Sekisui Diagnostics, LLC
500 West Avenue, Stamford, CT 06902
Tel. (203) 602-7777 Fax (203) 602-2221

Human Factor Xa

REF 526 Lot No. YYMMDD, Exp. YYYY-MM-DD

Description

Factor X is a vitamin K dependent, two-chain glycoprotein zymogen (Mr = 59,000) synthesized in the liver that circulates in plasma at a concentration of approximately 10 µg/mL. The NH_2-terminal light chain (Mr = 17,000) possesses the gamma-carboxyglutamic (gla) residues that enable factor X/Xa to bind to phospholipids/membranes in a calcium dependent manner. The COOH-terminal heavy chain (Mr = 42,000) possesses the latent catalytic domain.

Activation to factor Xa occurs by interaction with the intrinsic factor Xase complex (Factor VIIa/IXa/Ca^{+2}/phospholipid) or the extrinsic factor Xase complex (Factor VIIa/tissue factor/ Ca^{+2}/phospholipid). Both complexes cleave the molecule at Arg52-Ile53, releasing an activation peptide from the heavy chain, resulting in factor Xa as a two-chain molecule where the light chain remains with a Mr of 17,000 and the heavy chain has been reduced to a Mr of 29,000.

Factor Xa provides the enzymatic activity of the Prothrombinase complex (Factor Xa/factorVa/ Ca^{+2}/phospholipid) which converts prothrombin to thrombin. While factor Xa can convert prothrombin to thrombin alone, its activity is greatly enhanced when a part of the complex. Its activity may be inhibited by inactivation of the factor Va cofactor or directly by a natural inhibitor such as antithrombin III.

Preparation

Human factor Xa is activated from human factor X, itself purified from human plasma, using activator from Russell's viper venom (RVV-X). Factor Xa is purified from RVV-X via chromatography using benzamidine and gel filtration. Purity is determined via SDS-PAGE analysis.

Presentation

Screw-capped glass vial containing 80 µg of human factor Xa lyophilized from an 80 µL solution of 20 mM Tris, 150 mM NaCl, 100 mM mannitol, pH 7.3. Protein content was determined by spectrophotometric analysis at a wavelength of 280 nm using an extinction coefficient of 1.16 for a 0.1% solution, 1 cm pathlength.

Specific Activity

The specific activity of Lot YYMMDD is XXXX units/mg, therefore the vial contains approximately XXX units of activity. The activity has been measured via a factor Xa clotting assay.

Reconstitution

Add 80 µL of filtered deionized or sterile water to generate a 1.0 mg/mL stock solution.

Storage

Store the lyophilized protein at 2°-8°C. Aliquot and store reconstituted protein at –20°C or colder.

References

1. Davie, E. W., *et al.* *Advanced Enzymology* 1979, **48**: 277.
2. Jackson, C. M. and Nemerson, Y. *Annual Review of Biochemistry* 1980, **49**: 765-811.
3. Jesty, J., *et al. Methods in Enzymology* 1976, **45**: 95.
4. Fujikawa, K., *et al.* *Biochemistry* 1972, **11**: 4882.
5. Discipio, R. G., *et al.* *Biochemistry* 1977, **16**: 698.
6. Discipio, R. G., *et al.* *Biochemistry* 1979, **18**: 899.