H·O·D
HOUSE of DIAGNOSTICS

Patient Name :	Demo Patient Name	**Lab No :**	Demo Visit No
Age / Sex :	50 Y / F	**Registration On :**	21-Jan-25 07:46
Referred By :	DEMO HOSPITAL	**Patient ID :**	UHID.DEMO.001
Centre :	HOD Head Office		

Ferritin — Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 14:59

Observation	Result	Unit	Biological Ref. Interval	Method
Ferritin	113	ng/mL	11.1-264	CLIA

Biological Reference Range for Ferritin

Category	Total Observed Range
Iron Deficiency	0.68 - 34.5
Other Anemia	13.0 - 1390.8
Iron Overload	334.6 - 8573.0
Renal Dialysis	31.3 - 1321.2
Chronic Liver Disease	7.9 - 12826.0

Sample Type: Serum
Technology: VITROS MicroWell, MicroSensor and Intellicheck Technology
Analyzer: Fully Automated Integrated Biochemistry and ImmunoAssay Analyzer: VITROS 5600

Clinical Significance: Ferritin is found in serum in low concentrations and is directly proportional to the body~s iron stores. Serum ferritin concentration, when analyzed with other factors such as serum iron, iron-binding capacity, and tissue iron stores, is valuable in the diagnosis of iron -deficiency anemia, anemia of chronic infection, and conditions such as thalassemia and hemochromatosis that are associated with iron overload. Measurement of serum ferritin is particularly valuable in distinguishing iron-deficiency anemia caused by low iron stores from those resulting from inadequate iron utilization.

Remarks: Please correlate results with clinical conditions

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Magnesium — Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 14:07

Observation	Result	Unit	Biological Ref. Interval	Method
Magnesium	2.0	mg/dL	1.6 - 2.3	Arsenazo I

Clinical Significance of Magnesium (Mg):
* Magnesium, primarily an intracellular cation (60% found in bone) is a cofactor in numerous enzyme systems and has a role in energy producing oxidative phosphorylation.
* In extracellular fluid, it influences neuromuscular response and irritability.
* Magnesium concentration is determined by intestinal absorption, renal excretion, and exchange with bone and intracellular fluid.
* Approximately 35% of plasma magnesium is protein-bound, mainly to albumin, and therefore changes in albumin concentration may affect magnesium.
- Increased in: Dehydration, tissue trauma, renal failure, hypoadrenocorticism, hypothyroidism, drugs: aspirin (prolonged use), lithium, magnesium salts, progesterone, triamterene.
- Decreased in: Chronic diarrhea, enteric fistula, starvation, chronic alcoholism, total parenteral nutrition with inadequate replacement, hypoparathyroidism (especially post parathyroid surgery), acute pancreatitis, chronic glomerulonephritis, hyperaldosteronism, diabetic ketoacidosis, CHF, critical illness, Gitelman syndrome (familial hypokalemia-hypomagnesemia-hypocalciuria), hereditary isolated magnesium wasting, induced hypothermia, drugs: albuterol, amphotericin B, calcium salts, cisplatin, citrates (blood transfusion), cyclosporine, diuretics, ethacrynic acid.

Clinical Notes :
- A magnesium deficit may exist with little or no apparent change in serum level.
- There is a progressive reduction in serum magnesium level during normal pregnancy (related to hemodilution)

Sample Type: Serum
Technology: Dry Chemistry (VITROS MicroSlide, MicroSensor and Intellicheck Technology)
Analyzer: Fully Automated Integrated Biochemistry and Immunology Analyzer: VITROS 5600

Remarks: Please correlate results with clinical conditions.

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Vitamin B12

Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 15:05

Observation	Result	Unit	Biological Ref. Interval	Method
Vitamin B-12	351	pg/mL	239-931	CLIA

Technology: VITROS Microwell, Microsensor and Intellicheck Technology
Analyzer: Fully Automated Integrated Biochemistry and ImmunoAssay Analyzer: VITROS 5600

Remarks: Please correlate results clinically.

