CANCHECK® - CEA

Rapid test for detection of Carcino Embryonic Antigen in human serum/plasma/whole blood

DEVICE

INTENDED USE

CANCHECK® - CEA is a rapid, qualitative, two site sandwich immunoassay for the detection of Carcino Embryonic Antigen (CEA) levels in human serum / plasma / whole blood.

SUMMARY

CEA is a large family of related cell-surface glycoproteins. The CEA family consists of about 10 genes located on chromosome 19. Up to 36 different glycoproteins have been identified in the CEA family. CEA is a glycoprotein with a molecular mass of 150-300 kDa and contains 45-55% carbohydrate. It is a single polypeptide chain consisting of 641 amino acids, with lysine in the N-terminal.

CEA was first described in 1965, when its presence was demonstrated in foetal gut tissue and in tumours from the gastrointestinal tract. Subsequently, CEA was detected in the circulation of patients and recognized as a serum marker for colorectal cancer. In the early diagnosis of disease recurrence following surgical resection, a serial increase in CEA levels is the first evidence of tumour. In patients with disseminated tumours, serial determinations are useful for monitoring response to therapy. CEA values decrease with effective treatment, while they increase with disease refractory to therapy or progressive metastases.

PRINCIPLE

CANCHECK® - CEA utilizes the principle of agglutination of antibodies/ antisera with respective antigen in immuno-chromatography format along with use of nano gold particles as agglutination revealing agent. The conjugate pad contains two components - Agglutinating sera for CEA conjugated to colloidal gold and rabbit globulin conjugated to colloidal gold. As the test specimen flows through the membrane test assembly of the device, the highly specific Agglutinating sera for CEA - colloidal gold conjugate complexes with the CEA in the specimen and travels on the membrane due to capillary action along with the rabbit globulin-colloidal gold conjugate. This complex moves further on the membrane to the test region (T) where it is immobilized by another specific Agglutinating sera for CEA coated on the membrane leading to formation of a coloured band, if CEA level is equal to or higher than 5 ng/ml . The absence of this coloured band in the test region indicates a negative test result.

The rabbit globulin-colloidal gold conjugate and unbound complex, if any, move further on the membrane and are subsequently immobilized by the Agglutinating sera for rabbit globulin coated on the membrane at the control region (C), forming a coloured band. The control band formation is based on the 'Rabbit / Agglutinating sera for Rabbit globulin' system. Since it is completely independent of the analyte detection system, it facilitates formation of consistent control band signal independent of the analyte concentration. This control band acts as a procedural control and serves to validate the test results.

NORMAL REFERENCE VALUES

Non-smokers : upto 3 ng/ml
Smokers : upto 5 ng/ml

REAGENTS AND MATERIALS SUPPLIED

CANCHECK® - CEA kit contains:

A. Individual pouches, each containing :
   1. DEVICE : Membrane assembly pre-dispensed with Agglutinating sera for CEA - colloidal gold conjugate, rabbit globulin - colloidal gold conjugate, Agglutinating sera for CEA and Agglutinating sera for rabbit globulin coated at the respective regions.
   2. PIPETTE : Disposable Plastic Sample Applicator.
   3. Desiccant Pouch.

B. BUF : Sample running buffer in a dropper bottle.

C. Package Insert.

REF	506030010	506030025
Σ	10	25

STORAGE AND STABILITY

The sealed pouches in the test kit & the kit components may be stored between 4ºC to 30ºC for the duration of shelf life as indicated on the pouch / carton. DO NOT FREEZE. After first opening of the sample running buffer bottle, it can be stored between 4ºC to 30ºC for remaining duration of its shelf life.

