

**PATIENT NAME : KAUSIK RAY****REF. DOCTOR : DR. S.MALAKAR**

**CODE/NAME & ADDRESS :** C000013771  
 JEEVANDEEP  
 P-126, KALINDI HOUSING ESTATE,  
 KALINDI, KALINDI,  
 KOLKATA 700089  
 9830058619 9830092860

ACCESSION NO : **0031WH014378**  
 PATIENT ID : KAUSM542863850  
 CLIENT PATIENT ID:  
 ABHA NO :

AGE/SEX : 52 Years Male  
 DRAWN : 17/08/2023 11:22:58  
 RECEIVED : 17/08/2023 14:05:15  
 REPORTED : 17/08/2023 17:50:24

| Test Report Status | Final | Results | Biological Reference Interval | Units |
|--------------------|-------|---------|-------------------------------|-------|
|--------------------|-------|---------|-------------------------------|-------|

**HAEMATOLOGY - CBC****HEALTH SCREEN - 3****BLOOD COUNTS,EDTA WHOLE BLOOD**

|  |                 |             |               |
|--|-----------------|-------------|---------------|
| HEMOGLOBIN (HB)                            | <b>12.6</b> Low | 13.0 - 17.0 | g/dL          |
| METHOD : SPECTROPHOTOMETRY                 |                 |             |               |
| RED BLOOD CELL (RBC) COUNT                 | 4.54            | 4.5 - 5.5   | mil/ $\mu$ L  |
| METHOD : ELECTRICAL IMPEDANCE              |                 |             |               |
| WHITE BLOOD CELL (WBC) COUNT               | 6.97            | 4.0 - 10.0  | thou/ $\mu$ L |
| METHOD : ELECTRICAL IMPEDANCE              |                 |             |               |
| PLATELET COUNT                             | 226             | 150 - 410   | thou/ $\mu$ L |
| METHOD : ELECTRONIC IMPEDENCE & MICROSCOPY |                 |             |               |

**RBC AND PLATELET INDICES**

|  |                 |             |      |
|--|-----------------|-------------|------|
| HEMATOCRIT (PCV)                                 | <b>38.0</b> Low | 40 - 50     | %    |
| METHOD : CALCULATED                              |                 |             |      |
| MEAN CORPUSCULAR VOLUME (MCV)                    | 83.8            | 83 - 101    | fL   |
| METHOD : ELECTRICAL IMPEDANCE                    |                 |             |      |
| MEAN CORPUSCULAR HEMOGLOBIN (MCH)                | 27.8            | 27.0 - 32.0 | pg   |
| METHOD : CALCULATED                              |                 |             |      |
| MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION (MCHC) | 33.1            | 31.5 - 34.5 | g/dL |
| METHOD : CALCULATED                              |                 |             |      |
| RED CELL DISTRIBUTION WIDTH (RDW)                | 13.6            | 11.6 - 14.0 | %    |
| METHOD : ELECTRICAL IMPEDANCE                    |                 |             |      |
| MENTZER INDEX                                    | 18.5            |             |      |
| MEAN PLATELET VOLUME (MPV)                       | 9.3             | 6.8 - 10.9  | fL   |
| METHOD : CALCULATED                              |                 |             |      |

**WBC DIFFERENTIAL COUNT**

|  |    |         |   |
|--|----|---------|---|
| NEUTROPHILS  | 67 | 40 - 80 | % |
| METHOD : FLOWCYTOMETRY, ELECTRONIC IMPEDANCE & MICROSCOPY. |    |         |   |
| LYMPHOCYTES  | 21 | 20 - 40 | % |
| METHOD : FLOWCYTOMETRY, ELECTRONIC IMPEDANCE & MICROSCOPY. |    |         |   |
| MONOCYTES  | 8  | 2 - 10  | % |
| METHOD : FLOWCYTOMETRY, ELECTRONIC IMPEDANCE & MICROSCOPY. |    |         |   |
| EOSINOPHILS  | 4  | 1 - 6   | % |
| BASOPHILS  | 0  | 0 - 2   | % |



**Dr.Anwesha Chatterjee,MD**  
**Pathologist**

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 West Bengal, India  
 Tel : 9111591115, Fax : 30203412  
 CIN - U74899PB1995PLC045956  
 Email : customercare.saltlake@agilus.in

