 520 µmol/l).

However, it is recommended not to use samples that are clearly hemolyzed, lipemic or icteric and, if possible, to collect a new sample.

Specimen stability:

Samples can be stored at 2-8°C in stoppered tubes for up to 48 hours; if longer storage is required, freeze the sera or plasma at -25± 6°C.
A study performed on frozen samples over a period of two months, showed that the quality of results is not affected. Avoid successive freezing and thawing.

INSTRUCTIONS FOR USE

For complete instructions, see the User's Manual.

Reading Master lot data

Before each new lot of reagents is used, enter the specifications (or factory master data) into the instrument using the master lot entry (MLE) data.

If this operation is not performed **before initiating the tests**, the instrument will not be able to print results.

Note: the master lot data need only be entered once for each lot.

It is possible to enter MLE data **manually or automatically** depending on the instrument (refer to the User's Manual).

Calibration

Calibration, using the calibrator provided in the kit, must be performed each time a new lot of reagents is opened, after the master lot data have been entered. Calibration should then be performed every 14 days. This operation provides instrument-specific calibration curves and compensates for possible minor variations in assay signal throughout the shelf-life of the kit.
The calibrator, identified by S1, must be tested in **triplicate** (see User's Manual). The calibrator value must be within the set RFV "Relative Fluorescence Value" range. If this is not the case, recalibrate.

Procedure

1. **Only remove the required reagents from the refrigerator and allow them to come to room temperature for at least 30 minutes.**
2. Use one "FT3" strip and one "FT3" SPR for each sample, control or calibrator to be tested. **Make sure the storage pouch has been carefully resealed after the required SPRs have been removed.**
3. The test is identified by the "FT3" code on the instrument. The calibrator must be identified by "S1" and tested in **triplicate**. If the control is to be tested, it should be identified by "C1".
4. If necessary, clarify samples by centrifugation.
5. Mix the calibrator, control and samples using a vortex-type mixer (for serum or plasma separated from the pellet).
6. **For this test, the calibrator, control, and sample test portion is 100 µl.**
7. Insert the "FT3" SPRs and "FT3" strips into the instrument. Check to make sure the color labels with the assay code on the SPRs and the Reagent Strips match.
8. Initiate the assay as directed in the User's Manual. All the assay steps are performed automatically by the instrument.
9. Reclose the vials and return them to 2–8°C after pipetting.
10. The assay will be completed within approximately 40 minutes. After the assay is completed, remove the SPRs and strips from the instrument.
11. Dispose of the used SPRs and strips into an appropriate recipient.

RESULTS AND INTERPRETATION

Once the assay is completed, results are analyzed automatically by the computer. Fluorescence is measured twice in the Reagent Strip's reading cuvette for each sample tested. The first reading is a background reading of the substrate cuvette before the SPR is introduced into the substrate. The second reading is taken after incubating the substrate with the enzyme remaining on the interior of the SPR. The RFV (Relative Fluorescence Value) is calculated by subtracting the background reading from the final result. This calculation appears on the result sheet.
The results are automatically calculated by the instrument using calibration curves which are stored by the instrument (4 parameter logistic model) and are expressed in pmol/l.
Sera for free hormone assays should not be diluted. The result must be expressed as > 45 pmol/l.

VIDAS FT3 test results should be interpreted as part of a complete clinical profile and thyroid assessment, including at least TSH determination.

QUALITY CONTROL

A control is included in each VIDAS FT3 kit.
This control must be performed immediately after opening a new kit to ensure that reagent performance has not been altered. Each calibration must also be checked using this control. The instrument will only be able to check the control value if it is identified by C1.
Results cannot be validated if the control value deviates from the expected values.

Note

It is the responsibility of the user to perform Quality Control in accordance with any local applicable regulations.

LIMITATIONS OF THE METHOD

Interference may be encountered with certain sera containing antibodies directed against reagent components. For this reason, assay results should be interpreted taking into consideration the patient's history, and the results of any other tests performed.

RANGE OF EXPECTED VALUES

As a guideline, 95% of values corresponding to 116 adults who are clinically or biologically euthyroid without any associated serious illness are within the range: 4 - 8.3 pmol/l.

