Instruction for Use

【Product Name】

D-Dimer STAT (eCLIA)

【Package】

REF NO.	Package Size
0320500301	50T
0320500302	2×50T
0320500303	100T
0320500304	2×100T

【Intended Use】

Immunoassay for in vitro quantitative determination of D-Dimer in human plasma, which is mainly used for the elimination of venous thrombosis, the auxiliary diagnosis of disseminated intravascular coagulation and the monitoring of thrombolytic therapy.

D-Dimer is a specific degradation product of fibrin monomer, which is crosslinked by activation factor XIII and then hydrolyzed by plasmin. The majority of fibrin degradation products consist of high molecular weight X- oligomers, which are completely degraded to D-dimers only in vitro or during thrombolytic therapy[1].

D-dimer is an extremely sensitive marker of coagulation activation. The increase of D-dimer level indicates that there are frequent secondary fibrin degradation processes in vivo[1]. As long as there is activated thrombosis and fibrinolytic activity in the body's blood vessels, the level of D-dimer in the blood will increase. Myocardial infarction, cerebral infarction, pulmonary embolism, venous thrombosis, surgery, disseminated intravascular coagulation, infection and tissue necrosis can all cause D-dimer elevation[2,3]. Especially in the elderly and patients with hospitalize[2], D-dimer is easily increased due to abnormal coagulation caused by bacteremia and other diseases. D-dimer positive or elevated in secondary hyperfibrinolysis, such as hypercoagulable state, disseminated intravascular coagulation, renal disease, organ transplant rejection, thrombolytic therapy and so on, are also key indicators of deep vein thrombosis (DVT), pulmonary embolism (PE), and disseminated intravascular coagulation (DIC)[3-6]. The measurement of D-dimer is of great significance in the diagnosis and treatment of fibrinolytic system diseases (such as DIC, various thrombus) and related diseases (such as pregnancy syndrome), as well as the monitoring of thrombolysis therapy[7-8].

【Principles of the testing method】

Sandwich principle.Total duration of assay: 9 minutes.

20 μL of sample, biotinylated D-Dimer antibody and the ruthenium (Ru) complex-labeled D-Dimer antibody form an antigen-antibody sandwich complex, which is bound to streptavidin coated magnetic particles, and then transferred to the measuring cell where the magnetic particles are captured onto the surface of the electrode, while the unbound substances are washed away. Chemiluminescence is generated after the electrode is electrified, and the generated optical signal is measured by a photomultiplier, processed by an instrument, and the concentration of D-Dimer in the sample is calculated based on the calibration curve.

【Main Components】

The reagent pack consists of MB, RA, RB, calibrators and control materials (Optional), different lots cannot be used at the same time or mixed up together.

Components	Ingredients	Volume (2×50T)	Volume (50T)	Volume (100T)	Volume (2×100T)
(MB)	Streptavidin-coated microparticles: 0.1 M PBS; preservative	2×1.8 mL	1×1.8 mL	1×3.5 mL	2×3.5 mL
(RA)	Anti-D-Dimer-Ab~ $Ru(bpy)_3^{2+}$: 0.05 M MES buffer; preservative	2×3.8 mL	1×3.8 mL	1×7.5 mL	2×7.5 mL
(RB)	Anti-D-Dimer-Ab~ biotin: 0.05 M MES buffer; preservative.	2×3.8 mL	1×3.8 mL	1×7.5 mL	2×7.5 mL
Calibrator	D-Dimer antigen, 100 mM PBS pH7.4, ProClin 300, lyophilized	High: 1×1.0 mL Low: 1×1.0 mL			
Control Materials (Optional)	D-Dimer antigen, 100 mM PBS pH7.4, ProClin 300, lyophilized	High: 1×1.0 mL Low: 1×1.0 mL			

Traceability: This method can be traceable to manufacturer's selected measurement procedure.

See the control material value sheet for the target values and ranges of control materials.

