



Revised 16 Nov. 2011 rm (Vers. 2.1)

This kit is intended for Research Use Only.

Not for use in diagnostic procedures.

1 INTRODUCTION

The DRG CEA Enzyme Immunoassay Kit provides materials for measurement of CEA (Carcinoembryonic Antigen) in serum.

2 PRINCIPLE OF THE TEST

The DRG CEA ELISA Kit is a solid phase enzyme-linked immunosorbent assay (ELISA) based on the sandwich principle. The microtiter wells are coated with a monoclonal antibody directed towards a unique antigenic site on the CEA molecule.

An aliquot of sample containing endogenous CEA is incubated in the coated well with enzyme conjugate, which is an anti-CEA monoclonal antibody conjugated with horseradish peroxidase. After incubation the unbound conjugate is washed off.

The amount of bound peroxidase is proportional to the concentration of CEA in the sample.

Having added the substrate solution, the intensity of colour developed is proportional to the concentration of CEA in the sample.

3 PRECAUTIONS

- This kit is for research use only.
- For information on hazardous substances included in the kit please refer to Material Safety Data Sheets.
- All reagents of this test kit which contain human serum or plasma have been tested and confirmed negative for HIV I/II, HBsAg and HCV by FDA approved procedures. All reagents, however, should be treated as potential biohazards in use and for disposal.
- Avoid contact with Stop Solution containing 0.5 M H₂SO₄. It may cause skin irritation and burns.
- Never pipet by mouth and avoid contact of reagents and specimens with skin and mucous membranes.
- Do not smoke, eat, drink or apply cosmetics in areas where specimens or kit reagents are handled.
- Wear disposable latex gloves when handling specimens and reagents. Microbial contamination of reagents or specimens may give false results.
- Handling should be in accordance with the procedures defined by an appropriate national biohazard safety guideline or regulation.
- Do not use reagents beyond expiry date as shown on the kit labels.
- All indicated volumes have to be performed according to the protocol. Optimal test results are only obtained when using calibrated pipettes and microtiterplate readers.
- Do not mix or use components from kits with different lot numbers. It is advised not to exchange wells of different plates even of the same lot. The kits may have been shipped or stored under different conditions and the binding characteristics of the plates may result slightly different.
- Chemicals and prepared or used reagents have to be treated as hazardous waste according the national biohazard safety guideline or regulation.
- Safety Data Sheets for this product are available upon request directly from DRG Instruments GmbH.
- The Safety Data Sheets fit the demands of: EU-Guideline 91/155 EC.



Revised 16 Nov. 2011 rm (Vers. 2.1)

4 KIT COMPONENTS

4.1 Contents of the Kit

1. **Microtiter wells**, 12x8 (break apart) strips, 96 wells
Wells coated with monoclonal anti-CEA antibody
2. **Standard 0**, 3 ml contains BND/MIT as a preservative.
3. **Standard 1-5**, 5 vials, 1 ml
Concentrations: 5; 10; 25; 50; 100 ng/ml
contain BND/MIT as a preservative.
4. **Control Low & High**, 2 vials, (lyophilized) 1.0 mL each,
see „Reagent Preparation“
Control values and ranges please refer to vial label or QC-Datasheet.
contains BND/MIT as a preservative
5. **Enzyme Conjugate**, 1 vial, 14 ml, ready to use,
Monoclonal Anti-CEA antibody conjugated to horseradish peroxidase
6. **Substrate Solution**, 1 vial, 14 ml, ready to use,
TMB
7. **Stop Solution**, 1 vial, 14 ml, ready to use,
contains 0.5M H₂SO₄,
Avoid contact with the stop solution. It may cause skin irritations and burns.
8. **Wash Solution**, 1 vial, 30 ml (40X concentrated),
see „Preparation of Reagents“

Note: Additional *Standard 0* for sample dilution is available on request.

