



BREAST CANCER ANTIGEN (CA15-3)

ENZYME IMMUNOASSAY TEST KIT
Catalog Number: 10104

Enzyme Immunoassay for the Quantitative Measurement of Breast Cancer Antigen (CA15-3) in Human Serum.

Intended Use

The CA15-3 EIA test is intended for use as a monitoring and screening test for breast cancer. An abnormal result (i.e., elevated serum CA15-3 level) indicates further clinical management. CA15-3 is a useful tumor marker for patients in clinical remission following treatment. Post-operative serum CA15-3 values which fail to return to normal, strongly suggest the presence of residual tumor, while tumor recurrence is often accompanied by a rise of serum CA15-3 before progressive disease is clinically evident.

Introduction

Breast cancer is the most common life-threatening malignant lesion in women of many developed countries today, with approximately 180,000 new cases diagnosed every year. Roughly half of these newly diagnosed patients are node-negative, however 30% of these cases progress to metastatic disease.

There are a number of tumor markers that can help clinicians to identify and diagnose which breast cancer patients will have aggressive disease and which will have an indolent course. These markers include estrogen and progesterone receptors, DNA ploidy and percent-S phase profile, epidermal growth factor receptor, HER-2/neu oncogene, p53 tumor suppressor gene, cathepsin D, proliferation markers and CA15-3. CA15-3 is most useful for monitoring patients post-operatively for recurrence, particularly metastatic diseases. 96% of patients with local and systemic recurrence have elevated CA15-3, which can be used to predict recurrence earlier than radiological and clinical criteria. A 25% increase in the serum CA15-3 is associated with progression of carcinoma. A 50% decrease in serum CA15-3 is associated with response to treatment. CA15-3 is more sensitive than CEA in early detection of breast cancer recurrence. In combination with CA-125, CA15-3 has been shown to be useful in early detection of relapse of ovarian cancer. CA15-3 levels are also increased in colon, lung and hepatic tumors.

Test Principle

The CA15-3 EIA test is a two-site solid phase enzyme immunoassay. The molecules of CA15-3 are "sandwiched" between two monoclonal

antibodies. One coated to the bottom of the wells of the microtiter plates and the other linked to the horseradish peroxidase (enzyme conjugate). After incubation and washing, the enzymatic reaction develops a color which is proportional to the amount of CA15-3 molecules present in the assay.

Materials and Components

Materials provided with the test kits:

- Monoclonal Anti-CA15-3 antibody coated microtiter plate with 96 wells.
- Sample diluent, 100 mL.
- Enzyme conjugate reagent, 12 mL.
- CA15-3 reference standard set, containing 0, 15, 30, 60, 120, and 240 Unit/mL (liquid, ready for use) or lyophilized form.
- Wash Buffer Concentrate (50X), 15 mL.
- TMB Substrate, 12 mL.
- Stop solution, 12 mL.

Materials required but not provided:

- Precision pipettes and tips, 0.1 mL, 0.2 mL, 1 mL, and 5 mL.
- Distilled water.
- Disposable pipette tips.
- Vortex mixer.
- Absorbent paper or paper towel.
- A microtiter plate reader at 450nm wavelength, with a bandwidth of 10nm or less and an optical density range of 0-2 OD or greater.
- Graph paper.

Specimen Collection and Preparation

1. Blood should be drawn using standard venipuncture techniques and the serum should be separated from the red blood cells as soon as possible. Avoid grossly hemolytic, lipemic or turbid samples.
2. Plasma samples collected in tubes containing EDTA, heparin, or oxalate may interfere with test procedures and should be avoided.
3. Specimens should be capped and may be stored for 48 hours at 2-8°C prior to assaying. Specimens held for a longer time can be frozen at -20°C for 6 months prior to assaying. Thawed samples should be inverted several times to mix prior to testing.

Storage of test kits and instrumentation

1. Unopened test kits should be stored at 2-8°C upon receipt and the microtiter plate should be kept in a sealed bag with desiccants to minimize exposure to damp air. The test kit may be used throughout the expiration date of the kit. Refer to the package label for the expiration date.
2. Opened test kits will remain stable until the expiring date shown, provided it is stored as prescribed above.
3. A microtiter plate reader with a bandwidth of 10nm or less and an optical density range of 0-2 OD or greater at 450nm Wavelength is acceptable for use in absorbance Measurement.

Reagent preparation

1. All reagents should be brought to room temperature (18-25°C) before use. All reagents should be mixed by gently inverting or

swirling prior to use. Do not induce foaming.

2. If reference standards are lyophilized, reconstitute each standard with 0.5 mL distilled water. Allow the reconstituted material to stand for at least 20 minutes. Reconstituted standards should be sealed and stored at 2-8°C.
3. Dilute 1 volume of Wash Buffer (50x) with 49 volumes of distilled water. For example, Dilute 15 mL of wash buffer concentrate (50x) into 735 mL of distilled water to prepare 750 mL of washing buffer (1x). Mix well before use.

Assay Procedure

Important Note :

The CA15-3 standards have already been prediluted and are ready for use. Please do not dilute again!