Supporting instruments and materials required but not provided in this pack (provided by Lifotronic)

Additional materials for Automated ECL Immunoassay Analyzer eCL8000, eCL8000i, eCL8000p, eCL8000x:

- REF 679005, Auffer, 480 mL, or REF 679004, Auffer, 6×480 mL
- REF 679007, Buffer, 480 mL, or REF 679006, Buffer, 6×480 mL
- REF 679009, Concentrated Washing Buffer, 1 L, or REF 679008, Concentrated Washing Buffer, 6×1 L
- REF 679011, Assay Cup, 300 T, or REF 679012, Assay Cup, 3000 T

Additional materials for Automated ECL Immunoassay Analyzer eCL8600, eCL8600i, eCL8600p, eCL8800, eCL8800i, eCL8800p:

- REF 0320501804, Auffer, 2×1 L, or REF 0320501805, Auffer, 4×1 L
- REF 0320501904, Buffer, 2×1 L, or REF 0320501905, Buffer, 4×1 L
- [illegible] 4×800 mL
- REF 0320510001, Assay Cup/Assay Tip, 6×6×105, or REF 032120111, Assay Cup/Assay Tip, 12×2×105

Additional materials for Automated ECL Immunoassay Analyzer eCL9000, eCL9600, eCL9900, eCL9900i:

- REF 0320501801, Auffer, 2×2 L, or REF 0320501806, Auffer, 4×2 L
- REF 0320501901, Buffer, 2×2 L, or REF 0320501906, Buffer, 4×2 L
- REF 0320507501, PreClean, 2×2 L, or REF 0320507504, PreClean, 4×2 L
- REF 0320510001, Assay Cup/Assay Tip, 6×6×105, or REF 0320510002, Assay Cup/Assay Tip, 1×6×105

【Storage and Shelf Life】

Store at 2℃-8℃.

Do not freeze.

Store the reagent kit upright in order to ensure complete availability of the microparticles during automatic mixing prior to use.

Damaged, expired or contaminated reagents should be discarded.

Stability of the reagents	
Unopened at 2℃~8℃	18 months
Store at 2℃~8℃ after opening	8 weeks
on the analyzers at 2℃~15℃	8 weeks

The calibrators and control materials are stable up to the stated expiration date.

Stability of the calibrators and control materials	
Lyophilized, unopened at 2℃~8℃	18 months
Reconstituted at 2℃~8℃	1 months
Reconstituted at -15℃ or lower than -15℃	3 months (freeze-thawed only once)

【Applicable Instrument】

Automated ECL Immunoassay Analyzers: eCL8000, eCL8000i, eCL8000p, eCL8000x, eCL8600, eCL8600i, eCL8600p, eCL8800, eCL8800i, eCL8800p, eCL9000, eCL9600, eCL9900, eCL9900i.

【Specimen collection, handling and storage】

Venous blood was collected in glass or plastic test tube, anticoagulant with sodium citrate is added (which the ratio of sodium citrate and blood was 1:9), the plasma is obtained by centrifugation and separation, the plasma is stored at 2~8℃.

Plasma samples are stable at 18~28℃ for 24 hours, and 2~8℃ for 5 days. If more than 5 days, they should be packed separately. The samples can be stored for 6 months at -25~-15℃. Freezing and thawing cycle is permitted only once.

【Assay Procedure】

Testing procedures and precautions

Previous to operation, one should read the operational manual carefully to obtain system operation procedure, sample processing, security precaution, maintenance and other related information.

Set up D-Dimer STAT test according to the operational manual.

Put the D-Dimer STAT rackpack into the correct analyzer slot to automatically suspend magnetic beads at least 30 min before testing.

The sample volume required for each D-Dimer test is 20 μL.

Recommended ambient temperature:10~30℃; Relative humidity: ≤ 80%.

Handing of lyophilized calibrators and control materials

Carefully dissolve the contents of calibrator by adding exactly 1.0 mL of distilled or deionized water and allow to stand closed at room temperature for at least 15 minutes to reconstitute. Mix carefully, avoiding foam formation. Transfer aliquots of the reconstituted calibrators to the additional plastic bottles. After bottles is marked and dispensed. If you do not test immediately, you need to store the aliquots immediately at -15℃ or lower than -15℃.

