Enzyme Research Laboratories
Global Coag

Matched Pair Antibody Set for Elisa of Human Factor V antigen (F.V)

Sufficient reagent for 5 x 96 well plates

Catalogue: **FV-EIA**
Lot No: **SAMPLE**
Expiry date: ****/******
Store at -10-20°C.

For Research Use Only ~ Not for use in diagnostic procedures.

Description of Factor V (F.V)

Factor V (formerly referred to as accelerator globulin and labile factor) is a large glycoprotein (320 kDa) that is produced in the liver. The gene that encodes factor V (F.V) is located on chromosone-1. A congential deficiency of F.V is a hemorrhagic disorder inherited as an autosomal recessive disease.
The concentration of F.V in plasma is typically 10 ug/ml. F.V is a pro-cofactor that is activated through limited proteolysis by thrombin, or by activated factor X in the presence of phospholipid surface. Other physiological activators of F.V include plasmin, neutrophil elastase and platelet calpain. The activated cofactor (F.Va) is an essential component of the Prothrombin activator complex, which consists of F.Va, activated factor X, calcium and anionic phospholipid surface. The intact prothrombinase complex activates prothrombin to thrombin at a rate 300,000-fold greater than activated factor X alone. In a positive feedback loop, the thrombin generated accelerates its own generation by activating more F.V to F.Va. Thrombin also acts to down-regulate F.Va indirectly by activating Protein C, which inactivates F.Va cofactor activity [1-3].

Principle of Sandwich-style ELISA

Affinity-purified antibody to F.V is coated onto the wells of a microtitre plate. Any remaining binding sites on the plastic wells are blocked with an excess of bovine serum albumin. The plates are washed and plasma or other fluids containing F.V are applied. The coated antibody will capture the F.V in the sample. After washing the plate to remove unbound material, a peroxidase conjugated second antibody to F.V is added to the plate to bind o the captured F.V. After washing the plate to remove unbound conjugated antibody, the peroxidase activity is expressed by incubation with o-phenylenediamine (OPD). After a fixed development time the reaction is quenched with the addition of H_2SO_4 and the colour produced is quantified using a microplate reader. The colour generated is proportional to the concentration of F.V present in the sample.

Supplied Materials:

1. **Capture Antibody (FV-EIA-C):** One yellow capped vial containing 0.5 ml of polyclonal affinity purified anti-FV antibody for coating plates.

2. **Detecting Antibody (FV-EIA-D):** One red-capped vial containing 0.5 ml of polyclonal anti-FV antibody for detection of captured FV.

Materials Required but not Provided:

1. **Coating Buffer:** (50 mM Carbonate)
1.59 g of Na_2CO_3 and 2.93 g of $NaHCO_3$ up to 1 litre. Adjust pH to 9.6. Store at 2-8°C up to 1 month.

2. **PBS** (base for wash buffer and blocking buffer)
8.0g NaCl and 1.15g Na_2HPO_4, 0.2 g KH_2PO_4, 0.2 g KCl up to 1 litre. Adjust pH to 7.4 if necessary. Store up to 1 month at 2-8°C, discard if there us evidence of microbial growth.

3. **Wash Buffer: PBS-Tween (0.1% v/v).**
To 1 litre of PBS add 1.0 ml of Tween-20. Check that pH is 7.4. Store at 2-8°C up to 1 week.

4. **Blocking Buffer: PBS-BSA** (1%, w/v)
Dissolve 2.5 g of Bovine Serum Albumin (Sigma RIA grade) in 200 ml of PBS. Adjust pH to 7.4 if required, then make up to 250 ml with PBS. Aliquot and store frozen at -20°C.

5. **Sample Diluent:** (HBS-BSA-T20)
5.95 g HEPES (free acid), 1.46 g NaCl, 0.93 g Na_2EDTA, 2..5 g Bovine Serum Albumin (Sigma RIA grade) dissolved in 200 ml H_2O. Add 0.25 ml of Tween-20, check and adjust pH to 7.2 with NaOH, then make up to a final volume of 250 ml with H_2O. Aliquot and store frozen at -20°C.

6. **Substrate Buffer:** Citrate-Phosphate buffer pH 5.0
2.6 g Citric acid and 6.9 g Na_2HPO_4 up to a final volume of 500 ml with purified H_2O. Store at 2-8° up to 1 month.

7. **OPD Substrate:** (O-Phenylenediamine) Toxic!
Available in 5 mg tablets from Sigma # P-6912: Make up immediately before use, do not store. Dissolve 5 mg OPD in 12 ml substrate buffer then add 12 ul 30 % H_2O_2.

8. **Stopping Solution** (2.5 M H_2SO_4)
Caution very corrosive! Generates heat on dilution:
Where stock sulphuric acid is 18 Molar, add 13.9 ml to 86 ml H_2O.
Store at room temperature.

9. **Other:**
Microplates, 96-well Immulon 4-HBX (http://www.labsystems.fi)
Microplate washer (optional)
Microplate reader.

Assay procedure:

1. **Coating of Plates:**
Dilute the capture antibody 1/100 in coating buffer (preferably in a polypropylene tube) and immediately add 100 ul to every well in the plate. Incubate overnight at 4°C.