1. Patient serum and control serum should be diluted, 51 fold, Before use. Prepare a series of small tubes (such as 1.5 mL microcentrifuge tubes) and mix 20µL serum with 1.0 mL Sample Diluent.
2. Secure the desired number of coated wells in the holder. Dispense 100µL of CA15-3 standards, diluted specimens, and diluted controls into the appropriate wells. Gently mix For 10 seconds.
3. Incubate at 37°C for 1 hour.
4. Remove the incubation mixture by emptying the plate content into a waste container. Rinse and empty the microtiter plate 5 times with 1x wash buffering. Strike the microtiter plate sharply onto absorbent paper or paper towels to remove all residual water droplets.
5. Dispense 100µL of enzyme conjugate reagent into each Well. Gently mix for 10 seconds.
6. Incubate at 37°C for 1 hour.
7. Remove the contents and wash the plate as described in step 4 above.
8. Dispense 100µL TMB substrate reagent into each well. Gently mix for 10 seconds.
9. Incubate at room temperature in the dark for 20 Minutes.
10. Stop the reaction by adding 100µL of Stop Solution to each well. Gently mix for 10 seconds ensuring that the blue color completely changes to yellow.
11. Read the optical density at 450nm with a microtiter plate reader within 15 minutes.

Important Note

- The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.
- It is recommended that no more than 32 wells be used for each assay run, if manual pipetting is used, since pipetting of all standards, specimens and controls should be completed within 5 minutes. A full plate of 96 wells may be used if automated pipetting is available.
- Duplication of all standards and specimens, although not required, is recommended.

Calculation of Results

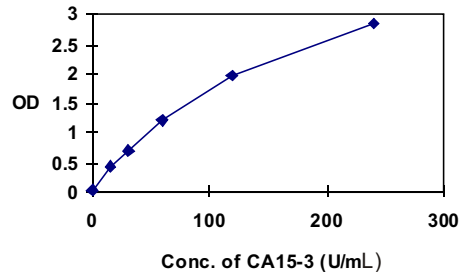
Calculate the mean absorbance value for each set of CA15-3 reference standards, specimens and controls. Construct a standard curve by plotting the mean absorbance obtained from each reference

standard against its concentration in units per mL on linear graph paper, with absorbance values on the vertical or Y axis and concentrations on the horizontal or X axis. Use the mean absorbance values for each specimen to determine the corresponding concentration of CA15-3 in units per mL from the standard curve. It is recommended that samples be analyzed in duplicates. Since the CA15-3 standards have already been diluted 51-fold, there is no need for the samples or controls to be multiplied by the dilution factor.

Example of Standard Curve

Results of typical standard run with optical density reading at 450nm shown in the Y axis against CA15-3 concentrations shown in the X axis.

CA15-3 Values (U/mL)	Absorbance (450 nm)
0	0.021
15	0.425
30	0.693
60	1.214
120	1.956
240	2.845



This standard curve is for the purpose of illustration only, and should not be used to calculate unknowns. Each user should obtain his or her own standard curve and data.

Expected Values and Sensitivity

Healthy women are expected to have CA15-3 values below 35 U/mL. The minimum detectable concentration of CA15-3 in this assay is estimated to be 5 U/mL.

Performance characteristics

1.Accuracy: Comparison between Our Assay and commercial available Kits provide the following data
 N = 55
 Correlation Coefficient = 0.975
 Slope = 0.924
 Intercept = 1.92
 Mean (Our Kits) = 28.93
 Mean (Abbott) = 26.78

2. Precision:

1).Intra-Assay:

Concentrations	N	Mean	S.D.	% CV
Level	20	16.27	0.970	5.96
Level I	20	86.26	4.290	4.97

2).Inter-Assay

Concentrations	N	Mean	S.D.	% CV
Level	10	11.89	1.098	9.23
Level I	10	106.32	6.460	6.07

3.Linearity

Two patient sera were serially diluted with 0 U/mL standard in a linearity study. The average recovery was 99 %.

Sample A			
Dilution	Expected	Observed	% Recov.
Undiluted	180.81	180.81	
2x	90.41	88.92	98.4
4x	42.21	43.72	103.6
8x	22.60	23.03	101.9
16x	11.30	12.04	106.5
Average Recovery: 102.6 %			

Sample B			
Dilution	Expected	Observed	% Recov.
Undiluted	207.19	207.19	
2x	103.60	105.23	101.6
4x	51.80	50.33	97.2
8x	25.90	26.67	103.0
16x	12.95	13.91	107.4
Average Recovery: 102.3 %			

Limitations of the Procedure

There are some limitation of the assay. We should let our customers know about that.

- 1)As with all diagnostic tests, a definite clinical diagnosis should not be based on the results of a single test, but should only be made by the physician after all clinical and laboratory findings have been evaluated.
- 2)Studies have implicated possible interference in immunoassay results in some patients with known rheumatoid factor and antinuclear antibodies. Serum samples from patients who have received infusions containing mouse monoclonal antibodies for diagnostic or therapeutic purposes, may contain antibody to mouse protein (HAMA). Although we have added some agents to avoid the interferences, we cannot guarantee to eliminate all the effects of that.
- 3)The wash procedure (steps 6-8) is critical. Insufficient washing will result in poor precision and falsely elevated absorbance. The use of tap water for washing could result in a higher background absorbance.

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Chemux Bioscience, Inc.

Website: www.chemux.com

385 Oyster Point Blvd Suite5-6., South San Francisco, CA94080
 Tel:+1-650-872-1800