Carefully dissolve the contents of control materials by adding exactly 1.0 mL of distilled or deionized water and allow to stand closed at room temperature for at least 15 minutes to reconstitute. Mix carefully, avoiding foam formation. Transfer aliquots of the reconstituted control materials to the additional plastic bottles. After bottles is marked and dispensed. If you do not test immediately, you need to store the aliquots immediately at -15℃ or lower than -15℃.

Calibration

Calibration should be performed using the lot-matching reagent and calibrators.

The target value of the calibrator has been written into the Radio-Frequency Identification card (RFID card) of the kit.

1. Before calibration, the target value, reagent information and master calibration curve information of the calibrator in the RFID card of the kit should be imported into the test system by swiping the card.
2. The supporting calibrator is tested, and the analyzer adjusts the master calibration curve according to the test results of the supporting calibrator to obtain the calibration curve tested by the current system (the analyzer can automatically interpret the validity of the calibration curve according to the adjustment results).

The test system should re-perform the calibration operation under the following conditions:

(1) When different lots of reagents are used;
(2) When the same lot of reagents has been used on the analyzer for more than 28 days;
(3) According to requirements: e.g. if the quality control result exceeds the defined limit;
(4) When changing the buffers of different lot numbers.

Quality control

For quality control, use D-Dimer STAT control materials.

In addition, other suitable control material can be used.

In order to ensure the reliability of test results, it's recommended to test the control materials every 24 hours. After each calibration, reagent lot change,

control results should fall within the scope of local regulations. If beyond, the analyzer status, reagents, calibration and other factors should be checked.

Calculation

The system software automatically calculates the analyte concentration using particular algorithm, and the result unit is μg FEU/mL or mg FEU/L : 1 μg FEU/mL = 1 mg FEU/L.

Specimen dilution

Samples with D-Dimer concentrations above the measuring range can be diluted with D-Dimer sample diluent. The recommended dilution ratio is 1:9. The concentration of the diluted sample must be > 10 μg FEU/mL. After manual dilution, multiply the result by the dilution factor.

【Biological reference interval】

The reference range of D-Dimer in healthy people is less than 0.5 μg FEU/mL.
The reference value range is based on the determination of the content of D-Dimer in 240 healthy people (including 120 cases aged 1~49 years, 120 cases over 50 years old, 60 cases of men and women in each group), the test results were statistically analyzed by normal distribution. The detection results were arranged in the order from small to large, and frequency analysis was conducted. Because D-Dimer had clinical significance only in the upper limit of reference value, 95% unilateral upper limit was selected as the upper limit of reference interval. It is suggested that each laboratory should establish the reference value range according to the tested patient groups.

【Result Interpretation】

In interpreting the results, the patient's overall clinical situation should be referred to, including symptoms, medical history and other relevant data and information.

【Limitations】

Test results are used only for clinical reference and cannot be used as the basis for diagnosis or rule-out of diseases alone.
The measuring range of the kit is 0.01~100 μg FEU/mL. Values below lower detection limit are reported as < 0.01 μg FEU/mL. Values above the measuring range are reported as > 100 μg FEU/mL.
The detection results were not affected by HOOK effect when the concentration of D-Dimer in the samples reached 500 μg FEU/mL.
When samples contain the bilirubin concentration of 30 mg/dL or less, lipid concentration of 2000 mg/dL or less, concentration of biotin 20 ng/mL or less, hemoglobin concentration of 500 mg/dL or less, total protein at 100 mg/mL or less, HAMA concentration at 100 ng/mL or less, the interference bias of determination results deviation within ± 15%. When the RF concentration in the sample is 1000 IU/mL, the relative recovery of the test results is between 85% and 115%.
Troponin I concentration of 50 μg/mL or less, the test result of D-Dimer should be < 0.05 μg FEU/mL.

【Analytical Performance】

Lower limit of measurement

Limit of Detection (LoD) is 0.05 μg FEU/mL.

Accuracy

The recovery ratio is in the range of 85%~115%.

Linearity

The correlation coefficient (r) was not less than 0.9900 in the interval of 0.05~100 μg FEU/mL.

