

VIDAS[®] CA 15-3[®] (153)

IVD

VIDAS CA 15-3 is an automated quantitative test for use on the VIDAS family instruments for the quantitative measurement of CA 15-3 levels in human serum or plasma (lithium heparin or EDTA) using the ELFA technique (Enzyme Linked Fluorescent Assay).

SUMMARY AND EXPLANATION

The VIDAS CA 15-3 test uses two monoclonal antibodies (115D8 and DF3) which react with a circulating CA 15-3, antigen expressed in human breast cancer cell. The monoclonal 115D8 antibody directed against human milk fat globule membranes, and the monoclonal DF3 antibody directed against an enriched fraction of human metastatic breast cancer membrane, react with the epitopes expressed by a family of high molecular weight glycoproteins known as polymorphic epithelial mucins (10, 11, 13, 18).

An increase in the concentration of CA 15-3 is frequently found in breast cancer, as in certain other cancers, but also in certain non-cancerous pathologies. The CA 15-3 concentration decreases after therapy and increases in cases of relapse, residual disease and metastasis.

The VIDAS CA 15-3 test is used for the monitoring of therapy for patients with diagnosed malignant tumors and to evaluate the evolution of the pathology. A decrease in the CA 15-3 concentration can indicate a positive response to therapy and therefore good prognosis. A constant increase in CA 15-3 concentration often reflects evolution of the tumor and a poor response to therapy (1-9, 12, 14-17, 19).

PRINCIPLE

The assay principle combines a 2-step enzyme immunoassay sandwich 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.

The sample is cycled in and out of the SPR several times. This operation enables the 115D8 fixed onto the interior wall of the SPR to capture the reactive antigenic determinants present in the sample. Unbound components are eliminated during the washing steps. Alkaline phosphatase-labeled DF3 antibody is then incubated in the SPR where it binds with the DF3 reactive antigenic determinants. Unbound conjugate is then eliminated during the washing steps.

During the final detection step, the substrate (4-Methylumbelliferyl phosphate) is cycled in and out of the SPR. The conjugate enzyme catalyzes the hydrolysis of this substrate into a fluorescent product (4-Methylumbelliferone) the fluorescence of which is measured at 450 nm. The intensity of the fluorescence is proportional to the concentration of CA 15-3 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 (30 TESTS):

30 CA 15-3 strips	STR	Ready-to-use.
30 CA 15-3 SPRs 1 x 30	SPR	Ready-to-use. Interior of SPR coated with monoclonal 115D8 antibodies (mouse).
CA 15-3 Control 1 x 1 ml (liquid)	C1	Ready-to-use. Bovine albumin + DF3 reactive antigenic determinants (human origin) + 0.9 g/l sodium azide. MLE data indicate the confidence interval in U/mL ("Control C1 Dose Value Range").
CA 15-3 Calibrator 1 x 1.5 ml (liquid)	S1	Ready-to-use. Bovine albumin + DF3 reactive antigenic determinants (human origin) + 0.9 g/l sodium azide. MLE data indicate the concentration in U/mL ("Calibrator (S1) Dose Value") and the confidence interval in "Relative Fluorescence Value" ("Calibrator (S1) RFV Range").
CA 15-3 Diluent 1 x 5 ml (liquid)	R1	Ready-to-use. Calf serum + 0.9 g/l sodium azide.
Specifications for the factory master data required to calibrate the test:		
<ul style="list-style-type: none"> • MLE data (Master Lot Entry) provided in the kit, or • MLE bar codes printed on the box label. 		
1 Clip seal		
1 Package Insert provided in the kit or downloadable from www.biomerieux.com/techlib .		

The SPR

The SPR is coated during production with monoclonal 115D8 antibodies (mouse). Each SPR is identified by the "153" code. Only remove the required number of SPRs from the pouch and **carefully reseal the pouch after opening using the clip seal provided with the kit.**

The Reagent 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 CA 15-3 Reagent Strip

Wells	Reagents
1	Sample well.
2 - 3 - 4	Empty wells.
5	Conjugate: Alkaline phosphatase-labeled DF3 antibody + 0.9 g/l sodium azide (400 µl).
6 - 7	Wash buffer: Tris (0.1 mol/l, pH 7.4) + NaCl (0.1 mol/l) + Tween (0.05 %) + 0.9 g/l sodium azide (600 µl).
8	Diluent: Tris (0.1 mol/l) + NaCl (0.1 mol/l) + calf serum (5 %) + 0.9 g/l sodium azide (400 µl).
9	Wash buffer: Tris (0.1 mol/l, pH 7.4) + NaCl (0.1 mol/l) + Tween (0.05 %) + 0.9 g/l sodium azide (600 µl).
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.

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.

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 SPRs (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 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 CA 15-3 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:

Human serum or plasma (lithium heparin or EDTA). It is recommended that each laboratory checks the compatibility of collection tubes used.

The use of heat inactivated sera has not been validated. 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 10 mg/ml equivalent in triglycerides),
- bilirubinemia (after spiking samples with bilirubin: 0 to 470 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.

Avoid successive freezing and thawing.

A study performed on frozen samples over a period of 2 months, showed that the quality of results is not affected.

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 upon receipt of a new lot of reagents 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 duplicate** (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 "153" strip and one "153" SPR from the kit for each sample, control or calibrator to be tested. **Make sure the storage pouch has been carefully resealed with the clip seal after the required SPRs have been removed.**
3. The test is identified by the "153" code on the instrument. The calibrator must be identified by "S1", and tested **in duplicate**. If the control is to be tested, it should be identified by "C1".
4. Mix the calibrator, control and samples using a vortex-type mixer (for serum or plasma separated from the pellet).
5. **For this test, the calibrator, control, and sample test portion is 100 µl.**
6. Insert the "153" SPRs and "153" strips into the instrument. Check to make sure the color labels with the assay code on the SPRs and the Reagent Strips match.
7. Initiate the assay as directed in the User's Manual. All the assay steps are performed automatically by the instrument.
8. Reclose the vials and return them to 2-8°C after pipetting.
9. The assay will be completed within approximately 60 minutes. After the assay is completed, remove the SPRs and strips from the instrument.
10. 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). The concentrations are expressed in U/ml.