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| METHOD : FLOWCYTOMETRY, ELECTRONIC IMPEDANCE & MICROSCOPY. |                 |                         |                               |               |
| ABSOLUTE NEUTROPHIL COUNT                                  | 4.67            | 2.0 - 7.0               |                               | thou/ $\mu$ L |
| METHOD : FLOWCYTOMETRY & CALCULATED                        |                 |                         |                               |               |
| ABSOLUTE LYMPHOCYTE COUNT                                  | 1.46            | 1 - 3                   |                               | thou/ $\mu$ L |
| METHOD : FLOWCYTOMETRY & CALCULATED                        |                 |                         |                               |               |
| ABSOLUTE MONOCYTE COUNT                                    | 0.56            | 0.20 - 1.00             |                               | thou/ $\mu$ L |
| METHOD : FLOWCYTOMETRY & CALCULATED                        |                 |                         |                               |               |
| ABSOLUTE EOSINOPHIL COUNT                                  | 0.28            | 0.02 - 0.50             |                               | thou/ $\mu$ L |
| METHOD : FLOWCYTOMETRY & CALCULATED                        |                 |                         |                               |               |
| ABSOLUTE BASOPHIL COUNT                                    | <b>0.00 Low</b> | 0.02 - 0.10             |                               | thou/ $\mu$ L |
| METHOD : FLOWCYTOMETRY & CALCULATED                        |                 |                         |                               |               |
| <b>MORPHOLOGY</b>  |                 |                         |                               |               |
| RBC  |                 | NORMOCYTIC NORMOCHROMIC |                               |               |
| METHOD : MICROSCOPIC EXAMINATION                           |                 |                         |                               |               |
| WBC  |                 | NORMAL MORPHOLOGY       |                               |               |
| METHOD : MICROSCOPIC EXAMINATION                           |                 |                         |                               |               |
| PLATELETS  |                 | ADEQUATE                |                               |               |
| METHOD : MICROSCOPIC EXAMINATION                           |                 |                         |                               |               |

**Interpretation(s)**

BLOOD COUNTS,EDTA WHOLE BLOOD-The cell morphology is well preserved for 24hrs. However after 24-48 hrs a progressive increase in MCV and HCT is observed leading to a decrease in MCHC. A direct smear is recommended for an accurate differential count and for examination of RBC morphology.

RBC AND PLATELET INDICES-Mentzer index (MCV/RBC) is an automated cell-counter based calculated screen tool to differentiate cases of Iron deficiency anaemia(>13) from Beta thalassaemia trait

(<13) in patients with microcytic anaemia. This needs to be interpreted in line with clinical correlation and suspicion. Estimation of HbA2 remains the gold standard for diagnosing a case of beta thalassaemia trait.

WBC DIFFERENTIAL COUNT-The optimal threshold of 3.3 for NLR showed a prognostic possibility of clinical symptoms to change from mild to severe in COVID positive patients. When age = 49.5 years old and NLR = 3.3, 46.1% COVID-19 patients with mild disease might become severe. By contrast, when age < 49.5 years old and NLR < 3.3, COVID-19 patients tend to show mild disease.

(Reference to - The diagnostic and predictive role of NLR, d-NLR and PLR in COVID-19 patients A.-P. Yang, et al. International Immunopharmacology 84 (2020) 106504 This ratio element is a calculated parameter and out of NABL scope.



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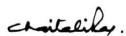
FBS (FASTING BLOOD SUGAR) **104** High 74 - 100 mg/dL  
 METHOD : ENZYMIC (HEXOKINASE/G-6-PDH)

**GLYCOSYLATED HEMOGLOBIN(HBA1C), EDTA WHOLE BLOOD**

HBA1C 5.6 Non-diabetic Adult < 5.7 %  
 Pre-diabetes 5.7 - 6.4  
 Diabetes diagnosis: > or = 6.5  
 Therapeutic goals: < 7.0  
 Action suggested : > 8.0  
 (ADA Guideline 2021)

METHOD : HPLC

ESTIMATED AVERAGE GLUCOSE(EAG) 114.0 < 116.0 mg/dL



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**Chief Biochemist cum MRQA**

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Test Report Status **Final**

Results

Biological Reference Interval

Units

**AGILUS DIAGNOSTICS LIMITED - KOLKATA**  
**Bio-Rad Variant II Turbo CDM 5.4 S/N : 13466**
**PATIENT REP**  
**V2TURBO\_A1c**
**Patient Data**

Sample ID: 3107124352  
 Patient ID: 0031WH014378  
 Name: KAUSIKRAY  
 Physician:  
 Sex:  
 DOB:

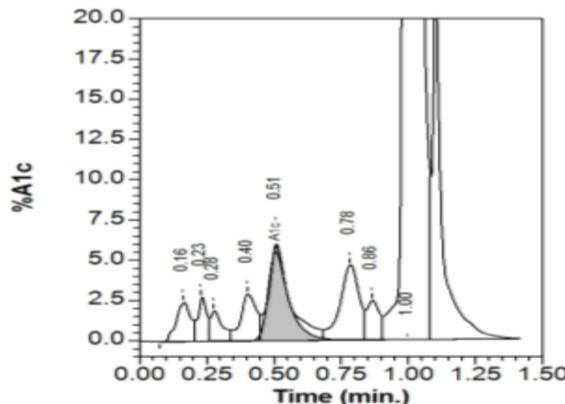
**Analysis Data**

Analysis Performed: 17/08/2023 16:08:56  
 Injection Number: 458  
 Run Number: 24  
 Rack ID:  
 Tube Number: 5  
 Report Generated: 17/08/2023 16:31:12  
 Operator ID:

Comments:

| Peak Name | NGSP % | Area % | Retention Time (min) | Peak Area |
|-----------|--------|--------|----------------------|-----------|
| A1a       | ---    | 1.4    | 0.162                | 25969     |
| A1b       | ---    | 0.9    | 0.229                | 16869     |
| F         | ---    | 0.9    | 0.275                | 16281     |
| LA1c      | ---    | 1.7    | 0.402                | 31109     |
| A1c       | 5.6    | ---    | 0.506                | 83085     |
| P3        | ---    | 3.6    | 0.781                | 64106     |
| P4        | ---    | 1.2    | 0.863                | 22044     |
| Ao        | ---    | 85.6   | 0.998                | 1540073   |

