BIOLABO
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T.I.B.C.

Total Iron Binding Capacity

Treatment of specimens for the determination of Total Iron Binding Capacity of transferrin in human serum and plasma.

REF 92308 : **R1** 1 x 60 ml **R2** 1 x 30 tests

TECHNICAL SUPPORT AND ORDERS
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CE

IVD **IN VITRO DIAGNOSTIC USE**

CLINICAL SIGNIFICANCE (1)

Transport of iron from one organ to another is accomplished by a plasma transport protein called apotransferrin (β_1-Globulin). The **apotransferrin-Fe^{3+} complex is called transferrin**. Because normally only about one third of the iron binding sites of transferrin are occupied by Fe^{3+}, serum apotransferrin has consirable reserve iron binding capacity The T.I.B.C. is a measurement of the maximum concentration of iron that serum proteins, principally apotransferrin, can bind. The serum T.I.B.C. varies in disorders of iron metabolism. It is often increased in iron deficiency and decreased in chronic inflammatory disorders or malignancies, and it is often decreased also in hematochromatosis.

PRINCIPLE (1) (4)

T.I.B.C. is determined by addition of sufficient Fe^{3+} to saturate iron binding sites on apotransferrin. The excess Fe^{3+} is removed by adsorption with basic magnesium carbonate powder.
After centrifugation, bound iron remaining in supernatant is measured with direct method REF 92108 (Ferene) or with deproteinization method REF 80008 (SFBC).

REAGENTS

Vial R1 **IRON SOLUTION**

Hydrochloric acid 5 mmol/L
Ferric chloride ≥ 502 µg/dL (≥ 90 µmol/L)

Vial R2 **PRECIPITANT**

Magnesium carbonate
With measuring spoon

SAFETY CAUTIONS

BIOLABO reagents are designated for professional, in vitro diagnostic use.

- Verify the integrity of the contents before use.
- Use adequate protections (overall, gloves, glasses).
- Do not pipette by mouth.
- In case of contact with skin or eyes, thoroughly wash affected areas with plenty of water and seek medical advice.
- Material Safety Data Sheet is available upon request.
- Waste disposal : Respect legislation in force in the country.

All specimens should be handled as potentially infectious, in accordance with good laboratory practices using appropriate precautions. Respect legislation in force in the country.

REAGENTS PREPARATION

Reagents are ready for use.

SPECIMEN COLLECTION AND HANDLING (2)

Serum or heparinised plasma. Analyse fresh or store at 2-8°C less than 72 h. Discard lipemic or hemolyzed specimens.
Transferrin is stable in specimen for :

- 6 months at –20°C.
- indefinitely at –70°C.

STABILITY AND STORAGE

Store at 18-25°C, well cap in the original vial and away from light.

- When free from contamination, reagents are stable until expiry date stated on the label of the kit when stored and used as described in the insert.
- Well recap vial R2 after use
- Discard reagent (vial R1) if cloudy.

INTERFERENCES (3)

Interferences linked to iron determination are indicated on the technical data sheet of the reagent REF 92108 or REF 80008.
Give a special care to potential contamination by environmental iron. Use carefully cleaned material (with HCl 0.1 N) and well rinsed with demineralised water.
For a more comprehensive review of factors affecting this assay refer to the publication of Young D.S.

MATERIAL REQUIRED BUT NOT PROVIDED

1. Basic medical analysis laboratory equipment.
1. Normal and pathological control sera.
3. Reagent for Iron determination REF 92108 or REF 80008.

CALIBRATION

Refer to technical data sheet of the reagent used for Iron determination.

QUALITY CONTROL

- BIOLABO EXATROL-N (Level I) REF 95010.
- BIOLABO EXATROL-P (Level II) REF 95011.
- Assayed control sera referring to the same method.
- External quality control program.

Refer to technical data sheet of the reagent used for Iron determination

Manufacturer | Use by | IVD In vitro diagnostic | Temperature limitation | REF Catalogue number | See insert | LOT Batch number | Store away from light | sufficient for | → dilute with

EXPECTED VALUES (1)(2)

T.I.B.C.	µg/dL (*)	[µmol/L]
0-4 days	186-393	[33.3-70.4]
3 months-16 years	290-515	[52.0-92.3]
16-60 years, male	307-522	[55.0-93.5]
16-60 years, femal	358-543	[64.1-97.3]
60-90 years	272-536	[48.7-96.1]
> 90 years	266-496	[47.7-88.9]

1 mg transferrin binds 1.25 µg of iron. As a screening, according to following formula :

Serum transferrin (g/L) = 0.008 T.I.B.C. (µg/dL)

(*) Confirm transferrine concentration by immunochemical procedure.

Each laboratory should establish its own normal ranges for the population that it serves.

PERFORMANCE CHARACTERISTICS

With Direct Method Reagent REF 92108 (Ferene) :

Within run N = 20	*Low level*	*High level*
Mean µg/dL	152	876
S.D. µg/dL	5.2	21
C.V. %	3.4	2.4

Between run N = 11	*Low level*	*High level*
Mean µg/dL	217	702
S.D. µg/dL	5.2	19.7
C.V. %	2.4	2.8

Detection limit : approximately 42 µg/dL (7.5 µmol/L)

Sensitivity for 600 µg/dL : approximately 0.190 Abs. at 600 nm.

LINEARITY

If T.I.B.C. results > 900 µg/dL (160 µmol/L), treat again 0.5 mL of specimen instead of 1 mL and reassay (see § **CALCULATION**).

MANUAL PROCEDURE

Let stand reagents and specimens at room temperature.

Pipette in centrifuge tube	
Specimen (*)	1 mL
Iron Solution (vial R1)	2 mL
Mix, wait 10 minutes then add :	
Precipitant (vial R2)	Using the spoon, measure a dose (approx 150 mg), level off and transfer the contents into the tube
Mix well by inversion. Allow to stand at room temperature for 30 minutes, shaking on a rotary or swinging agitator. Centrifuge 10 minutes at 3000 RPM.	
Measure Iron in supernatant, with reagent REF 80008 or REF 92108.	

Note : Iron is stable for 1 hour in supernatant.

(*) See § **LINEARITY.**

CALCULATION

1- Calculate the result as indicated in the Reagent technical data sheet used for Iron determination.

2- Calculate T.I.B.C. as follows :

T.I.B.C. = Iron concentration measured in supernatant x 3
(dilution 1 mL Specimen / 2 mL Iron Solution).

or

T.I.B.C. = Iron concentration measured in supernatant x 5
(dilution 0.5 mL Specimen / 2 mL Iron Solution).

Notes :

$$\% \text{ of Transferrin saturation} = \frac{100 \times \text{Serum iron}}{\text{T.I.B.C.}}$$

Units conversion factor : µmol/L = µg/dL x 0.1792

REFERENCES

(1) *TIETZ N.W. Text book of clinical chemistry, 3rd Ed. C.A. Burtis, E.R. Ashwood, W.B. Saunders (1999) p. 1699-1703.*

(2) *Clinical Guide to Laboratory Test, 4th Ed., N.W. TIETZ (2006) p. 638-639 et p.1062-1065*

(3) *YOUNG D.S., Effect of Drugs on Clinical laboratory Tests 4th Ed. (1995) p.3-364*

(4) *Ramsay W. N. M., in « Advances in Clinical Chemistry », H. Sobotka et C. P. Steward Ed., Academic Press (1958), vol.1, p.1*