2011

SOME COMMON LABORATORY TESTS GUIDE

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HCRC
FOREWORDS

Some Homoeopaths say, we need only the symptoms and signs to select the simillimum medicine and that will certainly cure the case whatever the disease may be. They do not bother to ascertain the prognosis or any other factors affecting the disease hence the cure, e.g. the Causa Occasionalis.

I think it is only a myth if diagnostic tests are of least or no value in Homoeopathy Science. To know the site of disease process, its manifestations, prognosis, its plane, whether material or dynamic and if dynamic, to what a degree, action of medicine on various planes etc. clinical laboratory tests are inevitable. The higher the dynamic plane of disease, the higher should be the potency of the remedy to get the ‘bestest’ simillimum.

There are many types of laboratory tests. Some tests for the same one may differ from each other and may also differ is the “normal” range due to method of test panel used, and this causes the patient’s confusion. If one wants a specific one, or a panel, let him say, he can certainly request it.

DR. RAJNEESH KUMAR SHARMA
SOME COMMON LABORATORY TESTS GUIDE

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**A-1 FETOPROTEIN (ALPHA-I-FETOPROTEIN)**

**ELEVATED IN:**

Hepatocellular carcinoma (usually values >1000 ng/ml), germinal neoplasms (testis, ovary, mediastinum, retroperitoneum), liver disease (alcoholic cirrhosis, acute hepatitis, chronic active hepatitis), fetal anencephaly, spina bifida

**ACETONE (SERUM OR PLASMA)**

**ELEVATED IN:**

DKA, starvation, isopropanol Ingestion

**ACID PHOSPHATASE (SERUM)**

**ELEVATED IN:**

Carcinoma of prostate, other neoplasms (breast, bone), Paget's disease, osteogenesis imperfecta, malignant invasion of bone, Gaucher's disease, multiple myeloma, myeloproliferative disorders, benign prostatic hypertrophy, prostatic palpation or surgery, hyperparathyroidism, liver disease, chronic renal failure

**ALANINE AMINOTRANSFERASE (ALT, SGPT)**

**ELEVATED IN:**

Liver disease (hepatitis, cirrhosis, Reye's syndrome), hepatic congestion, infectious mononucleosis, Ml,
myocarditis, severe muscle trauma, dermatomyositis/polymyositis, muscular dystrophy, drugs (antibiotics, narcotics, antihypertensive agents, heparin, labetalol, lovastatin, NSAIDs, amiodarone, chlorpromazine, phenytoin), malignancy, renal and pulmonary infarction, convulsions, eclampsia, shock liver

**ALBUMIN (SERUM)**

**ELEVATED IN:**
Dehydration

**DECREASED IN:**
Liver disease, nephrotic syndrome, poor nutritional status, rapid IV hydration, protein-losing enteropathies (inflammatory bowel disease), severe burns, neoplasia, chronic inflammatory diseases, pregnancy, oral contraceptives, prolonged immobilization

**ALDOLASE (SERUM)**

**ELEVATED IN:**
Muscular dystrophy, rhabdomyolysis, dermatomyositis/polymyositis, trichinosis, acute hepatitis and other liver diseases, MI, prostatic carcinoma, hemorrhagic pancreatitis, gangrene, delirium tremens

**DECREASED IN:**
Loss of muscle mass, late stages of muscular dystrophy
ALKALINE PHOSPHATASE (SERUM)

ELEVATED IN:

Biliary obstruction, cirrhosis (particularly primary biliary cirrhosis), liver disease (hepatitis, infiltrative liver diseases, fatty metamorphosis), Paget's disease of bone, osteitis deformans, rickets, osteomalacia, hypervitaminosis D, hyperparathyroidism, hyperthyroidism, ulcerative colitis, bowel perforation, bone metastases, healing fractures, bone neoplasms, acromegaly, infectious mononucleosis, CMV infections, sepsis, pulmonary infarction, CHF, hypernephroma, leukemia, myelofibrosis, multiple myeloma, drugs (estrogens, albumin, erythromycin and other antibiotics, cholestasis-producing drugs [phenothiazines])

DECREASED IN:

Hypothyroidism, pernicious anemia, hypophosphatemia, hypervitaminosis D, malnutrition

AMMONIA (SERUM)

ELEVATED IN:

Hepatic failure, hepatic encephalopathy, Reye's syndrome, portacaval shunt, drugs (diuretics, polymyxin B. methicillin)