Total Area: 1,799,535

**HbA1c (NGSP) = 5.6 %***chaitali.*

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**KIDNEY FUNCTION TEST**

|  |              |             |        |
|--|--------------|-------------|--------|
| BLOOD UREA NITROGEN                                  | <b>6 Low</b> | 8.4 - 25.7  | mg/dL  |
| METHOD : UREASE METHOD                               |              |             |        |
| CREATININE   | 0.84         | 0.60 - 1.30 | mg/dL  |
| METHOD : KINETIC ALKALINE PICRATE                    |              |             |        |
| BUN/CREAT RATIO                                      | 7.14         | 5.0 - 15.0  |        |
| URIC ACID  | 5.5          | 3.5 - 7.2   | mg/dL  |
| METHOD : URICASE                                     |              |             |        |
| TOTAL PROTEIN  | 6.9          | 6.0 - 8.3   | g/dL   |
| METHOD : BIURET                                      |              |             |        |
| ALBUMIN  | 4.4          | 3.5 - 5.2   | g/dL   |
| METHOD : COLORIMETRIC (BROMCRESOL GREEN)             |              |             |        |
| GLOBULIN   | 2.5          | 2.0 - 3.5   | g/dL   |
| METHOD : CALCULATED PARAMETER                        |              |             |        |
| CALCIUM  | 8.5          | 8.4 - 10.2  | mg/dL  |
| METHOD : ARSENAZO III                                |              |             |        |
| SODIUM, SERUM  | 140          | 136 - 145   | mmol/L |
| METHOD : ION SELECTIVE ELECTRODE TECHNOLOGY INDIRECT |              |             |        |
| POTASSIUM, SERUM                                     | 4.00         | 3.5 - 5.1   | mmol/L |
| METHOD : ION SELECTIVE ELECTRODE TECHNOLOGY INDIRECT |              |             |        |
| CHLORIDE, SERUM                                      | 105          | 98 - 107    | mmol/L |
| METHOD : ION SELECTIVE ELECTRODE TECHNOLOGY INDIRECT |              |             |        |

**LIVER FUNCTION PROFILE, SERUM**

|  |      |            |       |
|--|------|------------|-------|
| BILIRUBIN, TOTAL                         | 0.50 | 0.2 - 1.2  | mg/dL |
| METHOD : DIAZONIUM SALT                  |      |            |       |
| BILIRUBIN, DIRECT                        | 0.18 | 0.0 - 0.5  | mg/dL |
| METHOD : DIAZO REACTION                  |      |            |       |
| BILIRUBIN, INDIRECT                      | 0.32 | 0.1 - 1.0  | mg/dL |
| METHOD : CALCULATED                      |      |            |       |
| TOTAL PROTEIN                            | 6.9  | 6.0 - 8.30 | g/dL  |
| METHOD : BIURET                          |      |            |       |
| ALBUMIN                                  | 4.4  | 3.5 - 5.2  | g/dL  |
| METHOD : COLORIMETRIC (BROMCRESOL GREEN) |      |            |       |
| GLOBULIN                                 | 2.5  | 2.0 - 3.5  | g/dL  |
| ALBUMIN/GLOBULIN RATIO                   | 1.8  | 1 - 2.1    | RATIO |

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|   |                 | METHOD : CALCULATED PARAMETER |                               |       |
| ASPARTATE AMINOTRANSFERASE(AST/SGOT)                                    | <b>61 High</b>  | 5 - 34                        |                               | U/L   |
| METHOD : ENZYMATIC (NADH (WITHOUT P-5'-P))                              |                 |                               |                               |       |
| ALANINE AMINOTRANSFERASE (ALT/SGPT)                                     | <b>62 High</b>  | 0 - 55                        |                               | U/L   |
| METHOD : ENZYMATIC (NADH (WITHOUT P-5'-P))                              |                 |                               |                               |       |
| ALKALINE PHOSPHATASE  | 70              | 40 - 150                      |                               | U/L   |
| METHOD : PARA-NITROPHENYL PHOSPHATE                                     |                 |                               |                               |       |
| GAMMA GLUTAMYL TRANSFERASE (GGT)  | 19              | 11 - 59                       |                               | U/L   |
| METHOD : L-GAMMA-GLUTAMYL-4-NITROANALIDE / GLYCYLGLYCINE KINETIC METHOD |                 |                               |                               |       |
| LACTATE DEHYDROGENASE   | <b>226 High</b> | 125 - 220                     |                               | U/L   |
| METHOD : IFCC LACTATE TO PYRUVATE                                       |                 |                               |                               |       |

**Interpretation(s)****GLUCOSE FASTING,FLUORIDE PLASMA-TEST DESCRIPTION**

Normally, the glucose concentration in extracellular fluid is closely regulated so that a source of energy is readily available to tissues and so that no glucose is excreted in the urine.

**Increased in:** Diabetes mellitus, Cushing's syndrome (10 – 15%), chronic pancreatitis (30%). Drugs:corticosteroids,phenytoin, estrogen, thiazides.

