BECKMAN COULTER

AU/DxC AU US

Instructions For Use

FER
Ferritin

REF OSR61203 4 x 24 mL R1, 4 x 12 mL R2

For *in vitro* diagnostic use only.

For Rx use only

PRINCIPLE

INTENDED USE

The Ferritin Reagent is for the determination of ferritin concentrations in human serum and plasma on the Beckman Coulter AU/DxC AU clinical chemistry analyzers.

SUMMARY AND EXPLANATION

Serum ferritin is an indicator of body iron stores: it has been shown to correlate with stainable bone marrow iron. Measurements of ferritin aid in the diagnosis of diseases affecting iron metabolism, such as hemochromatosis (iron overload) and iron deficiency anemia.[1]

METHODOLOGY

Latex agglutination reactions occur as a result of antibody-coated latex beads aggregating if antigen is present in sufficient quantity. Immune complexes formed in solution scatter light in proportion to their size, shape and concentration. Under conditions of antibody excess, increasing amounts of antigen result in higher scatter. Turbidimeters measure the reduction of incident light due to reflection, absorption, or scatter.

In the Beckman Coulter procedure, the measurement of the decrease in light intensity transmitted (increase in absorbance) through particles suspended in solution as a result of complexes formed during the antigen-antibody reaction, is the basis of this assay. The anti-ferritin reagent is a suspension of polystyrene latex particles, of uniform size, coated with polyclonal rabbit anti-ferritin antibody. When serum, containing ferritin, is mixed with the anti-ferritin reagent, an agglutination mixture occurs. This is measured spectrophotometrically on Beckman Coulter Chemistry Analyzers.

SPECIMEN

SPECIMEN STORAGE AND STABILITY

Stable in serum and plasma for 7 days when stored at 4 – 8°C and for 12 months when stored at -20°C.[2]

Specimen storage and stability information provides guidance to the laboratory. Based on specific needs, each laboratory may establish alternative storage and stability information according to good laboratory practice or from alternative reference documentation.

Additional handling conditions as designated by this laboratory:

SPECIMEN COLLECTION AND PREPARATION

Serum, Li-heparin plasma and K2/K3 EDTA plasma samples are the recommended specimens.

Strongly lipemic samples should be avoided.

Additional instructions for patient sample preparation as designated by this laboratory:

Additional type conditions as designated by this laboratory:

REAGENTS

CONTENTS

Ferritin Reagent

Reagent storage location in this laboratory:

WARNING AND PRECAUTIONS

1. Exercise the normal precautions required for handling all laboratory reagents.
2. Dispose of all waste material in accordance with local guidelines.
3. This product contains material of animal origin. The product should be considered as potentially capable of transmitting infectious diseases.

REACTIVE INGREDIENTS

Final concentration of reactive ingredients

Glycine buffer (R1: pH 8.3, R2: pH 7.3) 170 mmol/L
Latex particles coated with rabbit anti-human ferritin
Preservative

> ⚠ **CAUTION**
>
> **Sodium azide preservative may form explosive compounds in metal drain lines. See NIOSH Bulletin: Explosive Azide Hazard (8/16/76).**
> **To avoid the possible build-up of azide compounds, flush wastepipes with water after the disposal of undiluted reagent. Sodium azide disposal must be in accordance with appropriate local regulations.**

GHS HAZARD CLASSIFICATION

Ferritin R1	WARNING	
	H316	Causes mild skin irritation.
	P332+P313	If skin irritation occurs: Get medical advice/attention.
		Ethylenediaminetetraacetic Acid, Disodium Salt, Dihydrate 1 - 5%

SDS	Safety Data Sheet is available at beckmancoulter.com/techdocs

MATERIALS NEEDED BUT NOT SUPPLIED WITH REAGENT KIT

Serum Protein Multi-Calibrator (Cat No. ODR3021)

Storage location of the Calibrator in this laboratory:

EQUIPMENT AND MATERIALS

For use on the AU480, AU680, AU5800, DxC 500 AU, DxC 500i and DxC 700 AU Beckman Coulter Analyzers.

Storage location of test tubes or sample cups in this laboratory:

REAGENT PREPARATION

R1 is ready for use and can be placed directly on board the instrument. The R2 latex solution should be mixed by inversion 5 – 10 times before placing on the instrument and at weekly intervals thereafter.