DECREASED IN:

Drugs (neomycin, lactulose, tetracycline), renal failure
### Amylase (Serum)

**Elevated in:**

- Acute pancreatitis, pancreatic neoplasm, abscess, pseudocyst, ascites, macroamylasemia, perforated peptic ulcer, intestinal obstruction, intestinal infarction, acute cholecysitis, appendicitis, ruptured ectopic pregnancy, salivary gland inflammation, peritonitis, burns, diabetic ketoacidosis, renal insufficiency, drugs (morphine), carcinomatosis of lung, esophagus, ovary, acute ethanol ingestion

**Decreased in:**

- Advanced chronic pancreatitis, hepatic necrosis

### Angiotensin Converting Enzyme (ACE Level)

**Elevated in:**

- Sarcoidosis, primary biliary cirrhosis, alcoholic liver disease, hyperthyroidism, hyperparathyroidism, diabetes mellitus, amyloidosis, multiple myeloma, lung disease (asbestosis, silicosis, berylliosis, allergic alveolitis, coccidioidomycosis), Gaucher's disease, leprosy

### Anion Gap

**Elevated in:**

- Lactic acidosis, Ketoacidosis (DKA, alcoholic starvation), Uremia (chronic renal failure), Ingestion of toxins (paraldehyde, methanol, salicylates, ethylene glycol)
### DECREASED IN:

Hypoalbuminemia, severe hypermagnesemia, IgG myeloma, lithium toxicity, lab error (falsely Decreased sodium or overestimation of bicarbonate or chloride)

### ANTI-DNA

### PRESENT IN:

SLE, chronic active hepatitis, infectious mononucleosis, biliary cirrhosis

### ELEVATED IN:

Streptococcal upper airway infection, acute rheumatic fever, acute glomerulonephritis, increased levels of B-lipoprotein

**NOTE:** A fourfold increase in titer between acute and convalescent specimens is diagnostic of streptococcal upper airway infection regardless of the initial titer.

### ANTIMITOCHONDRIAL ANTIBODY

### ELEVATED IN:

Primary biliary cirrhosis (85-95%), chronic active hepatitis (25%-30%) cryptogenic cirrhosis (25-30%)
# ANTINUCLEAR ANTIBODY (ANA)

**POSITIVE TEST:**

SLE (more significant if titer >1: 160), drugs (phenytoin, ethosuximide, phenobarbital, methyldopa, hydralazine, carbamazepine, penicillin, procainamide, chlorpromazine, griseofulvin, thiazides), chronic active hepatitis, age over 60 yr (particularly age over 80), rheumatoid arthritis, scleroderma, mixed connective tissue disease, necrotizing vasculitis, Sjogren's syndrome (SS), tuberculosis, pulmonary interstitial fibrosis

# ANTITHROMBIN III

**DECREASED IN:**

Hereditary deficiency of antithrombin III, DIC, pulmonary embolism, cirrhosis, thrombolytic therapy, chronic liver failure, post-surgery, third trimester of pregnancy, oral contraceptives, nephrotic syndrome, IV heparin >3 days, sepsis

**ELEVATED IN:**

Warfarin drugs, post-MI

# ASPARTATE AMINOTRANSFERASE (AST, SGOT)

**ELEVATED IN:**

Liver disease (hepatitis, cirrhosis, Reye's syndrome), hepatic congestion, infectious mononucleosis, MI, myocarditis, severe muscle trauma,
dermatomyositis/polymyositis, muscular dystrophy, drugs (antibiotics, narcotics, antihypertensive agents, heparin, labetalol, lovastatin, NSAIDs, phenytoin, amiodarone, chlorpromazine), malignancy, renal and pulmonary infarction, convulsions, eclampsia

### BASOPHIL COUNT

**ELEVATED IN:**

Leukemia, inflammatory processes, polycythemia vera, Hodgkin's lymphoma, hemolytic anemia, after splenectomy, myeloid metaplasia

**DECREASED IN:**

Stress, hypersensitivity reaction, steroids, pregnancy, hyperthyroidism

### BILIRUBIN, DIRECT (CONJUGATED BILIRUBIN)

**ELEVATED IN:**

Hepatocellular disease, biliary obstruction, drug-induced cholestasis, hereditary disorders (Dubin-Johnson syndrome, Rotor's syndrome)