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Folic Acid - Vitamin B9

Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 15:58

Observation	Result	Unit	Biological Ref. Interval	Method
Folate	5.46	ng/mL	2.76 - 20.0	CLIA

Reference Range:
Deficient : 0.35-3.37
Border line: 3.38-5.38
Normal : > 5.38 ng/mL

Sample Type: Serum
Technology: VITROS MicroWell, MicroSensor and Intellicheck Technology
Analyzer: Fully Automated Integrated ImmunoAssay Analyzer: VITROS ECI

Clinical Significance: Folic acid, also known as folates, are class of vitamin compounds, essential for nucleic acid and mitochondrial protein synthesis, amino acid metabolism and aids in rapid cell division and growth. Deficiency seen in pregnancy, low dietary intake, macrocytic and megaloblastic anaemia, drugs (phenytoin, methotrexate,sulphasalazine, triamterene, pyremethamine, trimethoprim-sulphamethoxazole, barbiturates and oral contraceptives), chronic alcoholism, Crohn's disease, Celiac disease, malabsorption syndromes, ileo-jejunal surgeries. Deficiency is also associated with neural tube defects in developing embryo.
Low serum folate levels reflect the first stage of negative folate balance.
Low RBC folate reflects second stage of negative folate balance and more closely correlates with tissue levels and megaloblastic anaemia

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CBC

EDTA Whole Blood Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 10:44 **Approved On:** 21-Jan-25 11:28

Observation	Result	Unit	Biological Ref. Interval	Method
Hemoglobin	12.5	gm/dL	12.0 - 15.0	Photometric Measurement
Total RBC	4.34	million/µL	3.8 - 4.8	Coulter Principle
Platelet Count	269	X 10^3 / µL	150 - 410 x 10^3/µL	Impedance
Total Leucocyte Count (WBC)	4.84	X 10^3 / µL	4.0 - 10.0	Flow Cytometry
Differential Leucocyte Count (DLC)				
Neutrophils	48.9	%	40 - 80	Flow Cytometry
Lymphocytes	38.6	%	20 - 40	Flow Cytometry
Monocytes	8.8	%	2 - 10	Flow Cytometry
Eosinophils	2.9	%	1 - 6	Flow Cytometry
Basophils	0.8	%	0 - 1	Flow Cytometry
Absolute Neutrophil Count	2.37	X 10^3 / µL	2.0 - 7.5	Flow Cytometry
Absolute Lymphocyte Count	1.87	X 10^3 / µL	1.0 - 4.0	Flow Cytometry
Absolute Monocyte Count	0.43	X 10^3 / µL	0.2 - 1.0	Flow Cytometry
Absolute Eosinophil Count	0.14	X 10^3 / µL	0.04 - 0.44	Flow Cytometry
Absolute Basophil Count	0.05	X 10^3 / µL	0.00 - 0.30	Flow Cytometry
Indices				
Hematocrit (PCV)	38.8	%	36 - 46	Calculated
Mean Corpuscular Volume (MCV)	89.3	fL	83 - 101	Calculated
Mean Corp. Hemoglobin (MCH)	28.7	pg	27 - 32	Calculated
MCH Concentration (MCHC)	32.2	g/dl	31.5 - 34.5	Calculated
Red Cell Dist. Width (RDW-CV)	12.5	%	11.5 - 14.5	Calculated
Red Cell Dist. Width (RDW-SD)	43.2	fL	39 - 46	Calculated
Mean Platelet Volume (MPV)	11.9	fL	7-5 - 12.0	Calculated
P-LCC	**106**	10^9/L	30-90	SF Cube
P-LCR	39.41	%	11-45	Calculated
Neutrophil-Lymphocyte Ratio (NLR)	1.27	Ratio		Calculated
Mentzer Index	20.58	Index		Calculated

Remarks: *Please correlate with clinical conditions*

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Free Thyroid Test [FT3,FT4,TSH]

Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 14:37

Observation	Result	Unit	Biological Ref. Interval	Method
Free Triiodothyronine [FT3]	3.71	pg/mL	2.77 - 5.27	CLIA
Free Thyroxine [FT4]	0.95	ng/dL	0.78 - 2.19	CLIA
Thyroid Stimulating Hormone (TSH)	**6.22**	mIU/L	0.46-4.68	CLIA

Note:

1. **TSH Levels are subject to circadian variation**, reaching peak levels between 2-4 AM & the minimum between 6-10 PM. The variation is of the order of 50-206% Hence time of the day has influence on the measured serum TSH concentrations (Reference:Tietz Textbook of Clinical Chemistry & Molecular Diagnostics - 5th Edition Page 123). Fluctuating TSH value must be Clinically correlated.
2. Circulating TSH levels are known to show a circadian rhythm & diurnal variation. The diagnosis based on one TSH value which fluctuates is not reliable. Clinical correlation is mandatory.
3. Values <0.03 ulU/mL need to be clinically correlated due to presence of a rare TSH variant in some individuals.

Remarks: Please correlate results clinically.