**Decreased in :**Pancreatic islet cell disease with increased insulin,insulinoma,adrenocortical insufficiency,hypopituitarism,diffuse liver disease,malignancy(adrenocortical,stomach,fibrosarcoma),infant of a diabetic mother,enzyme deficiency diseases(e.g.galactosemia),Drugs-insulin,ethanol,propranolol,sulfonylureas,tolbutamide, and other oral hypoglycemic agents.

**NOTE:** While random serum glucose levels correlate with home glucose monitoring results (weekly mean capillary glucose values),there is wide fluctuation within individuals.Thus, glycosylated hemoglobin(HbA1c) levels are favored to monitor glycemic control.

High fasting glucose level in comparison to post prandial glucose level may be seen due to effect of Oral Hypoglycaemics & Insulin treatment,Renal Glycosuria,Glycaemic index & response to food consumed,Alimentary Hypoglycemia,Increased insulin response & sensitivity etc.

**GLYCOSYLATED HEMOGLOBIN(HbA1C), EDTA WHOLE BLOOD-Used For:**

1. Evaluating the long-term control of blood glucose concentrations in diabetic patients.

2. Diagnosing diabetes.

3. Identifying patients at increased risk for diabetes (prediabetes).

The ADA recommends measurement of HbA1c (typically 3-4 times per year for type 1 and poorly controlled type 2 diabetic patients, and 2 times per year for well-controlled type 2 diabetic patients) to determine whether a patient's metabolic control has remained continuously within the target range.

1. eAG (Estimated average glucose) converts percentage HbA1c to mg/dl, to compare blood glucose levels.

2. eAG gives an evaluation of blood glucose levels for the last couple of months.

3. eAG is calculated as eAG (mg/dl) = 28.7 \* HbA1c - 46.7

**HbA1c Estimation can get affected due to :**

1. Shortened Erythrocyte survival : Any condition that shortens erythrocyte survival or decreases mean erythrocyte age (e.g. recovery from acute blood loss,hemolytic anemia) will falsely lower HbA1c test results.Fructosamine is recommended in these patients which indicates diabetes control over 15 days.

2.Vitamin C & E are reported to falsely lower test results.(possibly by inhibiting glycation of hemoglobin.

3. Iron deficiency anemia is reported to increase test results. Hypertriglyceridemia,uremia, hyperbilirubinemia, chronic alcoholism,chronic ingestion of salicylates & opiates addiction are reported to interfere with some assay methods,falsely increasing results.

4. Interference of hemoglobinopathies in HbA1c estimation is seen in

a) Homozygous hemoglobinopathy. Fructosamine is recommended for testing of HbA1c.

b) Heterozygous state detected (D10 is corrected for HbS & HbC trait.)

c) HbF > 25% on alternate platform (Boronate affinity chromatography) is recommended for testing of HbA1c.Abnormal Hemoglobin electrophoresis (HPLC method) is recommended for detecting a hemoglobinopathy

**LIVER FUNCTION PROFILE, SERUM-**

**Bilirubin** is a yellowish pigment found in bile and is a breakdown product of normal heme catabolism. Bilirubin is excreted in bile and urine, and elevated levels may give yellow discoloration in jaundice.**Elevated levels** results from increased bilirubin production (eg, hemolysis and ineffective erythropoiesis), decreased bilirubin excretion (eg, obstruction and hepatitis), and abnormal bilirubin metabolism (eg, hereditary and neonatal jaundice). Conjugated (direct) bilirubin is elevated more than unconjugated (indirect) bilirubin in Viral hepatitis, Drug reactions, Alcoholic liver disease Conjugated (direct) bilirubin is also elevated more than unconjugated (indirect) bilirubin when

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there is some kind of blockage of the bile ducts like in Gallstones getting into the bile ducts, tumors & Scarring of the bile ducts. Increased unconjugated (indirect) bilirubin may be a result of Hemolytic or pernicious anemia, Transfusion reaction & a common metabolic condition termed Gilbert syndrome, due to low levels of the enzyme that attaches sugar molecules to bilirubin.

**AST** is an enzyme found in various parts of the body. AST is found in the liver, heart, skeletal muscle, kidneys, brain, and red blood cells, and it is commonly measured clinically as a marker for liver health. AST levels increase during chronic viral hepatitis, blockage of the bile duct, cirrhosis of the liver,liver cancer,kidney failure,hemolytic anemia,pancreatitis,hemochromatosis. AST levels may also increase after a heart attack or strenuous activity. ALT test measures the amount of this enzyme in the blood. ALT is found mainly in the liver, but also in smaller amounts in the kidneys,heart,muscles, and pancreas. It is commonly measured as a part of a diagnostic evaluation of hepatocellular injury, to determine liver health. AST levels increase during acute hepatitis,sometimes due to a viral infection,ischemia to the liver,chronic hepatitis,obstruction of bile ducts,cirrhosis.

**ALP** is protein found in almost all body tissues.Tissues with higher amounts of ALP include the liver,bile ducts and bone.Elevated ALP levels are seen in Biliary obstruction, Osteoblastic bone tumors, osteomalacia, hepatitis, Hyperparathyroidism, Leukemia, Lymphoma, Pagets disease,Rickets,Sarcoidosis etc. Lower-than-normal ALP levels seen in Hypophosphatasia,Malnutrition,Protein deficiency,Wilsons disease.