### BILIRUBIN, INDIRECT (UNCONJUGATED BILIRUBIN)

**ELEVATED IN:**

Hemolysis, liver disease (hepatitis cirrhosis, neoplasm), hepatic congestion secondary to congestive heart failure,
hereditary disorders (Gilbert's disease, Crigler-Najjar syndrome)

**BILIRUBIN, TOTAL**

ELEVATED IN:

Liver disease (hepatitis, cirrhosis, cholangitis, neoplasm, biliary obstruction, infectious mononucleosis), hereditary disorders (Gilbert's disease, Dubin-Johnson syndrome), drugs (steroids, diphenylhydantoin, phenothiazines, penicillin, erythromycin, clindamycin, captopril, amphotericin B, sulfonamides, azathioprine, isoniazid, 5-aminosalicylic acid, allopurinol, methyldopa, indomethacin, halothane, oral contraceptives, procainamide, tolbutamide, labetalol), hemolysis, pulmonary embolism or infarct, hepatic congestion secondary to CHF

**BLEEDING TIME (MODIFIED IVY METHOD)**

ELEVATED IN:

Thrombocytopenia, capillary wall abnormalities, platelet abnormalities (Bernard-Soulier, Glamzmann's), drugs (aspirin, warfarin, anti inflammatory medications, streptokinase, urokinase, dextran, B lactam antibiotics, moxalactam), DIC, cirrhosis, uremia, myeloproliferative disorders, Von Willebrand's
C-REACTIVE PROTEIN

ELEVATED IN:

Rheumatoid arthritis, rheumatic fever, inflammatory bowel disease, bacterial infections, MI, oral contraceptives, third trimester of pregnancy (acute phase reactant), inflammatory and neoplastic diseases

CALCITONIN (SERUM)

ELEVATED IN:

Medullary carcinoma of the thyroid (particularly if level >1500 pg/ml), carcinoma of the breast, APUDomas, carcinoids, renal failure, thyroiditis

CALCIUM (SERUM)

INCREASED IN:

Hyperparathyroidism, primary (due to hyperplasia or adenoma of parathyroids) or secondary Hyperparathyroidism due to parathormone-secreting cancer -Hematologic malignancies (e.g., myeloma, lymphoma, leukemia) -Excess vitamin D intake -Bone tumor (Metastatic carcinoma (10% of patients)) -Acute osteoporosis (e.g., immobilization of young patients or in Paget's disease) -Milk-alkali (Burnett's) syndrome -Idiopathic hypercalcemia of infants -Infantile hypophosphatasia -Berylliosis -Hyperthyroidism (some patients) -Cushing's syndrome (some patients) -Addison's disease (some patients) -Myxedema (some patients) -
Hyperproteinemia (Sarcoidosis, -Multiple myeloma (some patients)) -Thiazide drugs -Artifactual (e.g., venous stasis during blood collection, use of cork-stoppered test tubes)

**DECREASED IN:**
- Hypoparathyroidism (Surgical; Idiopathic; Pseudohypoparathyroidism) - Malabsorption of calcium and vitamin D (Obstructive jaundice) - Hypoalbuminemia (Cachexia, Nephrotic syndrome, Sprue, Celiac disease, Cystic fibrosis of pancreas) - Chronic renal disease with uremia and phosphate retention - Acute pancreatitis with extensive fat necrosis - Insufficient calcium, phosphorus, and vitamin D ingestion (Bone disease (osteomalacia, rickets); Starvation; Late pregnancy)

Total serum protein should always be known for proper interpretation of serum calcium levels.

**CARBOXYHEMOGLOBIN (CARBON MONOXIDE; CO)**

**ELEVATED IN:**
Smoking, exposure to smoking, exposure to automobile exhaust fumes malfunctioning gas-burning appliances

**CARCINOEMBRYONIC ANTIGEN (CEA)**

**ELEVATED IN:**
Colorectal carcinomas, pancreatic carcinomas, and metastatic disease usually produce higher elevations (>20 ng/ml)

Carcinomas of the esophagus, stomach, small intestine,
liver, breast ovary, lung and thyroid usually produce lesser elevations Benign conditions (smoking, inflammatory bowel disease hypothyroidism, cirrhosis, pancreatitis, infections) usually produce levels <10 ng/ml

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### CHLORIDE (SERUM)

**ELEVATED IN:**

- Dehydration, excessive infusion of normal saline
- Hyperparathyroidism, renal tubular disease, metabolic acidosis, prolonged diarrhea
- Drugs (ammonium chloride administration, acetazolamide, boric acid, triamterene)