Within-run precision (repeatability)

The coefficient of variation (CV) ≤ 7%.

Between-lot precision

The coefficient of variation (CV) ≤ 10%.

Control material accuracy

The test results are within the range of control materials.

Homogeneity of calibrators and control materials

In-bottle homogeneity: coefficient of variation (CV) ≤7%.
Between-bottle homogeneity: coefficient of variation (CV) ≤10%.

Method comparison

A comparison of the Lifotronic D-Dimer STAT assay (y) with the commercial D-dimer assay method (x) using clinical samples gave the following correlations:

Number of plasma samples measured: 133
Linear regression:
Y=1.0338X+0.1089
r = 0.9917
The sample concentrations were between 0.200 and 92.73 μg FEU/mL.

【Precaution and Warning】

The kit is only used for in vitro diagnostics.
Exercise the normal precautions required for handling all laboratory reagents.
All reagents and samples including specimen, reagents, calibrators and control materials should avoid foaming before and during test.
Disposal of all waste material should be in accordance with local guidelines.
Safety data sheet available for professional user on request.
This product contains animal-sourced materials and may have potential biological risk. All samples and test wastes should be treated as the source of infection, and all wastes must be disposed according to local regulations.
Any serious incident that would be occurred in relation to the device shall be reported to the manufacturer and the competent authority of the Member State in which the user and/or the patient is established.

The preservative ProClin™300 which contain Mixture of 5-Chloro-2-methyl-4-isothiazolin-3-one and 2-Methyl-2H-isothiazol-3-one (3:1): May cause an allergic skin reaction. thus, proper personal protection should be adopt while handling the reagent: avoid breathing dust/fume/gas/mist/vapours/spray, wear protective gloves and contaminated work clothing should not be allowed out of the workplace. If skin irritation or rash occurs: get medical advice/attention, take off contaminated clothing and wash it before reuse, and dispose of contents/container to an approved waste disposal plant.

【Symbols Explanation】

Symbol	Title of Symbol	Symbol	Title of Symbol
	Manufacturer		Consult instructions for use
	Use by date	IVD	In vitro diagnostic medical device
LOT	Batch code	Σ	Sufficient for <n> tests
SN	Serial number		Biological risks
	Temperature limit		This way up
EC REP	Authorized representative in the European Community	CE	Indicates this device is in compliance with Europe Directive.
REF	Catalogue number	P/N	Material code
	Warning		Date of manufacture
UDI	Unique device identifier		

【Reference】

1. M.B. Pinheiro et al. D-dimer in preeclampsia: Systematic review and meta-analysis. Clinica Chimica Acta 414 (2012) 166–170.
2. S.-S. Chang, et al. Evaluation of the value of rapid D-dimer test in conjunction with cardiac troponin I test for early risk stratification of myocardial infarction. J Thromb Thrombolysis.2010; 30:472–478.
3. Ota, et al. Diagnosis of Deep Vein Thrombosis by Plasma-Soluble Fibrin or D-Dimer. American Journal of Hematology. 2005; 79:274–280.
4. Becker DM, Philbrick JT, Bachhuber TL, Humphrics JE. D-dimer testing and acute venous thromboembolism, A shortcut to accurate diagnosis. Arch Intern Med. 1996;156:939-46.
5. Bonameaux H, Schneider PA, Reber G, et al. Measurement of plasma D-dimer for diagnosis of deep venous thrombosis. Am J Clin Pathol. 1989;91:82-5.
6. Shitrit D, Heyd J, Raveh D, Rudensky B. Diagnostic value of the D-dimer test in deep vein thrombosis improved results by a new assay method and by using discriminate levels. Thromb Res. 2001;102:125-31.
7. American College of Emergency Physicians Board of Directors. Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting with Suspected Lower-Extremity Deep Venous Thrombosis. Ann Em Med. 2003;42:1,124.
8. Ramzi DW, Leeper KV. DVT and Pulmonary Embolism: Part 1, Diagnosis. Am Fam Phys. 2004;69:12, 2829.

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