Result in pg/ml (ng/l) = result in pmol/l x 0.651
These figures are given as a guide. FT3 levels vary greatly depending on the patient's age, geographical location and general state of health: pregnancy, serious illness, situations modifying protein balance (outpatient treatment, hospitalization, etc.).
It is recommended that each laboratory establish its own reference values from a rigorously selected population.

PERFORMANCE

Studies performed using VIDAS FT3 gave the following results:

Measurement range

The measurement range of the VIDAS FT3 kit is: 0.7 - 45 pmol/l.

Detection limit

Defined as the smallest concentration of FT3 which is significantly different from the zero concentration with a probability of 95%: **≤ 0.7 pmol/l.**

Precision
The results in the table below are given as a guide.

Within-run reproducibility:

4 samples were tested 30 times in a same run.

Samples	1	2	3	4
Mean concentration (pmol/l)	12.60	7.64	4.66	3.09
Coefficient of variation	3.4%	5.3%	3.4%	7.2%

Between-run reproducibility:

4 samples were tested singly in 29 different runs on the same VIDAS.

Sample	1	2	3	4
Mean concentration (pmol/l)	12.50	7.43	4.49	3.07
Coefficient of variation	3.8%	5.6%	5.2%	6.5%

Specificity
The specificity of anti-T3 antibody used in this assay is:

Tested compound	Cross reactivity (%)
Triiodothyronine	100
L-Thyroxine	0.20
Diiodothyronine	6
Triiodoacetic acid	65
Tetraiodoacetic acid	0.16
3-3'-5' triiodothyronine (T3 reverse)	< 0.1
Diiodotyrosine	< 0.1
Monoiodotyrosine	< 0.1
Phenylbutazone	< 0.1
Tyrosine	< 0.1
Sodium salicylate	< 0.1

Comparison with another test method

Correlation was established between the VIDAS FT3 kit and another radioimmunoassay method.

VIDAS FT3 = 1.2 X + 0.63 r = 0.98
(n = 384)

WASTE DISPOSAL
Dispose of 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.

LITERATURE REFERENCES

1. EKINS R. - Measurement of Free Hormones in Blood - Endocrine Reviews, vol. 11, n°1, 1990, 5-46.
2. BALDET L. - Dosage des hormones thyroïdiennes : thyroxine (T4) et triiodothyronine (T3). In La thyroïde, LECLERE J., ORGIAZZI J., ROUSSET B., SCHLIENGER J.L., Expansion Scientifique Française, ed. 1992, 211-216.
3. PEARCE C.J., BYFIELD P.G.H. - Free thyroïd hormone assays and thyroïd function. Ann. Clin. Biochem., 1986, 23, 230-237.
4. CARAYON P., NICCOLI-SIRE P., LEJEUNE P.J., et al. - Recommandation de consensus sur le diagnostic et la surveillance des maladies de la glande thyroïde. Ann. Biol. Clin.- mai-juin 2002, vol. 60, n°3.

INDEX OF SYMBOLS

Symbol	Meaning
REF	Catalog number
IVD	*In Vitro* Diagnostic Medical Device
	Manufacturer
	Temperature limit
	Use by date
LOT	Batch code
	Consult Instructions for Use
	Contains sufficient for <n> tests
	Date of manufacture

WARRANTY

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REVISION HISTORY

Change type categories :

N/A	Not applicable (First publication)
Correction	Correction of documentation anomalies
Technical change	Addition, revision and/or removal of information related to the product
Administrative	Implementation of non-technical changes noticeable to the user

Note: *Minor typographical, grammar, and formatting changes are not included in the revision history.*

Release date	Part Number	Change Type	Change Summary
2015/01	07682K	Administrative	INDEX OF SYMBOLS REVISION HISTORY
		Technical	CONTENT OF THE KIT (60 TESTS) WARNINGS AND PRECAUTIONS INSTRUCTIONS FOR USE

BIOMÉRIEUX

bioMérieux SA
376 Chemin de l'Orme
69280 Marcy-l'Etoile - France

673 620 399 RCS LYON
Tel. 33 (0)4 78 87 20 00
Fax 33 (0)4 78 87 20 90
www.biomerieux.com

CE