**GGT** is an enzyme found in cell membranes of many tissues mainly in the liver,kidney and pancreas.It is also found in other tissues including intestine,spleen,heart, brain and seminal vesicles.The highest concentration is in the kidney,but the liver is considered the source of normal enzyme activity.Serum GGT has been widely used as an index of liver dysfunction.Elevated serum GGT activity can be found in diseases of the liver,biliary system and pancreas.Conditions that increase serum GGT are obstructive liver disease,high alcohol consumption and use of enzyme-inducing drugs etc.

**Total Protein** also known as total protein,is a biochemical test for measuring the total amount of protein in serum.Protein in the plasma is made up of albumin and globulin.Higher-than-normal levels may be due to:Chronic inflammation or infection,including HIV and hepatitis B or C,Multiple myeloma,Waldenstroms disease.Lower-than-normal levels may be due to: Agammaglobulinemia,Bleeding (hemorrhage),Burns,Glomerulonephritis,Liver disease, Malabsorption,Malnutrition,Nephrotic syndrome,Protein-losing enteropathy etc.

**Albumin** is the most abundant protein in human blood plasma.It is produced in the liver.Albumin constitutes about half of the blood serum protein.Low blood albumin levels (hypoalbuminemia) can be caused by:Liver disease like cirrhosis of the liver, nephrotic syndrome,protein-losing enteropathy,Burns,hemodilution,increased vascular permeability or decreased lymphatic clearance,malnutrition and wasting etc

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**Dr. Chaitali Ray, PHD**  
**Chief Biochemist cum MRQA**

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**Patient Ref. No. 31000004781313**

**PATIENT NAME : KAUSIK RAY****REF. DOCTOR : DR. S.MALAKAR**

**CODE/NAME & ADDRESS :** C000013771  
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 KOLKATA 700089  
 9830058619 9830092860

ACCESSION NO : **0031WH014378**  
 PATIENT ID : KAUSM542863850  
 CLIENT PATIENT ID:  
 ABHA NO :

AGE/SEX : 52 Years Male  
 DRAWN : 17/08/2023 11:22:58  
 RECEIVED : 17/08/2023 14:05:15  
 REPORTED : 17/08/2023 17:50:24

**Test Report Status****Final****Results****Biological Reference Interval****Units****BIOCHEMISTRY - LIPID****HEALTH SCREEN - 3****LIPID PROFILE, SERUM**

|  |                 |  |       |
|--|-----------------|--|-------|
| CHOLESTEROL, TOTAL                                   | 160             | < 200 Desirable<br>200 - 239 Borderline High<br>>/= 240 High   | mg/dL |
| METHOD : ENZYMATIC ASSAY                             |                 |  |       |
| TRIGLYCERIDES  | 114             | < 150 Normal<br>150 - 199<br>Borderline High<br>200 - 499 High<br>>/=500 Very High   | mg/dL |
| METHOD : GLYCEROL PHOSPHATE OXIDASE                  |                 |  |       |
| HDL CHOLESTEROL                                      | <b>34 Low</b>   | Low : < 40<br>High : > / = 60  | mg/dL |
| METHOD : ACCELERATOR SELECTIVE DETERGENT METHODOLOGY |                 |  |       |
| LDL CHOLESTEROL, DIRECT                              | 107             | Adult Optimal : < 100<br>Near optimal : 100 - 129<br>Borderline high : 130 - 159<br>High : 160 - 189<br>Very high : > or = 190 | mg/dL |
| METHOD : MEASURED, LIQUID SELECTIVE DETERGENT        |                 |  |       |
| NON HDL CHOLESTEROL                                  | 126             | Desirable: Less than 130<br>Above Desirable: 130-159<br>Borderline High: 160-189<br>High: 190 -219<br>Very High: >or = 220     | mg/dL |
| METHOD : CALCULATED                                  |                 |  |       |
| VERY LOW DENSITY LIPOPROTEIN                         | 22.8            | < or = 30  | mg/dL |
| METHOD : CALCULATED                                  |                 |  |       |
| CHOL/HDL RATIO                                       | <b>4.7 High</b> | 3.3 - 4.4 Low Risk<br>4.5-7.0 Average Risk<br>7.1 - 11.0 Moderate Risk<br>> 11.0 High Risk                                     |       |
| METHOD : CALCULATED                                  |                 |  |       |
| LDL/HDL RATIO  | <b>3.2 High</b> | 0.5 - 3.0 Desirable/ Low Risk<br>3.1-6.0 Borderline /Moderate Risk<br>> 6.0 High Risk  |       |