4.1.1 Equipment and material required but not provided

- A microtiter plate calibrated reader (450±10 nm)(e.g. the DRG Instruments Microtiter Plate Reader).
- Calibrated variable precision micropipettes.
- Absorbent paper.
- Aqua dest.

4.2 Storage and stability of the Kit

When stored at 2-8°C unopened reagents will retain reactivity until expiration date. Do not use reagents beyond this date. Opened reagents must be stored at 2-8°C. Microtiter wells must be stored at 2-8°C. Once the foil bag has been opened, care should be taken to close it tightly again.
Opened kits retain activity for two months if stored as described above.

4.3 Preparation of Reagents

Allow all reagents and required number of strips to reach room temperature prior to use.

**Revised 16 Nov. 2011 rm (Vers. 2.1)****Control**

Reconstitute the lyophilized content with 1.0 ml distilled water and let stand for 10 minutes in minimum. Mix the control several times before use.

Note: for longer use the reconstituted control should be aliquoted and frozen at -20°C.

Wash Solution

Dilute 30 ml of concentrated Wash Solution with 1170 ml deionized water to a final volume of 1200 ml.

The diluted Wash Solution is stable for 2 weeks at room temperature.

4.4 Disposal of the Kit

The disposal of the kit must be made according to the national regulations. Special information for this product is given in the Material Safety Data Sheets (see chapter 13).

4.5 Damaged Test Kits

In case of any severe damage of the test kit or components, DRG have to be informed written, latest one week after receiving the kit. Severely damaged single components should not be used for a test run. They have to be stored until a final solution has been found. After this, they should be disposed according to the official regulations.

5 SPECIMEN

Serum can be used in this assay.

Do not use haemolytic, icteric or lipaemic specimens.

5.1 Specimen Collection**Serum:**

Collect blood by venipuncture (e.g. Sarstedt Monovette # 02.1388.001), allow to clot, and separate serum by centrifugation at room temperature. Do not centrifuge before complete clotting has occurred. Samples containing anticoagulant may require increased clotting time.

Specimen Storage:

Specimens should be capped and may be stored for up to 48 hours at 2-8°C prior to assaying.

Specimens held for a longer time (up to six months) should be frozen only once at -20°C prior to assay. Thawed samples should be inverted several times prior to testing.

5.2 Specimen Dilution

If in an initial assay, a specimen is found to contain more than the highest standard, the specimens can be diluted with *Standard 0* and reassayed as described in Assay Procedure.

For the calculation of the concentrations this dilution factor has to be taken into account.

Example:

a) dilution 1:10: 10 µl Serum + 90 µl Standard 0 (mix thoroughly)

b) dilution 1:100: 10 µl dilution a) 1:10 + 90 µl Standard 0 (mix thoroughly).



Revised 16 Nov. 2011 rm (Vers. 2.1)

6 TEST PROCEDURE

6.1 General Remarks

- All reagents and specimens must be allowed to come to room temperature before use. All reagents must be mixed without foaming.
- Once the test has been started, all steps should be completed without interruption.
- Use new disposal plastic pipette tips for each standard, control or sample in order to avoid cross contamination
- Absorbance is a function of the incubation time and temperature. Before starting the assay, it is recommended that all reagents are ready, caps removed, all needed wells secured in holder, etc. This will ensure equal elapsed time for each pipetting step without interruption.
- As a general rule the enzymatic reaction is linearly proportional to time and temperature.



Revised 16 Nov. 2011 rm (Vers. 2.1)

6.2 Assay Procedure

All standards, samples, and controls should be run in duplicate concurrently so that all conditions of testing are the same. Each run must include a standard curve.

1. Secure the desired number of Microtiter wells in the holder.
2. Dispense **50 µl** of each Standard, controls and samples with new disposable tips into appropriate wells.
3. Dispense **100 µl** Enzyme Conjugate into each well.
4. Thoroughly mix for 10 seconds. It is important to have a complete mixing in this step.
5. Incubate for **60 minutes** at room temperature (without covering the plate).
6. Briskly shake out the contents of the wells.
Rinse the wells 3 times with diluted Wash Solution (400 µl per well). Strike the wells sharply on absorbent paper to remove residual droplets.