**DECREASED IN:**

- CHF, SIADH, Addison's disease, vomiting, gastric suction, salt-losing nephritis, continuous infusion of D5W, thiazide diuretic administration, diaphoresis, diarrhea, burns

### CHOLESTEROL, TOTAL

**ELEVATED IN:**

- Primary hypercholesterolemia, biliary obstruction, diabetes melitus, nephrotic syndrome, hypothyroidism, primary biliary cirrhosis, high cholesterol diet, third trimester of pregnancy, MI, drugs (steroids, phenothiazines, oral contraceptives)

**DECREASED IN:**

- Starvation, malabsorption, sideroblastic anemia, thalassemia, abetalipoproteinemia, hyperthyroidism, Cushing's syndrome, hepatic failure, multiple myeloma, polycythemia vera, chronic myelocytic leukemia, myeloid metaplasia, Waldenstrom's macroglobulinemia, myelofibrosis
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<tr>
<td><strong>INCREASED IN:</strong></td>
</tr>
<tr>
<td>Acute and chronic inflammation (slightly), obstructive jaundice C3 is</td>
</tr>
</tbody>
</table>

| **DECREASED IN:** |
| Acute glomerulonephritis, systemic lupus erythromatosis |

<table>
<thead>
<tr>
<th>COOMBS, DIRECT</th>
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<tbody>
<tr>
<td><strong>POSITIVE:</strong></td>
</tr>
<tr>
<td>Autoimmune hemolytic anemia, erythroblastosis fetalis,</td>
</tr>
</tbody>
</table>
transfusion reactions, drugs (a-methyldopa, penicillin, tetracycline, sulfonamides, levodopa, cephalosporins, quinidine, insulin)

**FALSE POSITIVE:**
May be seen with cold agglutinins

**COOMBS, INDIRECT**

**POSITIVE:**
Acquired hemolytic anemia, incompatible cross-matched blood, anti-Rh antibodies, drugs (methyldopa, mefenamic acid, levodopa)

**COPPER (SERUM)**

**INCREASED IN:**
- Anemias (Pernicious anemia, Megaloblastic anemia of pregnancy, Iron deficiency anemia, Aplastic anemia, Leukemia, acute and chronic, Infection, acute and chronic, Malignant lymphoma, Hemochromatosis)  
- Collagen diseases (including SLE, rheumatoid arthritis, acute rheumatic fever, glomerulonephritis)  
- Hypothyroidism  
- Hyperthyroidism  
- Frequently associated with increased C-reactive protein

**DECREASED IN:**
- Nephrosis (ceruloplasmin lost in urine)  
- Wilson's disease  
- Acute leukemia in remission  
- Some iron deficiency anemias of childhood (that require copper as well as iron
therapy) - Kwashiorkor

<table>
<thead>
<tr>
<th>CORTISOL (PLASMA)</th>
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<tbody>
<tr>
<td>ELEVATED IN:</td>
<td></td>
</tr>
<tr>
<td>- Ectopic ACTH production (i.e., oat cell carcinoma of lung), loss of normal diurnal variation, pregnancy, chronic renal failure - iatrogenic, stress, adrenal or pituitary hyperplasia or adenomas</td>
<td></td>
</tr>
<tr>
<td>DECREASED IN:</td>
<td></td>
</tr>
<tr>
<td>Primary adrenocortical insufficiency, anterior pituitary hypofunction, secondary adrenocortical insufficiency, adrenogenital syndromes</td>
<td></td>
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<table>
<thead>
<tr>
<th>CREATINE KINASE (CK, CPK)</th>
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</thead>
<tbody>
<tr>
<td>ELEVATED IN:</td>
<td></td>
</tr>
<tr>
<td>MI, myocarditis, rhabdomyolysis, myositis, crush injury/trauma, polymyositis, dermatomyositis, vigorous exercise, muscular dystrophy, myxedema, seizures, malignant hyperthermia syndrome, IM injections, CVA, pulmonary embolism and infarction, acute dissection of aorta</td>
<td></td>
</tr>
<tr>
<td>DECREASED IN:</td>
<td></td>
</tr>
<tr>
<td>Steroids, decreased muscle mass, connective tissue disorders, alcoholic liver disease, metastatic neoplasms</td>
<td></td>
</tr>
</tbody>
</table>
CREATINE KINASE ISOENZYMES CK-MB

ELEVATED IN:

Mi, myocarditis, pericarditis, muscular dystrophy, cardiac defibrillation, cardiac surgery, extensive rhabdomyolysis, strenuous exercise (marathon runners), mixed connective tissue disease, cardiomyopathy, hypothermia

CK-MM

ELEVATED IN:

Crush injury, seizures, malignant hyperthermia syndrome, rhabdomyolysis, myositis, polymyositis, dermatomyositis, vigorous exercise, muscular dystrophy, IM injections, and acute dissection of aorta

CK-BB

ELEVATED IN:

CVA, subarachnoid hemorrhage, neoplasms (prostate, GI tract, brain, ovary, breast, lung), severe shock, bowel infarction, hypothermia

CREATININE (SERUM)

ELEVATED IN:

Renal insufficiency (acute and chronic), Decreased renal perfusion (hypotension, dehydration, CHF), urinary tract infection, rhabdomyolysis, ketonemia Drugs (antibiotics [aminoglycosides, cephalosporins], hydantoin, diuretics,
methyldopa)

**FALSELY ELEVATED IN:**

DKA, administration of some cephalosporins (e.g., cefoxitin, cephalothin)

**DECREASED IN:**

Decreased muscle mass (including amputees and older persons), pregnancy, prolonged debilitation

---

**CREATININE CLEARANCE**

**ELEVATED IN:**

Pregnancy, exercise

**DECREASED IN:**

Renal insufficiency, drugs (cimetidine, procainamide, antibiotics, quinidine)

---

**CRYOGLOBULINS (SERUM)**

**PRESENT IN:**

Collagen-vascular diseases, CLL, hemolytic anemias, multiple myeloma, Waldenstrom’s macroglobulinemia, chronic active hepatitis, Hodgkin's disease
**D-XYLOSE ABSORPTION**

DECREASED IN:

Malabsorption syndrome

**EOSINOPHIL COUNT**

ELEVATED IN:

Allergy, parasitic infestations (trichinosis, aspergillosis, hydatidosis), angioneurotic edema, drug reactions, warfarin sensitivity, collagen-vascular diseases, acute hypereosinophilic syndrome, eosinophilic nonallergic rhinitis, myeloproliferative disorders, Hodgkin's lymphoma, radiation therapy, NHL, L-tryptophan ingestion

**ERYTHROCYTE SEDIMENTATION RATE (WESTERGREN)**

ELEVATED IN:

Collagen-vascular diseases, infections, MI, neoplasms, inflammatory states (acute phase reactant)

**EXTRACTABLE NUCLEAR ANTIGEN (ENA COMPLEX, ANTI-RNP ANTIBODY, ANTI-SM, ANTI-SMITH)**

PRESENT IN:

SLE, rheumatoid arthritis, Sjogren's syndrome, MCTD
### FECAL FAT, QUANTITATIVE (72 HR COLLECTION)

**ELEVATED IN:**

Malabsorption syndrome

### FERRITIN (SERUM)

**ELEVATED IN:**

Hyperthyroidism, inflammatory states, liver disease (ferritin elevated from necrotic hepatocytes), neoplasms (neuroblastomas, lymphomas, leukemia, breast carcinoma), iron replacement therapy, hemochromatosis

**DECREASED IN:**

Iron deficiency anemia

### FIBRIN DEGRADATION PRODUCT (FDP)

**ELEVATED IN:**

DIC, primary fibrinolysis, pulmonary embolism, severe liver disease

**NOTE:** The presence of rheumatoid factor may cause falsely elevated FDP

### FIBRINOGEN

**ELEVATED IN:**

Tissue inflammation/damage (acute-phase protein reactant), oral contraceptives, pregnancy, acute infection,
MI

**DECREASED IN:**
- DIC, hereditary afibrinogenemia, liver disease, primary or secondary fibrinolysis, cachexia

**FOLATE (FOLIC ACID)**

**DECREASED IN:**
- Folic acid deficiency (inadequate intake, malabsorption), alcoholism, drugs (methotrexate, trimethoprim, phenytoin, oral contraceptives, azulfadine), vitamin B12 deficiency (defective red cell folate absorption)