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METHOD : CALCULATED

**Interpretation(s)**

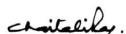
- 1) Cholesterol levels help assess the patient risk status and to follow the progress of patient under treatment to lower serum cholesterol concentrations.
- 2) Serum Triglyceride (TG) are a type of fat and a major source of energy for the body. Both quantity and composition of the diet impact on plasma triglyceride concentrations. Elevations in TG levels are the result of overproduction and impaired clearance. High TG are associated with increased risk for CAD (Coronary artery disease) in patients with other risk factors, such as low HDL-C, some patient groups with elevated apolipoprotein B concentrations, and patients with forms of LDL that may be particularly atherogenic.
- 3) HDL-C plays a crucial role in the initial step of reverse cholesterol transport, this considered to be the primary atheroprotective function of HDL
- 4) LDL -C plays a key role in causing and influencing the progression of atherosclerosis and, in particular, coronary sclerosis. The majority of cholesterol stored in atherosclerotic plaques originates from LDL, thus LDL-C value is the most powerful clinical predictor.
- 5) Non HDL cholesterol: Non-HDL-C measures the cholesterol content of all atherogenic lipoproteins, including LDL hence it is a better marker of risk in both primary and secondary prevention studies. Non-HDL-C also covers, to some extent, the excess ASCVD risk imparted by the sLDL, which is significantly more atherogenic than the normal large buoyant particles, an elevated non-HDL-C indirectly suggests greater proportion of the small, dense variety of LDL particles

Serum lipid profile is measured for cardiovascular risk prediction. Lipid Association of India recommends LDL-C as primary target and Non HDL-C as co-primary treatment target.

**Risk Stratification for ASCVD (Atherosclerotic cardiovascular disease) by Lipid Association of India**

| <b>Risk Category</b>   |   |
|--|---|
| Extreme risk group   | A. CAD with > 1 feature of high risk group  |
|  | B. CAD with > 1 feature of Very high risk group or recurrent ACS (within 1 year) despite LDL-C < or = 50 mg/dl or polyvascular disease  |
| Very High Risk   | 1. Established ASCVD 2. Diabetes with 2 major risk factors or evidence of end organ damage 3. Familial Homozygous Hypercholesterolemia  |
| High Risk  | 1. Three major ASCVD risk factors. 2. Diabetes with 1 major risk factor or no evidence of end organ damage. 3. CKD stage 3B or 4. 4. LDL >190 mg/dl 5. Extreme of a single risk factor. 6. Coronary Artery Calcium - CAC >300 AU. 7. Lipoprotein a >/= 50mg/dl 8. Non stenotic carotid plaque |
| Moderate Risk  | 2 major ASCVD risk factors  |
| Low Risk   | 0-1 major ASCVD risk factors  |
| <b>Major ASCVD (Atherosclerotic cardiovascular disease) Risk Factors</b> |   |
| 1. Age > or = 45 years in males and > or = 55 years in females           | 3. Current Cigarette smoking or tobacco use   |
| 2. Family history of premature ASCVD                                     | 4. High blood pressure  |
| 5. Low HDL   |   |

Newer treatment goals and statin initiation thresholds based on the risk categories proposed by LAI in 2020.



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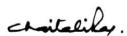
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| Risk Group                    | Treatment Goals                  |                                  | Consider Drug Therapy |                 |
|-------------------------------|----------------------------------|----------------------------------|-----------------------|-----------------|
|                               | LDL-C (mg/dl)                    | Non-HDL (mg/dl)                  | LDL-C (mg/dl)         | Non-HDL (mg/dl) |
| Extreme Risk Group Category A | <50 (Optional goal<br><OR = 30 ) | < 80 (Optional goal<br><OR = 60) | >OR = 50              | >OR = 80        |
| Extreme Risk Group Category B | <OR = 30                         | <OR = 60                         | > 30                  | >60             |
| Very High Risk                | <50                              | <80                              | >OR= 50               | >OR= 80         |
| High Risk                     | <70                              | <100                             | >OR= 70               | >OR= 100        |
| Moderate Risk                 | <100                             | <130                             | >OR= 100              | >OR= 130        |
| Low Risk                      | <100                             | <130                             | >OR= 130*             | >OR= 160        |

\*After an adequate non-pharmacological intervention for at least 3 months.

**References:** Management of Dyslipidaemia for the Prevention of Stroke: Clinical Practice Recommendations from the Lipid Association of India. Current Vascular Pharmacology, 2022, 20, 134-155.



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**Test Report Status****Final****Results****Biological Reference Interval****Units****SPECIALISED CHEMISTRY - HORMONE****HEALTH SCREEN - 3****THYROID PANEL, SERUM**

|  |       |               |        |
|--|-------|---------------|--------|
| T3   | 162.0 | 35 - 193      | ng/dL  |
| METHOD : TWO-STEP CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY |       |               |        |
| T4   | 8.66  | 4.87 - 11.71  | µg/dL  |
| METHOD : TWO-STEP CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY |       |               |        |
| TSH (ULTRASENSITIVE)   | 4.612 | 0.350 - 4.940 | µIU/mL |
| METHOD : TWO-STEP CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY |       |               |        |

**Interpretation(s)**

**Triiodothyronine T3 , Thyroxine T4, and Thyroid Stimulating Hormone TSH** are thyroid hormones which affect almost every physiological process in the body, including growth, development, metabolism, body temperature, and heart rate.

Production of T3 and its prohormone thyroxine (T4) is activated by thyroid-stimulating hormone (TSH), which is released from the pituitary gland. Elevated concentrations of T3, and T4 in the blood inhibit the production of TSH.

Excessive secretion of thyroxine in the body is hyperthyroidism, and deficient secretion is called hypothyroidism.

In primary hypothyroidism, TSH levels are significantly elevated, while in secondary and tertiary hyperthyroidism, TSH levels are low.

