



LDN Labor Diagnostika Nord GmbH & Co. KG

Am Eichenhain 1, 48531 Nordhorn

Telefon: +49-5921-8197 0

Telefax: +49-5921-8197 222

e-mail: info@ldn.de

Internet: <http://www.ldn.de>

LDN[®]

Instructions for use

CEA ELISA

REF

TM E-4100



IVD



CEA ELISA

INTRODUCTION

Intended Use

The CEA ELISA is an enzyme immunoassay for the quantitative in vitro diagnostic measurement of Carcinoembryonic Antigen (CEA) in serum.

Summary and Explanation

Carcinoembryonic antigen (CEA) is a 200 kD glycoprotein. Cells that express CEA, both incorporate this glycoprotein into their cell membrane and release it into the blood. CEA is therefore detectable both on cells and in body liquids.

The normal values are normally < 5 ng/mL

Tumors that are associated with increased CEA values are:

Colon carcinoma, stomach carcinoma, breast cancer, lung cancer, pancreatic cancer, gullet cancer.

The most important role of CEA is in colon cancer, since the level of CEA correlates with the stage of the tumor..

PRINCIPLE OF THE TEST

The 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 of the CEA molecule.

An aliquot of patient sample containing endogenous CEA is incubated in the coated well with enzyme conjugate, which is an anti-CEA 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 patient sample.

WARNINGS AND PRECAUTIONS

- This kit is for in vitro diagnostic use only. For professional use only.
- 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.
- Before starting the assay, read the instructions completely and carefully. Use the valid version of the package insert provided with the kit. Be sure that everything is understood.
- The microplate contains snap-off strips. Unused wells must be stored at 2 °C to 8 °C in the sealed foil pouch and used in the frame provided.
- Pipetting of samples and reagents must be done as quickly as possible and in the same sequence for each step.
- Use reservoirs only for single reagents. This especially applies to the substrate reservoirs. Using a reservoir for dispensing a substrate solution that had previously been used for the conjugate solution may turn solution colored. Do not pour reagents back into vials as reagent contamination may occur.
- Mix the contents of the microplate wells thoroughly to ensure good test results. Do not reuse microwells.
- Do not let wells dry during assay; add reagents immediately after completing the rinsing steps.
- Allow the reagents to reach room temperature (21-26°C) before starting the test. Temperature will affect the absorbance readings of the assay. However, values for the patient samples will not be affected.
- 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 done 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.
- Avoid contact with Stop Solution containing 0.5 M H₂SO₄. It may cause skin irritation and burns.

- Some reagents contain Proclin 300, BND and/or MIT as preservatives. In case of contact with eyes or skin, flush immediately with water.
- TMB substrate has an irritant effect on skin and mucosa. In case of possible contact, wash eyes with an abundant volume of water and skin with soap and abundant water. Wash contaminated objects before reusing them. If inhaled, take the person to open air.
- Chemicals and prepared or used reagents have to be treated as hazardous waste according to the national biohazard safety guideline or regulation.
- For information on hazardous substances included in the kit please refer to Material Safety Data Sheets. Material Safety Data Sheets for this product are available upon request.

KIT COMPONENTS

Contents of the Kit

TM 96

TM E-4131 Microtiterwells

12x8 (break apart) strips, 96 wells; Wells coated with monoclonal anti-CEA antibody

Standards and Controls

contains non-mercury preservative

	Cat. no.	Standard	Concentration	Volume/Vial
STANDARD A	TM E-4101	Standard 0	0 ng/mL	3 ml
STANDARD B	TM E-4102	Standard 1	5 ng/mL	1 ml
STANDARD C	TM E-4103	Standard 2	10 ng/mL	1 ml
STANDARD D	TM E-4104	Standard 3	25 ng/mL	1 ml
STANDARD E	TM E-4105	Standard 4	50 ng/mL	1 ml
STANDARD F	TM E-4106	Standard 5	100 ng/mL	1 ml
CONTROL 1	TM E-4151	Control 1	low	1 ml (lyophilized)*
CONTROL 2	TM E-4152	Control 2	high	1 ml (lyophilized)*

* see „Reagent Preparation“

Control values and ranges please refer to vial label or QC-Datasheet

CONJUGATE

TM E-4140 Enzyme Conjugate

1 vial, 14 ml, ready to use, Monoclonal Anti-CEA antibody conjugated to horseradish peroxidase, contains non-mercury preservative

SUBSTRATE

FR E-0055 Substrate Solution

1 vial, 14 mL, ready to use; Tetramethylbenzidine (TMB).

STOP-SOLN

FR E-0080 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.

WASH-CONC 40x

FR E-0030 Wash Solution

1 vial, 30 mL (40X concentrated); see „Preparation of Reagents“.

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

Equipment and material required but not provided

- A microtiter plate calibrated reader (450±10 nm)
- Calibrated variable precision micropipettes.
- Absorbent paper.
- Distilled or deionized water
- Timer
- Linear graph paper or software for data reduction

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.

Preparation of Reagents

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

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

Add deionized water to the 40X concentrated 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.

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.