Important note:

The sensitivity and precision of this assay is markedly influenced by the correct performance of the washing procedure!

7. Add **100 µl** of Substrate Solution to each well.
8. Incubate for **30 minutes** at room temperature.
9. Stop the enzymatic reaction by adding **100 µl** of Stop Solution to each well.
10. Read the OD at **450±10 nm** with a microtiter plate reader **within 10 minutes** after adding the Stop Solution.

6.3 Calculation of Results

1. Calculate the average absorbance values for each set of standards, controls and patient samples.
2. Construct a standard curve by plotting the mean absorbance obtained from each standard against its concentration with absorbance value on the vertical(Y) axis and concentration on the horizontal (X) axis.
3. Using the mean absorbance value for each sample determine the corresponding concentration from the standard curve.
4. Automated method: The results in the IFU have been calculated automatically using a 4 PL (4 Parameter Logistics). Other data reduction functions may give slightly different results.
5. The concentration of the samples can be read directly from this standard curve. Samples with concentrations higher than that of the highest standard have to be further diluted. For the calculation of the concentrations this dilution factor has to be taken into account.

Below is listed a typical example of a standard curve with the CEA ELISA.

Standard	Optical Units (450 nm)
Standard 0 (0 ng/ml)	0.06
Standard 1 (5 ng/ml)	0.20
Standard 2 (10 ng/ml)	0.34
Standard 3 (25 ng/ml)	0.62
Standard 4 (50 ng/ml)	1.12
Standard 5 (100 ng/ml)	2.04

**Revised 16 Nov. 2011 rm (Vers. 2.1)**

7 LEGAL ASPECTS

7.1 Reliability of Results

The test must be performed exactly as per the manufacturer's instructions for use. Moreover the user must strictly adhere to the rules of GLP (Good Laboratory Practice) or other applicable national standards and/or laws.

7.2 Liability

Any modification of the test kit and/or exchange or mixture of any components of different lots from one test kit to another could negatively affect the intended results and validity of the overall test. Such modification and/or exchanges invalidate any claim for replacement.

Regardless, in the event of any claim, the manufacturer's liability is not to exceed the value of the test kit. Any damage caused to the test kit during transportation is not subject to the liability of the manufacturer.

8 REFERENCES

1. Engall, E. Methods in Enzymology, Volume 70, Van Vunakis, H. and Langone, J.J. (eds.), Academic Press, New York, 419-492 (1980).
2. Uotila, M. Ruoslahti, E. and Engvall, E., J. Immunol. Methods, 42, 11-15 (1981).
3. Gold, P., Freedman S.O: Demonstration of tumor specific antigen in human colonic carcinoma by immunologic tolerance and absorption techniques. J Exp. Med. 1965; 127:439-462.
4. Thompson, D.P.M. Krupcy J, Freedman S.O., et al. The radioimmunoassay of circulating carcinoembryonic antigen of the human digestive system. Proc Natl Acad Sci USA 1969, 64:161-167.
5. Schwartz M.K. Tumor markers in diagnosis and screening. In: Ting S.W., Chen J.S., Schwartz M.K.: , eds. Human tumor markers, Amsterda: Elsevier Science, 1987; 3-16.
6. Zamchek N, and Martin E.W. Sequential Carcinoembryonic Antigen Levels in Pancreatic Cancer: Some Clinical Correlations. Cancer 1981; 47:1620-1627.
7. Mughal A.W., Hortobagyi G.N.; Fritsche H.A., Buzdar A.U. Yap H-Y. and Blumenschein G.R. Serial Plasma Carcinoembryonic Antigen Measurements During Treatment of Metastatic Breast Cancer. JAMA 1983; 259; 1881-1886.

Version 2011-10-11~rm