Below mentioned are the guidelines for Pregnancy related reference ranges for Total T4, TSH & Total T3. Measurement of the serum TT3 level is a more sensitive test for the diagnosis of hyperthyroidism, and measurement of TT4 is more useful in the diagnosis of hypothyroidism. Most of the thyroid hormone in blood is bound to transport proteins. Only a very small fraction of the circulating hormone is free and biologically active. It is advisable to detect Free T3, FreeT4 along with TSH, instead of testing for albumin bound Total T3, Total T4.

| Sr. No. | TSH        | Total T4 | FT4    | Total T3 | Possible Conditions  |
|---------|------------|----------|--------|----------|--|
| 1       | High       | Low      | Low    | Low      | (1) Primary Hypothyroidism (2) Chronic autoimmune Thyroiditis (3) Post Thyroidectomy (4) Post Radio-Iodine treatment   |
| 2       | High       | Normal   | Normal | Normal   | (1) Subclinical Hypothyroidism (2) Patient with insufficient thyroid hormone replacement therapy (3) In cases of Autoimmune/Hashimoto thyroiditis (4). Isolated increase in TSH levels can be due to Subclinical inflammation, drugs like amphetamines, Iodine containing drug and dopamine antagonist e.g. domperidone and other physiological reasons. |
| 3       | Normal/Low | Low      | Low    | Low      | (1) Secondary and Tertiary Hypothyroidism  |
| 4       | Low        | High     | High   | High     | (1) Primary Hyperthyroidism (Graves Disease) (2) Multinodular Goitre (3) Toxic Nodular Goitre (4) Thyroiditis (5) Over treatment of thyroid hormone (6) Drug effect e.g. Glucocorticoids, dopamine, T4 replacement therapy (7) First trimester of Pregnancy  |
| 5       | Low        | Normal   | Normal | Normal   | (1) Subclinical Hyperthyroidism  |
| 6       | High       | High     | High   | High     | (1) TSH secreting pituitary adenoma (2) TRH secreting tumor  |
| 7       | Low        | Low      | Low    | Low      | (1) Central Hypothyroidism (2) Euthyroid sick syndrome (3) Recent treatment for Hyperthyroidism  |



**Dr.Anwesha Chatterjee,MD**  
**Pathologist**

**Dr. Chaitali Ray, PHD**  
**Chief Biochemist cum MRQA**

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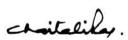
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|   |            |        |        |        |  |
|---|------------|--------|--------|--------|--|
| 8 | Normal/Low | Normal | Normal | High   | (1) T3 thyrotoxicosis (2) Non-Thyroidal illness                      |
| 9 | Low        | High   | High   | Normal | (1) T4 Ingestion (2) Thyroiditis (3) Interfering Anti TPO antibodies |

REF: 1. TIETZ Fundamentals of Clinical chemistry 2.Guidlines of the American Thyroid association during pregnancy and Postpartum, 2011.

**NOTE:** It is advisable to detect Free T3,FreeT4 along with TSH, instead of testing for albumin bound Total T3, Total T4.TSH is not affected by variation in thyroid - binding protein. TSH has a diurnal rhythm, with peaks at 2:00 - 4:00 a.m. And troughs at 5:00 - 6:00 p.m. With ultradian variations.

**Dr.Anwesha Chatterjee,MD**  
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Test Report Status Final

Results

Biological Reference Interval Units

**SPECIALISED CHEMISTRY - VITAMIN****HEALTH SCREEN - 3****VITAMIN B12(CYANOCOBALAMINE), SERUM**

VITAMIN B12 335 187 - 883 pg/mL

METHOD : TWO-STEP CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY

**25 - HYDROXYVITAMIN D(VITAMIN D TOTAL), SERUM**

25 - HYDROXYVITAMIN D 46.0 Deficiency <10.0 ng/mL  
 Insufficiency 10.0 - <30.0  
 Sufficiency >30.0 - 100.0  
 Excess >100.0 - 150.0  
 Toxicity > 150.0

METHOD : ONE STEP DIRECT CHEMILUMINESCENCE IMMUNOASSAY

**Interpretation(s)****VITAMIN B12(CYANOCOBALAMINE), SERUM-Test description**

1. Measures the amount of Vitamin B12/ Cyanocobalamin or Methyl cobalamin in blood. 2. Done in Anemic conditions like Megaloblastic anemia, pernicious anemia, dietary folate deficiencies, 3. Workup of neuropathies especially due to diabetes. 4. Nerve health and it is monitored in treatment of nerve damage. 5. Important vitamin for women of childbearing age and for older people.

1. Part of water-soluble B complex of vitamins. 2. It is essential in DNA synthesis, hematopoiesis & CNS integrity. 3. Source for B12 is dietary foods like milk, yoghurt, eggs, meat, fortified cereals, bread. 4. Absorption depends on the HCl secreted by the stomach and occurs in intestines. 5. It is part of enterohepatic circulation, hence excreted in feces(approx. 0.1% per day)

**Test interpretation**

**Higher than normal levels** are in patients on Vitamin supplements or patients with COPD, CRF, Diabetes, Liver cell damage, Obesity, Polycythemia.