STORAGE AND STABILITY

The reagents are stable, unopened, up to the stated expiry date when stored at 2 – 8°C. Once open, reagents stored on board the instrument are stable for 60 days.

INDICATIONS OF DETERIORATION

Visible signs of microbial growth, gross turbidity, precipitate or change in color in the Ferritin reagent may indicate degradation and warrant discontinuation of use.

Additional storage requirements as designated by this laboratory:

STABILITY OF FINAL REACTION MIXTURE

The Beckman Coulter AU/DxC AU analyzer automatically computes every determination at the same time interval.

CALIBRATION

CALIBRATION INFORMATION

The frequency of calibration for the Ferritin procedure is every 30 days. Ferritin values assigned to the calibrators are traceable to the 3rd International Standard for Ferritin, Recombinant NIBSC code: 94/572.

Recalibrate the assay every 30 days, or when the following occur:

1. Change in reagent lot or significant shift in control values,
2. Major preventative maintenance was performed on the analyzer or a critical part was replaced.

Following calibration, the resulting curve should be visually reviewed, on the Beckman Coulter AU/DxC AU analyzer, for acceptability. Quality control procedures should be undertaken immediately following calibration in accordance with good laboratory practice

QUALITY CONTROL

During operation of the Beckman Coulter AU/DxC AU analyzer, at least two levels of an appropriate quality control material should be tested a minimum of once a day. In addition, controls should be performed after calibration with each new lot of reagent, and after specific maintenance or troubleshooting steps described in the appropriate Beckman Coulter AU/DxC AU analyzer Instructions For Use (IFU) and Reference Manual. Quality control testing should be performed in accordance with regulatory requirements and each laboratory's standard procedure.

Please note that recovery of non-Beckman Coulter controls may vary with reagent lots of immunoassay products, due to the use of non-human materials in the controls.

Location of controls used at this laboratory.

CONTROL NAME	SAMPLE TYPE	STORAGE

TESTING PROCEDURE(S)

A complete list of test parameters and operational procedures are provided in the relevant AU/DxC AU analyzer IFU and Reference Manual.

RESULTS INTERPRETATION

The default unit of measure is µg/L, for conversion to SI units (ng/mL) multiply by 1.0.

REPORTING RESULTS

EXPECTED RESULTS

Reference[3 4]

Male:	20 - 250 ng/mL
Female:	10 - 120 ng/mL

Reference Intervals shown above were taken from the literature.

Expected values may vary with age, sex, sample type, diet and geographical location. Each laboratory should verify the transferability of the expected values to its own population, and if necessary determine its own reference interval according to good laboratory practice.
For diagnostic purposes, results should always be assessed in conjunction with the patient's medical history, clinical examinations and other findings.

Expected reference ranges in this laboratory:

INTERVALS	SAMPLE TYPE	UNITS

Additional reporting information as designated by this laboratory:

PROCEDURAL NOTES

LIMITATIONS

This assay has been specifically designed to substantially reduce the risk of interference from HAMA or Heterophilic antibodies. However as with all immunoassays there is always a small risk from such interferences and therefore for diagnostic purposes the Ferritin results should always be assessed in conjunction with other available information e.g., patient's medical history, clinical impressions and results of other tests.[5,6,7]

To investigate samples which are believed to contain interference, a number of approaches can be adopted. Serial dilution may reveal incorrect recovery, PEG precipitation, pre-treatment with non immune serum or assay of the sample in an alternate assay system are all useful in identifying whether the sample contains an interferent. The results of such samples should be interpreted with extreme care.[7] Samples with extremely abnormal optical characteristics, especially turbidity, may produce atypical results. Such samples must be serially diluted and results compared to ensure that no such interference exists.

INTERFERENCES

Results of studies[8] conducted show that the following substances interfere with this Ferritin procedure.

The criteria for no significant interference is recovery within 10% of the initial value or ≤ 8.5 ng/mL concentration change.