Damaged Test Kits

In case of any severe damage of the test kit or components, the supplier has 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.

SPECIMEN

Serum can be used in this assay.

Do not use haemolytic, icteric or lipaemic specimens.

Please note: Samples containing sodium azide should not be used in the assay.

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. Patients receiving anticoagulant therapy 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.

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).

TEST PROCEDURE

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.

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 frame holder.
2.	Dispense 50 µl of each Standard, controls and samples <u>with new disposable tips</u> into appropriate wells.
3.	Dispense 100 µl Enzyme Conjugate into each well. Thoroughly mix for 10 seconds. It is important to have a complete mixing in this step.
4.	Incubate for 60 minutes at room temperature (without covering the plate).
5.	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!
6.	Add 100 µl of Substrate Solution to each well.
7.	Incubate for 30 minutes at room temperature.
8.	Stop the enzymatic reaction by adding 100 µl of Stop Solution to each well.
9.	Determine the absorbance (OD) of each well at 450 ± 10 nm with a microtiter plate reader. It is recommended that the wells be read within 10 minutes after adding the Stop Solution.

Calculation of Results

1. Calculate the average absorbance values for each set of standards, controls and patient samples.
2. Using linear graph paper, 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 or reported as > 100 ng/mL. For the calculation of the concentrations this dilution factor has to be taken into account.

Example of Typical Standard Curve

The following data is for demonstration only and **cannot** be used in place of data generations at the time of assay.

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

EXPECTED NORMAL VALUES

It is strongly recommended that each laboratory should determine its own normal and abnormal values. The literature cut-off is 5 ng/ml for non-smokers and 10 ng/ml for smokers. The results alone should not be the only reason for any therapeutic consequences. The results should be correlated to other clinical observations and diagnostic tests.

QUALITY CONTROL

Good laboratory practice requires that controls be run with each calibration curve. A statistically significant number of controls should be assayed to establish mean values and acceptable ranges to assure proper performance. It is recommended to use control samples according to state and federal regulations. The use of control samples is advised to assure the day to day validity of results. Use controls at both normal and pathological levels.

The controls and the corresponding results of the QC-Laboratory are stated in the QC certificate added to the kit. The values and ranges stated on the QC sheet always refer to the current kit lot and should be used for direct comparison of the results.

It is also recommended to make use of national or international Quality Assessment programs in order to ensure the accuracy of the results.

Employ appropriate statistical methods for analysing control values and trends. If the results of the assay do not fit to the established acceptable ranges of control materials patient results should be considered invalid.

In this case, please check the following technical areas: Pipetting and timing devices; photometer, expiration dates of reagents, storage and incubation conditions, aspiration and washing methods.

After checking the above mentioned items without finding any error contact your distributor.

ASSAY CHARACTERISTICS

Assay Dynamic Range

The range of the assay is between 0.596 – 100 ng/ml.

Specificity of Antibodies (Cross Reactivity)

Cross-reactivities are not known

Analytical Sensitivity

The analytical sensitivity was calculated from the mean plus two standard deviations of twenty (20) replicate analyses of *Standard 0* and was found to be < 0.596 ng/ml.

Precision

Intra-Assays of 3.2% - 4.8% were observed.

Inter-Assays of 4.0% – 6.5% were observed.

LIMITATIONS OF USE

Reliable and reproducible results will be obtained when the assay procedure is performed with a complete understanding of the package insert instruction and with adherence to good laboratory practice.

Any improper handling of samples or modification of this test might influence the results.

Interfering Substances

Any improper handling of samples or modification of this test might influence the results.

Hemolytic, icteric and lipemic sera should be avoided.

The assay contains reagents to minimize interference of HAMA and heterophilic antibodies. However, extremely high titers of HAMA or heterophilic antibodies may interfere with the test results.

Drug Interferences

Smokers have been reported to exhibit increased levels of CEA (see expected values)

High-Dose-Hook Effect

No hook effect was observed in this test up to 10.000 ng/ml.

LEGAL ASPECTS

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. This is especially relevant for the use of control reagents. It is important to always include, within the test procedure, a sufficient number of controls for validating the accuracy and precision of the test.

The test results are valid only if all controls are within the specified ranges and if all other test parameters are also within the given assay specifications. In case of any doubt or concern please contact us.

Therapeutical Consequences

Therapeutical consequences should never be based on laboratory results alone even if all test results are in agreement with the items as stated under "Reliability of Results". Any laboratory result is only a part of the total clinical picture of a patient.

Only in cases where the laboratory results are in acceptable agreement with the overall clinical picture of the patient should therapeutical consequences be derived.

The test result itself should never be the sole determinant for deriving any therapeutical consequences.

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.

Claims submitted due to customer misinterpretation of laboratory results subject to point "Therapeutical Consequences" are also invalid. 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.

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. Krupey 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.

Symbols:

	Storage temperature		Manufacturer		Contains sufficient for <n> tests
	Expiry date		Batch code		For in-vitro diagnostic use only!
	Consult instructions for use		Content		CE labelled
	Caution		Catalogue number		For research use only!