**Decreased levels seen in**

Inflammatory bowel disease, Pernicious anemia - genetic deficiency of intrinsic factor - necessary for Vit B12 absorption, Strict vegetarians lead to sub-clinical B12 deficiency- high among elderly patients, Malabsorption due to gastrectomy, smoking, pregnancy, multiple myeloma & hemodialysis, Alcohol & drugs like amino salicylic acid, anticonvulsants, cholestyramine, cimetidine, Hyperthyroidism (High levels of thyroid). Seen in mothers of children with (NTD) Neural tube defects- hence fortification and supplements are advised in expecting mothers

**Recommendations**-1. To prevent biotin interference the patient should be atleast 8 hours fasting before submitting the sample. 2. Vit B12 and Folic acid evaluated together in macrocytic anemias to avoid methyl folate trap. Carmel's composite criteria for inadequate Vit B12 status: Serum vitamin B12 < 148 pmol/L, or 148-258 pmol/L and MMA > 0.30μmol/L, or tHcy > 13 nmol/L (females) and >15 nmol/L (males).

**Associated Test**-Holo-TC: Marker of vitamin B12 status -specificity and sensitivity better than serum vitamin B12, hence recommended in borderline and deficient cases for confirmation.

**References**-O'Leary F, Samman S. Vitamin B12 in health and disease. Nutrients. 2010 Mar 2(3):299-316.

**25 - HYDROXYVITAMIN D(VITAMIN D TOTAL), SERUM-Test description**

Vitamin D has anti-inflammatory and immune-modulating properties and it works towards the bones, teeth, intestines, immune system, pancreas, muscles and brain. It helps to maintain normal calcium and phosphate levels. Vitamin D is a fat-soluble vitamin. Also called as "Sunshine Vitamin". Two main forms as Cholecalciferol (vitamin D3) which is synthesized in skin from 7-dehydrocholesterol in response to sunlight (Type B UV) exposure & Ergocalciferol (vitamin D2) present mainly in dietary sources.

**Vit D<sub>25(OH)D</sub> deficiency** is seen due to poor or inadequate sunlight exposure, Nutritional or dietary deficiency or fat malabsorption, Severe Hepatocellular disease, Secondary hyperparathyroidism, Hypocalcemia tetany which can cause involuntary contraction of muscles, leading to cramps and spasms, Rickets in children, Osteomalacia in adults- due to vitamin D deficiency mainly, Older adults- osteoporosis. (Increased risk of bone fractures) due to long-term effect of calcium and/or vitamin D deficiency, Other conditions that are precipitated by Vit D deficiency included increased cardiovascular risk, low immunity & chronic renal failure.

**Elevated levels** may be seen in patients taking supplements( hence recommended to repeat after 3 months for estimation of accurate levels), Vitamin D intoxication, sarcoidosis and malignancies containing non regulated 1-alpha hydroxylase in the lesion.

**Recommendations**

1. To prevent biotin interference the patient should be atleast 8 hours fasting before submitting the sample. 2. 25(OH)D is the analyte of choice for determination of the Vitamin D status as it is the major storage & active form of Vitamin D and has longer half-life. 3. Kidney Disease Outcomes Quality Initiatives (KDOQI) and Kidney Disease Improving Global Outcomes (KDIGO) recommend activated vitamin D testing for CKD patients.

**Note**-Our Vitamin D assays is standardized to be in alignment with the ID-LC/MS/MS 25(OH)vitamin D Reference Method Procedure (RMP), the reference procedure for the Vitamin D Standardization Program (VDSP). The VDSP, a collaboration of the National Institutes of Health Office of Dietary Supplements, National Institute of Technology and Standards, Centers for Disease Control and Prevention, and Ghent University, is an initiative to standardize 25(OH)vitamin D measurement across methods.

Reference:



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1. Wallach Interpretation of diagnostic test, 10th edition.

**\*\*End Of Report\*\***

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**CONDITIONS OF LABORATORY TESTING & REPORTING**

1. It is presumed that the test sample belongs to the patient named or identified in the test requisition form.
2. All tests are performed and reported as per the turnaround time stated in the AGILUS Directory of Services.
3. Result delays could occur due to unforeseen circumstances such as non-availability of kits / equipment breakdown / natural calamities / technical downtime or any other unforeseen event.
4. A requested test might not be performed if:
  - i. Specimen received is insufficient or inappropriate
  - ii. Specimen quality is unsatisfactory
  - iii. Incorrect specimen type
  - iv. Discrepancy between identification on specimen container label and test requisition form
5. AGILUS Diagnostics confirms that all tests have been performed or assayed with highest quality standards, clinical safety & technical integrity.
6. Laboratory results should not be interpreted in isolation; it must be correlated with clinical information and be interpreted by registered medical practitioners only to determine final diagnosis.
7. Test results may vary based on time of collection, physiological condition of the patient, current medication or nutritional and dietary changes. Please consult your doctor or call us for any clarification.
8. Test results cannot be used for Medico legal purposes.
9. In case of queries please call customer care (91115 91115) within 48 hours of the report.

**Agilus Diagnostics Ltd**

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**Dr.Anwesha Chatterjee,MD**  
**Pathologist**

**Dr. Chaitali Ray, PHD**  
**Chief Biochemist cum MRQA**

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