Vitamin D, 25 - Hydroxy

Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 14:37

Observation	Result	Unit	Biological Ref. Interval	Method
25-OH Vitamin D (Total)	34.8	ng/mL	20 - 100	CLIA

Technology: VITROS Microwell, Microsensor, and Intellicheck Technology
Analyzer: Fully Automated Integrated Biochemistry and ImmunoAssay: VITROS 5600

Clinical Significance: The major circulating form of vitamin D is 25-hydroxyvitamin D (25(OH)D); thus, the total serum 25(OH)D level is currently considered the best indicator of vitamin D supply to the body from cutaneous synthesis and nutritional intake. The reference range of the total 25(OH)D level is 20-100 ng/mL.
There are two principal forms of vitamin D: D2 and D3. Many of the currently available assays measure and report on both vitamin D2 and D3 metabolites. This can be useful in studies evaluating the contribution of vitamin D2 and D3 to overall vitamin D status. 25-hydroxyvitamin D (25(OH)D) is the major circulating form of vitamin D; thus, the total serum 25(OH)D level is currently considered the best indicator of vitamin D supply to the body from cutaneous synthesis and nutritional intake.
One exception is that 25(OH)D levels do not indicate clinical vitamin D status in patients with chronic renal failure or type 1 vitamin D-dependent rickets or when calcitriol (1,25-dihydroxy vitamin D) is used as a supplement. Interpretation of 25(OH)D can be challenging owing to wide variability in patient's weight, ethnicity, assays, laboratory procedures and validation of reference ranges.
Vitamin D deficiency is defined by most experts as a serum 25(OH)D level of less than 20 ng/mL.
Vitamin D insufficiency has been defined as a serum 25(OH)D level of 20-29 ng/mL.
Vitamin D sufficiency has been defined as serum 25(OH)D levels of 30-100 ng/mL.
Vitamin D toxicity is observed when serum 25(OH)D levels are greater than 100 ng/mL.

Remarks: *Please correlate results clinically*.

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Zinc

Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 08:08 **Received On:** 21-Jan-25 12:21 **Approved On:** 21-Jan-25 14:23

Observation	Result	Unit	Biological Ref. Interval	Method
Zinc	77.76	µg/dL	70-115	Colorimetric

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Note:

1. There is a circadian variation with levels peaking around 9 am and 6 pm
2. Zinc levels decrease post prandially

Comments: Zinc is second to iron as the most abundant trace element in the body. Most zinc is in the skeletal muscle (60%) and bone (30%). It is involved in almost all aspects of metabolism. Dietary sources of zinc are oysters, shell fish & meat. Zinc is required for wound healing, immune function and fetal development. Human zinc deficiency is often associated with diets low in animal derived protein but high in cereals that bind zinc. Nutritional zinc deficiency is fairly prevalent despite wide availability of zinc in foods. Long term zinc supplementation may induce copper deficiency. Zinc toxicity is rare in humans. Inhalation of zinc oxide fumes is the most common cause of metal fume fever.

Decreased Levels: Treatment with anabolic steroids & metal chelating drugs, synthetic diet therapies, Acrodermatitisenteropathica, Alopecia, Typhoid, Pulmonary tuberculosis, liver metastasis, Celiac sprue, Thalassemia major, Pernicious anemia, Acute Myocardial infarction, Renal disease, pregnancy,lactation & old age

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Increased levels Hemodialysis with zinc containing dialysate, Primary osteosarcoma of bone, Coronary heart disease, Arteriosclerosis, Familial hyperzincemia& Anemia

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Advise: *Please correlate results clinically*.

5-Alpha DHT (Di -Hydrotestosterone)

Serum Sample

Accession No: DEMO_BARCODE **Collected On:** 21-Jan-25 07:46 **Received On:** 21-Jan-25 12:22 **Approved On:** 21-Jan-25 19:01

Observation	Result	Unit	Biological Ref. Interval	Method
5-Alpha-Dihydrotestosterone (DHT)	142.3	pg/mL	<431	ELISA

Clinical Significance of 5-alpha-Dihydrotestosterone (DHT)

1. Assess Pseudohermaphroditism
2. Diagnose 5alpha-reductase deficiency
3. Assess efficacy of drugs that inhibit 5alpha -reductase

Increased Levels Observed In

- Hirsutism
- Chronic anovulatory syndrome
- High 5alpha -reductase activity

Decreased Levels Observed In

- Hypogonadism
- 5alpha -reductase deficiency

Advise:*Please correlate results clinically*.

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