2. Blocking:
Empty contents of plate and add 150 ml of blocking buffer to every well and incubate for 90 minutes at 22 °C. Wash the plate X 3 with wash buffer.

3. Samples:
Reference plasma is diluted 1/100 (100%) then serial 1/2's down to 1/6400 (1.56%). Sample plasmas are diluted 1/200, 1/400 & 1/800. All dilutions are made in HBS-BSA-T20 sample diluent. Apply 100 ul/well and incubate plate at 22°C for 90 minutes. Wash X3 with wash buffer.

4. Detecting Antibody:
Apply the detecting antibody 1/100 in HBS-BSA-T20 sample diluent and apply 100 ul to every well. Incubate plate @ 22 °C for 90 minutes. Wash X3 with wash buffer.

5. OPD Substrate:
Apply 100 ul of freshly prepared OPD substrate to every well. Allow colour to develop for 10-15 minutes then stop colour reaction with the addition of 50 ul/well of 2.5 M H_2SO_4. The plate can be read at a wavelength of 490 nm.

Calculation of Results

The construction of a proper reference curve is of no less importance than other aspect of the assay. A reference curve should be constructed by plotting the known concentration of standards versus absorbance. This can be done manually using graph paper, or by using curve-fitting computer software. In our experience, the dose response curves of most immunoassays tend to be sigmoid in shape. Although linear regions can be identified within the curve, the best overall fit is often obtained using an algorithm that provides a weighted theoretical model of fit throughout the entire curve, such 4-parameter or 5-parameter logistic curve fit [4,5]. In general, the simplest model that defines the concentration-response relationship should be used [6].
The" back-fit" test us a simple and reliable method to determine if a curve-fitting method is appropriate. In this test, the apparent concentrations for the absorbance values of each standard point are read from the reference curve. The derived values are compared to the assigned values. An appropriate curve fitting method will produce derived values that closely match assigned values throughout the range of the curve, within user-defined limits[6]. The coefficient of determination (R^2) is a valuable indicator of the overall fit, but should not be used by itself in the selection of a curve fitting method, as a poor fit in a particular region of the curve may not be evident from this value alone [5,6].
In the quality control of this product we have determined that under the conditions described above, a reference curve that is constructed using serial dilutions of normal pooled plasma, will produce a correlation coefficient (R^2) of at least 0.980 using a log-log fit, and an R^2 of at least 0.990 using a 4-parameter logistic curve fit algorithm. However, the performance characteristics of in-house assays developed using this product in other laboratories may vary slightly from ours. Different curve fitting methods may be employed but we recommend that the back-fit test be applied as evidence that the fitting method is appropriate.

Technical Notes:

› This paired antibody product is intended to facilitate the end user in establishing an in-house immunoassay for research purposes only. It must be not be used for diagnostic applications. Assay validation is the responsibility of the end user and should be done according to user defined protocols[6].
› Reference calibrators should be of the same matrix and anticoagulant as the samples to be tested (example serum or plasma, citrate or EDTA).
› Do not use samples diluted less than 1/10, as falsely high readings may result.
› The optimal colour development time should be determined empirically as the time required to obtain an absorbance of at least 1.000 at 490 nm for the 100% reference point, not to exceed 20 minutes.
› Rheumatoid factor in plasma samples can sometimes interfere in sandwich type ELISAs by binding to the capture and/or detecting antibodies.
› The wells should not be allowed to become dry. Keep plate covered or in a humid chamber during incubations.
› Antibodies are supplied in a 50% glycerol solution and can be centrifuged briefly in a micro-centrifuge to gather residual reagent from the cap and walls of the tube.

References and Reviews

1. Kane WH, Davie EW; Blood Coagulation Factors V and VIII: Structural functional similarities and their relationship to hemorrhagic and thrombotic disorders. Blood 71:539, 1988.
2. Hoyer, LW Wyshock EG, Colman RW, in Hemostasis and Thrombosis. Edition, eds. RW Colman, J Hirsh, VJ Marder and EW Salzman, pp 109-133, J.B. Lippincott & Co., Philadelphia, 1994.
3. Nesheim ME, Katzmann JA, Tracy PB, Mann KG; in Methods Enzymology 80:249, 1980.
4. Nix, B, Wild D, in Immunoassays, A Practical Approach, editor J.P. Gosling, pp. 239-261, Oxford University Press, 2000.
5. NCCLS. Evaluation of the Linearity of Quantitative Analytical Methods; Proposed Guideline – Second Edition. NCCLS Document EP6-P2 (ISBN 1-56238-446-5, NCCLS, Wayne, Pennsylvania USA, 2001.
6. FDA Guidance for Industry. Bioanalytical Method Validation; May 2001, available on the internet: www.fda.gov/cder/guidance/index.htm

Related Products:

SAFV-IG	Sheep Anti-Human FV, whole IgG from antiserum
SAFV-AP	Sheep Anti-Human FV, affinity purified IgG
SAFV-HRP	Sheep Anti-Human FV, IgG-peroxidase conjugated
FV-DP	Plasma deficient in FV, immune depleted

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