Affinity Biologicals™ INC.

REPRESENTATIVE DATASHEET*

Matched-Pair Antibody Set
for ELISA of
Rabbit Fibrinogen antigen (Fg)

Sufficient reagent for **4 x 96 well** plates

Product #: RBFG-EIA
Lot #: XXXX
Expiry Date: XXXX

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Store at –10 to -20°C

For Research Use Only
Not for use in diagnostic procedures.

Description of Fibrinogen (Fg)

Human fibrinogen is a 340 kDa plasma protein produced in the liver. Plasma concentrations are typically 1.7 – 3.5 g/L (5-10 µM). The intact fibrinogen molecule consists of two identical subunits, each consisting of three non-identical polypeptide chains denoted as Aα, Bβ and γ. The letters A and B in the Aα and Bβ chains designate, respectively, fibrinopeptide A (FpA, residues 1-16), and fibrinopeptide B (FpB, residues 1-14), which are cleaved by thrombin upon conversion of fibrinogen to fibrin. The fibrin monomers polymerize in a half-overlap fashion to form insoluble fibrin fibrils. The polymerised fibrin is subsequently stabilized by activated Factor XIII that forms amide linkages between γ chains and, to a lesser extent, α chains of the fibrin molecules.
Proteolysis of fibrinogen by plasmin initially liberates C-terminal residues from the Aα chain to produce fragment X (intact D-E-D, which is still clottable). Fragment X is further degraded to non-clottable fragments Y (D-E) and D. Fragment Y can be digested into its constituent D and E fragments. Proteolysis of crosslinked fibrin by plasmin results in fragment DD (D-Dimer consisting of the D domains of 2 fibrin molecules crosslinked via the γ chains), fragment E (central E domain) as well as DDE in which fragment E is non-covalently associated with DD. The molecular weights of the cleavage fragments produced from human crosslinked fibrin are: 184 kDa for fragment DD, 92 kDa for D, 50 kDa for E, 1.54 kDa for FpA and 1.57 kDa for FpB.
Most of the fibrinogen in the circulation consists of 2 copies of each chain ($A\alpha_2$, $B\beta_2$, γ_{A2}), but in normal plasma approximately 10% of the fibrinogen molecules contain one γ_A chain and one variant γ chain (termed γ′), in which the c-terminal AGDV residues are replaced with the amino acid sequence VRPEHPAETEYDSLYPEDDL. This variant fibrinogen is commonly referred to as fibrinogen gamma prime (γ_A/γ') but has also been called fibrinogen 2 or peak 2 fibrinogen because it elutes separately from fibrinogen 1 (γ_{A2}) by ion exchange chromatography. Residues 414-427 of the γ′ chain of fibrin gamma prime (contain a high-affinity binding site for exosite II of thrombin, which allows the active site of bound thrombin to remain available to interact with substrates while demonstrating resistance to heparin mediated inhibition by antithrombin[1-4].

Principle of Sandwich-style ELISA

Affinity-purified polyclonal antibody to rabbit Fg is coated onto the wells of a microtitre plate. The plates are washed and plasma or other fluids containing Fg are applied. The coated antibody will capture the Fg in the sample. After washing the plate to remove unbound material, a peroxidase conjugated second antibody to rabbit Fg is added to the plate to bind to the captured Fg. 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 rabbit Fg in the sample.

Supplied Materials:

1. Capture Antibody (RBFG-EIA-C): One yellow-capped vial containing 0.4 ml of affinity-purified polyclonal anti-rabbit fibrinogen antibody for coating plates.

2. Detecting Antibody (RBFG-EIA-D): One red-capped vial containing 0.4 ml of peroxidase conjugated polyclonal anti-rabbit fibrinogen antibody for detection of captured fibrinogen.

Note: Antibodies are supplied in a 50% (v/v) glycerol solution for storage at –10 to -20°C. Keep vials tightly capped. Do not store in frost-free freezers.

Materials Required but not Provided:

This paired antibody set has been optimized for performance using the buffers and conditions described below. Most reagents are available as part of the VisuLize™ Buffer Pak (see Related Products section) or may be prepared as described below.

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

2. Sample Diluent and Wash Buffer: PBS-Tween (0.1%,v/v)
8.0g NaCl, 1.15g Na_2HPO_4, 0.2g KH_2PO_4, 0.2g KCl and 1.0 ml of Tween-20, up to 1 litre. Adjust pH to 7.4. Store at 2-8°C up to 1 week.

3. Conjugate Diluent: HBS-BSA-T20
5.95g HEPES (free acid), 1.46 g NaCl, 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.

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

5. OPD Substrate: (o-Phenylenediamine.2HCl) TOXIC!
(5mg tablets: Sigma # P-6912). Make up immediately before use. Dissolve 5mg OPD in 12 ml substrate buffer then add 12 µl 30% H_2O_2. Do not store.

6. 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.

7. Other:
Microplates, 96-well Immulon 4-HBX (http://www.labsystems.fi)
Microplate washer (optional)
Microplate reader.
Optional: VisuLize™ Buffer Pak (see Related Products section)

Assay Procedure:

1. Coating of plates:
Dilute the capture antibody 1/100 in coating buffer (preferably in a polypropylene tube) and immediately add 100 µl to every well in the plate. Incubate 2 hours at 22°C or overnight at 2-8°C.