NOTES

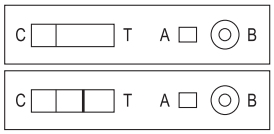
1. Read the instructions carefully before performing the test.
2. For in vitro diagnostic use only. NOT FOR MEDICINAL USE. For professional use only.
3. Do not use the kit beyond expiry date and do not re-use the test device.
4. Do not intermix reagents from different lots.
5. Contact with the contents of desiccant pouch containing, among other substances, cobalt chloride (CAS# 7646-79-9) should be kept to a minimum. Inhalation / swallowing may cause harm.
6. Handle all specimens as if potentially infectious. Follow standard biosafety guidelines for handling and disposal of potentially infectious material.
7. If desiccant colour at the point of opening the pouch has turned from blue to pink or colourless, another test device must be run.
8. Sample running buffer contains Sodium Azide (0.1%), avoid skin contact with this reagent. Azide may react with lead and copper in the plumbing and form highly explosive metal oxide. Flush with large volumes of water to prevent azide build-up in the plumbing.

SPECIMEN COLLECTION AND PREPARATION

1. **CANCHECK® - CEA** uses human serum / plasma / whole blood as specimen.
2. No special preparation of the patient is necessary prior to specimen collection by approved techniques.
3. For whole blood, collect blood with a suitable anticoagulant such as EDTA or Heparin or Oxalate and use the freshly collected blood.
4. Whole blood should be used immediately and should not be frozen.
5. Though fresh specimen is preferable, in case of delay in testing, it may be stored **at 2°C to 8°C for maximum up to 24 hrs.**
6. If serum is to be used as specimen, allow blood to clot completely. Centrifuge to obtain clear serum.
7. Repeated freezing and thawing of the specimen should be avoided.
8. Do not use turbid, lipaemic and hemolysed serum/plasma.
9. Do not use hemolysed, clotted or contaminated blood specimens.
10. Specimen containing precipitates or particulate matter must be centrifuged and the clear supernatant only should be used for testing.
11. Refrigerated specimens must be brought to room temperature prior to testing.

TESTING PROCEDURE AND INTERPRETATION OF RESULTS

1. Bring the kit components of **CANCHECK® - CEA** device to room temperature before testing.
2. Open a foil pouch by tearing along the "notch".
3. Remove the testing device and the sample applicator. ***Once opened, the device must be used immediately.***
4. Label the test device with patient's identity.
5. Place the testing device on a flat horizontal surface.
6. Holding the sample applicator vertically, carefully dispense exactly **four drops** (100µl) of serum / plasma / whole blood into the specimen port 'A'.
7. Add **five drops** of sample running buffer into the buffer port 'B'.
8. At the end of **15 minutes,** read results as follows:

	**Negative Result** Presence of one coloured band at Control (C) region indicates absence of CEA or the concentration of CEA in the specimen is **below** the detection limit of **5 ng/ml.**
	**Positive Result** If the concentration of CEA in the specimen is **above 5 ng/ml**, two coloured bands appear at Test (T) and Control (C) regions. The intensity of test band may be more or less than the control band, depending upon the concentration of CEA in specimen.
	**Invalid Result** The test is invalid if no band is visible at fifteen minutes. The test should also be considered invalid if only the test band appears and no control band appears. Verify the test procedure and repeat the test with a new **CANCHECK® - CEA** device.

PERFORMANCE CHARACTERISTICS

The detection limit of **CANCHECK® - CEA** is upto 5 ng/ml.

In an in-house study, the performance of **CANCHECK® - CEA** was evaluated using a panel of specimens of positive (of varying reactivity) and negative sera in comparison with commercially available ELISA kit. 100% correlation with ELISA was observed.

The results of the evaluation are as follows:

SPECIMEN DATA	Total	CANCHECK® - CEA	Commercially Available ELISA
Total number of specimen tested	186	186	186
Number of Positive serum/plasma specimens	15	15	15
Number of Negative serum/plasma specimens	141	141	141
Number of Negative whole blood specimens	30	29	30

Based on this evaluation:
Sensitivity of **CANCHECK® - CEA** - 100%.
Specificity of **CANCHECK® - CEA** - 99.41%.