Samples with CA 15-3 titers > 400 U/ml should be reassayed after maximum dilution by 1/10 in CA 15-3 diluent.

If the dilution factor has not been entered when the Work List was created (see User's Manual), multiply the result by the dilution factor to obtain the sample concentration.

Interpretation of test results should be made taking into consideration the patient's history, and the results of any other tests performed.

QUALITY CONTROL

A control is included in each VIDAS CA 15-3 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

Samples collected from patients receiving mouse monoclonal antibody preparations for diagnostic or therapeutic purposes may contain human anti-mouse antibodies (HAMA). These samples may give falsely high or low concentrations when tested with kits containing mouse antibodies.

The VIDAS CA 15-3 assay is based on the use of monoclonal DF3 and 115D8 antibodies which are supplied exclusively by Fujirebio Diagnostics Inc., their distributors and licensed organizations. Methods using antibodies other than DF3 and 115D8 can give different clinical results.

Results from this test should be interpreted as part of a complete clinical profile and in conjunction with other diagnostic techniques. The VIDAS CA 15-3 assay cannot be used as a screening test for cancer.

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 history, and the results of any other tests performed.

It is not advisable to perform CA 15-3 assays on patients who have received a contrast agent in the previous 24 hours [20].

RANGE OF EXPECTED VALUES

These figures are given as a guide; it is recommended that each laboratory establish its own reference values from a rigorously selected population.

The following results were obtained using 543 samples collected from 134 healthy subjects, 347 subjects with a diagnosed malignant pathology, and 62 subjects with a non-malignant affection:

	No. of subjects	Percentage (%) in relation to the zone of values in U/ml			
		< 30 U/ml	30-60 U/ml	60-200 U/ml	> 200 U/ml
Healthy female subjects					
< 50 years	69	99	1	0	0
≥ 50 years	65	97	3	0	0
Malignant pathologies					
Breast					
Stage I	25	84	16	0	0
Stage II	25	68	24	8	0
Stage III	25	56	24	12	8
Stage IV	25	20	12	28	40
Colorectal	49	86	10	4	0
Pulmonary	46	65	26	7	2
Ovarian	56	66	32	0	2
Pancreatic	19	69	26	5	0
Thyroid	27	93	7	0	0
Other pathologies	50	80	20	0	0
Gynecological					
Non malignant pathologies					
Renal	26	77	19	4	0
Hepatic	29	97	3	0	0
Others	7	100	0	0	0

PERFORMANCE

Studies performed using VIDAS CA 15-3 gave the following results:

Measurement range

The measurement range of the VIDAS CA 15-3 kit extends from 2 to 400 U/ml.

Analytical detection limit

Defined as the smallest concentration of DF3 reactive antigenic determinants which is significantly different from the zero concentration with a probability of 95%: **2 U/ml**.

Hook effect

No hook effect was found up to DF3 reactive antigenic determinant concentrations of 38,000 U/ml.

PrecisionWithin-run reproducibility:

5 samples were tested 30 times in a same run.

Sample	1	2	3	4	5
Mean (U/ml)	5.3	10.9	22.0	105.1	374.9
CV %	3.6	3.2	3.5	2.7	3.4

Between-run reproducibility:

5 samples were tested in 29 different runs on the same VIDAS instrument.

Sample	1	2	3	4	5
Mean (U/ml)	6.1	11.4	22.5	100.4	354.8
CV %	5.4	4.8	4.8	4.0	4.9

AccuracyDilution test

The serum matrix of the sample can influence the results of the dilution test. When printing out results, it is recommended to indicate the level of dilution used.

2 samples were diluted in the CA 15-3 diluent and tested singly in 3 runs. The ratio of the mean concentration measured over the expected concentration is expressed as a mean recovery percentage.

Sample	Dilution factor	Expected concentration (U/ml)	Mean measured concentration (U/ml)	Mean recovery percentage (%)
1	1/1	186.2	186.2	100
	1/2	93.1	96.8	104
	1/4	46.5	49.6	107
	1/8	23.3	25.2	108
	1/16	11.6	13.5	116
2	1/1	266.5	266.5	100
	1/2	133.2	152.4	114
	1/4	66.6	85.0	128
	1/8	33.3	43.3	130
	1/16	16.7	22.9	137

Comparison with other test methods

The concentration of DF3 reactive antigenic determinants may vary in a sample determined using the kits from different manufacturers, depending on the test method used.

If the test method is changed and in the case of patient monitoring, laboratories should confirm the concentrations previously found.

Correlation was established between the VIDAS CA 15-3 kit and a radioimmunoassay method.

VIDAS = 0.89 IRMA technique + 1.1

n = 171 r = 0.997.

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 type 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

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INDEX OF SYMBOLS

Symbol	Meaning
	Catalog number
	In Vitro Diagnostic Medical Device
	Manufacturer
	Temperature limit
	Use by date
	Batch code
	Consult Instructions for Use
	Contains sufficient for <n> tests
	Caution, consult accompanying documents
	Date of manufacture

WARRANTY

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REVISION HISTORYChange 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	08814I	Administrative	INDEX OF SYMBOLS REVISION HISTORY
		Technical	CONTENT OF THE KIT (30 TESTS) WARNINGS AND PRECAUTIONS INSTRUCTIONS FOR USE

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