2. Blocking:
Blocking is not required under the conditions described. Washing the plate with PBS-Tween is sufficient to block non-specific interactions. Wash plate X 3 with wash buffer.

3. Samples:
Reference plasma is diluted 1/10,000 (100%) then serial 1/2's down to 1/320,000 (3.13%). Sample plasmas are diluted 1/20,000, 1/40,000 & 1/80,000. All dilutions are made in PBS-Tween sample diluent. Apply 100 µl/well and incubate plate @ 22°C for 60 minutes. Wash plate X 3 with wash buffer.

4. Detecting Antibody:
Dilute the detecting antibody 1/100 in HBS-BSA-T20 conjugate diluent and apply 100 µl to each well. Incubate plate @ 22°C for 60 minutes. Wash plate X 3 with wash buffer.

5. OPD Substrate:
Apply 100 µl 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 µl/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 any 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 as a 4-parameter or 5-parameter logistic curve fit [5,6]. In general, the simplest model that defines the concentration-response relationship should be used[7].
The "back-fit" test is 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 [6,7]

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 semi-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. Assay validation is the responsibility of the end user and should be done according to user-defined protocols[7].
- 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 1/500, 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.
- The presence of heterophilic antibodies in samples may interfere in ELISA 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:

1. Hantgan RR, Francis CW, Marder VJ; Fibrinogen Structure and Physiology; in Hemostasis and Thrombosis, 3rd Edition, eds. RW Colman, J Hirsh, VJ Marder and EW Salzman, pp 277-300, J.B. Lippincott Co., Philadelphia PA, USA, 1994.
2. Binnie CG, Lord ST; The Fibrinogen Sequences that Interact with Thrombin; Blood 81, pp 3186-3192, 1993.
3. Pospisil CH, Stafford AR, Fredenburgh JC, Weitz JI; Evidence that both Exosites on Thrombin Participate in Its High Affinity Interaction with Fibrin; JBC 278, pp 21584-21591, 2003.
4. Medved L, Weisel JW; Recommendations for Nomenclature on Fibrinogen and Fibrin; JTH 7, pp 355-359, 2009.
5. Nix,B, Wild D, in Immunoassays, A Practical Approach, editor J.P. Gosling, pp. 239-261, Oxford University Press, 2000.
6. NCCLS. Evaluation of the Linearity of Quantitative Analytical Methods; Proposed Guidline – Second Edition. NCCLS Document EP6-P2 (ISBN 1-56238-446-5, NCCLS, Wayne, Pennsylvania USA, 2001.
7. FDA Guidance for Industry. Bioanalytical Method Validation; May 2001, available on the internet: www.fda.gov/cder/guidance/index.htm

Related Products:

Cat #: **EIA-PAK-1**	VisuLIze™ Buffer Pak: 5 plates, buffers, substrate
Cat #: **SARFG-IG**	Sheep anti-rabbit Fibrinogen, whole IgG from antiserum
Cat #: **SARFG-AP**	Sheep anti-rabbit Fibrinogen, affinity-purified IgG (APIgG)
Cat #: **SARFG-HRP**	Sheep anti-rabbit Fibrinogen, peroxidase labelled IgG
Cat #: **SAFG-IG**	Sheep anti-human Fibrinogen, whole IgG from antiserum
Cat #: **SAFG-AP**	Sheep anti-human Fibrinogen, affinity purified IgG
Cat #: **SAFG-HRP**	Sheep anti-human Fibrinogen, peroxidase labelled IgG
Cat #: **SAFG-APHRP**	Sheep anti-human Fibrinogen, peroxidase labelled APIgG
Cat #: **FG-EIA**	Paired antibody set for ELISA of Fibrinogen, 5 x 96 wells
Cat #: **FG-DP**	Human plasma deficient in Fibrinogen
Cat #: **FG-CP**	High Fibrinogen control plasma
Cat #: **LFG-CP**	Low Fibrinogen control plasma
Cat #: **SAFNE-IG**	Sheep anti-Fibrin Fragment E, whole IgG from antiserum
Cat #: **SAFNE-AP**	Sheep anti-Fibrin Fragment E, affinity purified IgG
Cat #: **SAFNE-HRP**	Sheep anti-Fibrin Fragment E, peroxidase labelled IgG
Cat #: **SAFPA-IG**	Sheep anti-Fibrinopeptide A, whole IgG from antiserum
Cat #: **SAFPA-AP**	Sheep anti-Fibrinopeptide A, affinity purified IgG
Cat #: **SAFPA-HRP**	Sheep anti-Fibrinopeptide A, peroxidase labelled IgG
Cat#: **SAFGP-IG**	Sheep anti-Fibrinogen Gamma Prime, whole IgG
Cat#: **SAFGP-HRP**	Sheep anti-Fibrinogen Gamma Prime, HRP-conj. IgG
Cat#: **MFG-EIA**	Paired Antibodies for ELISA of murine Fibrinogen

Visit our site (www.affinitybiologicals.com) for details.

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