LIMITATIONS OF THE TEST

1. CEA level is elevated in some patients having benign conditions such as cirrhosis (45%), pulmonary emphysema (30%), rectal polyps (5%), benign breast disease (15%) and ulcerative colitis (15%).
2. CEA level is also elevated in a variety of cancers like colorectal (70%), lung (45%), gastric (50%), breast (40%), pancreatic (55%), ovarian (25%) and uterine (40%).
3. CEA testing is useful as an adjunct to clinical staging. Persistently elevated levels that are 5-10 times the upper reference limit stongly suggest the presence of colon cancer but may be associated with other cancers also. The pretreatment CEA level is prognostic of the development of metastasis. A high level of CEA associated with greater likelihood of developing metastasis.
4. After successful therapy, CEA levels decline. During remission, CEA remains stable. Rising CEA values may indicate recurrence of disease. The lead-time from CEA elevation to clinical recurrence is about 5 months.
5. Preoperative measurement of CEA concentration is desirable as this may give independent prognostic information, help with surgical management and provide a baseline level for subsequent determinations. For patients with stage 2 (Dukes' B) and 3 (Dukes' C) disease who may be candidates for liver resection, CEA levels should be measured every 2-3 months for at least 3 years after diagnosis. For monitoring treatment of advanced disease, CEA should be tested every 2-3 months.
6. Interferences due to heterophile antibodies, Rheumatoid Factors and other nonanalyte substances in patient's serum, capable of binding antibodies multivalently and providing ereoneous analyte detection in immunoassays, has been reported in various studies. Though **CANCHECK® - CEA** uses sufficient amounts of blocking reagents to inhibit the majority of this interference; nevertheless, some samples with high titres may still express clinically important assay interference. Both laboratory professionals and clinicians must be vigilant to this possibility of antibody interference. Results that appear to be internally inconsistent or incompatible with the clinical presentation should invoke suspicion of the presence of an endogenous artifact and lead to appropriate in vitro investigative action.
7. As with all diagnostic tests, a definitive clinical diagnosis should not be based on the result of a single test, but should only be made by the physician after all clinical and laboratory findings have been evaluated.
8. **CANCHECK® - CEA** should only be used as a screening test in clinically suspected cases only and its results should be confirmed by a quantitative method before taking clinical decisions.

WARRANTY

This product is designed to perform as described on the label and package insert. The manufacturer disclaims any implied warranty of use and sale for any other purpose.

BIBLIOGRAPHY

1. Clinical Laboratory Diagnostics, Use and Assessment of Clinical Laboratory Results, Edited by Lothar Thomas, First Edition, TH Books Verlagsgesellschaft mBH, Frankfurt, Germany, 1998 : 963-965.
2. Teitz Textbook of Clinical Chemistry, Second Edition, WB Saunders Publishing, 1994: 913-914.
3. Geoffrey W. B. Clark et al., Carcino embryonic Antigen-Measurements in the Management of Esophageal Cancer: An Indicator of Subclinical Recurrence. The American Journal of Surgery. December 1995;170(6):597-601.
4. Shahbaz Habib Faridi, Mohammed Amanullah Khan, Bushra Siddiqui et. al., Role of serum carbinoembryonic antigen (CEA) as a tumor marker in breast cancer. Journal of Advanced Medical and Health Research, Vol. 1, Issue 2, July-Dec 2014, 57-60.
5. Data on file: Zephyr Biomedicals.

SYMBOL KEYS

	Temperature Limitation		Manufacturer	DEVICE	Device		Harmful if swallowed. Do not breathe vapour. If swallowed, seek medical advice immediately and show this container or label. Avoid release to the environment. Refer to special instructions.
	Use by		Consult Instructions for use	PIPETTE	Disposable Plastic Sample Applicator		
	Date of Manufacture	REF	Catalogue Number	BUF	Sample Running Buffer		
LOT	Batch Number / Lot Number	IVD	*In vitro* Diagnostic Medical Device		This side up		
	Contains sufficient for <n> tests		Do not reuse		Do not use if package is damaged		

Manufactured by:

Zephyr Biomedicals

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