Bilirubin:	No significant interference up to 40 mg/dL Bilirubin
Hemolysis:	No significant interference up to 500 mg/dL Hemolysate
Lipemia:	No significant interference up to 400 mg/dL Intralipid*
RF:	No significant interference up to 500 IU/mL RF

* Intralipid is a 20% IV fat emulsion used to emulate extremely turbid samples. Approximate triglyceride concentration is 1,200 mg/dL.

The information presented is based on results from Beckman Coulter studies and is current at the date of publication. Beckman Coulter Inc., makes no representation about the completeness or accuracy of results generated by future studies. Further information on interfering substances is available.[9]

In very rare cases gammopathy, especially monoclonal IgM (Waldenström's macroglobulinemia), may cause unreliable results.

Laboratory specific procedure notes:

PERFORMANCE CHARACTERISTICS

PERFORMANCE CHARACTERISTICS

Data contained within this section is representative of performance on Beckman Coulter systems. Data obtained in your laboratory may differ from these values.

DYNAMIC RANGE / ANALYTICAL MEASURING RANGE

The Ferritin procedure is linear from 8 – 450 ng/mL with recovery within 10% or 3 ng/mL. Samples exceeding the upper limit of linearity should be diluted and repeated. The sample may be diluted, repeated and multiplied by the dilution factor automatically utilizing the AUTO REPEAT RUN.

Prozone or hook effect may occur with highly elevated Ferritin samples (>20,000 ng/mL).

ANALYTICAL SENSITIVITY

The lowest detectable level on the DxC 700 AU was calculated as 4.94 ng/mL.

The lowest detectable level represents the lowest measurable level of Ferritin that can be distinguished from zero. It is calculated as the absolute mean plus three standard deviations of 20 replicates of an analyte free sample.

Limit of Detection

The Limit of Detection (LOD) for the Ferritin reagent was determined to be less than 4.3 ng/mL The Limit of Detection (LOD) for the Ferritin reagent on the AU5800 analyzer was determined to be less then 4.6 ng/mL.This was determined according to CLSI protocol EP17-A.[10]

Limit of Quantitation

The Limit of Quantitation (LOQ) for the Ferritin reagent was determined to be less than 7.8 ng/mL. This was determined according to CLSI protocol EP17-A[10] and represents the lowest concentration of Ferritin that can be measured with a total imprecision of 20%.

METHODS COMPARISON

Reference[11]

Patient serum samples were evaluated in method comparison studies.

Results of Deming regression analysis were as follows:

Y Method	DxC 500 AU
X Method	DxC 700 AU
Slope	1.032
Intercept (ng/mL)	1.406
Correlation Coeff. (r)	0.9994
No. of Samples (n)	113
Range (ng/mL)	8.781 - 439.739

PRECISION

Reference[11]

Estimates of precision, based on CLSI recommendations[12] are consistent with typical performance.

The repeatability precision is less than 8% CV and within laboratory precision is less than 11% CV. Assays of control material were carried out and data reduced following CLSI guidelines above.

The following data was obtained on a DxC 500 AU using 3 serum pools analyzed over 20 days.

N= 80	Within-run		Total	
Mean, mg/dL	SD	CV%	SD	CV%
51.53	1.7	3.2	1.9	3.7
130.34	1.6	1.3	2.0	1.5
429.97	2.3	0.5	2.9	0.7

ADDITIONAL INFORMATION

DxC 700 AU analyzers require that each reagent application has a standard format of abbreviated Test Name. This Test Name is required to allow automated loading of the calibrator information for each application. Refer to the table below for the Test Name assigned to each application for this assay.

Test Name	Description
FER1G	Ferritin (Serum)

Refer to the Beckman Coulter Chemistry Systems Reagent Guide (BAGUIDE) for specific chemistry information for the AU/DxC AU clinical chemistry systems and guidance on symbols used on all AU/DxC AU product labelling.

Setting Sheet Footnotes

User defined

Lot or Lot + Bottle

† Beckman Coulter Serum Protein Multi-Calibrator Cat. No: ODR3021

* Values set for working in SI units µg/L equivalent to ng/mL.

REVISION HISTORY

Updated Specimen Section

Updated REPORTING RESULTS section

Updated PROCEDURAL NOTES section

Updated References section

Preceding version revision history

Add DxC 500i instrument to IFU

REFERENCES

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