**FTA-ABS (SERUM) (FLUORESCENT TREPONEMAL ANTIBODY)**

**REACTIVE IN:**
- Syphilis, other treponemal diseases (yaws, pinta, bejel)

**GASTRIN (SERUM)**

**ELEVATED IN:**
- Zollinger-Ellison syndrome (gastrinoma), pernicious anemia, hyperparathyroidism, retained gastric antrum, chronic renal failure, gastric ulcer, chronic atrophic gastritis, pyloric obstruction, malignant neoplasms of the stomach, H2 blockers, omeprazole
GLOMERULAR BASEMENT MEMBRANE ANTIBODY (ANTIGLOMERULAR BASEMENT ANTIBODY)

PRESENT IN:
Goodpasture's syndrome

GLUCOSE-6-PHOSPHATE DEHYDROGENASE SCREEN (BLOOD)

ABNORMAL:
If a deficiency is detected, quantitation of G6PD is necessary; a G6PD screen may be falsely interpreted as abnormal

GLUCOSE TOLERANCE TEST

ELEVATED IN:
Glucose intolerance, diabetes mellitus, Cushing's syndrome, acromegaly, pheochromocytoma

GLUCOSE, FASTING

ELEVATED IN:
Diabetes mellitus, stress, infections, MI, CVA, Cushing's syndrome, acromegaly, acute pancreatitis, glucagonoma, hemochromatosis, drugs (glucocorticoids, diuretics [thiazides, loop diuretics]), glucose intolerance
### GLUCOSE, POSTPRANDIAL

**ELEVATED IN:**
- Diabetes mellitus, glucose intolerance

**DECREASED IN:**
- Post-gastrointestinal resection, reactive hypoglycemia, hereditary fructose intolerance, galactosemia, leucine sensitivity

### GLYCATED (GLYCOSYLATED) HEMOGLOBIN (HBA1C)

**ELEVATED IN:**
- Uncontrolled diabetes mellitus (glycosylated hemoglobin levels reflect the level of glucose control over the preceding 120 days)

**DECREASED IN:**
- Hemolytic anemias, Decreased RBC survival, pregnancy, chronic blood loss, chronic renal failure, insulinoma

### HAM TEST (ACID SERUM TEST)

**POSITIVE IN:**
- Paroxysmal nocturnal hemoglobinuria (PNH)

**FALSE POSITIVE IN:**
- Hereditary or acquired spherocytosis, recent transfusion with aged RBC, aplastic anemia, myeloproliferative
syndromes, leukemia, hereditary dyserythropoietic anemia type II (HEMPAS)

**HAPTOGLOBIN (SERUM)**

**ELEVATED IN:**
Inflammation (acute phase reactant), collagen-vascular diseases, infections (acute phase reactant), drugs (androgens)

**DECREASED IN:**
Hemolysis (intravascular > extravascular), megaloblastic anemia, severe liver disease, large tissue hematomas, infectious mononucleosis, drugs (oral contraceptives)

**HEMATOCRIT**

**ELEVATED IN:**
Polycythemia vera, smoking, COPD, high altitudes, dehydration, hypovolemia

**DECREASED IN:**
Blood loss (GI, GU), anemia, pregnancy

**HEMOGLOBIN**

**ELEVATED IN:**
Hemoconcentration, dehydration, polycythemia vera, COPD, high altitudes, false elevations (hyperlipemic
plasma, WBC >50,000 mm$^3$), stress

<table>
<thead>
<tr>
<th>DECREASED IN:</th>
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</thead>
<tbody>
<tr>
<td>Hemorrhage (GI, GU), anemia</td>
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<table>
<thead>
<tr>
<th>HEPATITIS A ANTIBODY</th>
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<tbody>
<tr>
<td>PRESENT IN:</td>
</tr>
<tr>
<td>Viral hepatitis A, can be IgM or IgG (if IgM, acute hepatitis A; if IgG, previous infection with hepatitis A)</td>
</tr>
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<thead>
<tr>
<th>HEPATITIS B SURFACE ANTIGEN (HBSAG)</th>
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<tbody>
<tr>
<td>DETECTED IN:</td>
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<tr>
<td>Acute viral hepatitis Type B. Chronic hepatitis B</td>
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<thead>
<tr>
<th>HIGH DENSITY LIPOPROTEIN (HDL) CHOLESTEROL</th>
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<tbody>
<tr>
<td>INCREASED:</td>
</tr>
<tr>
<td>Use of gemfibrozil, nicotinic acid, estrogens, regular aerobic exercise, small (1 oz) daily alcohol intake</td>
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<tr>
<th>DECREASED:</th>
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<tbody>
<tr>
<td>Deficiency of apoproteins, liver disease, probucol ingestion, Tangier disease</td>
</tr>
<tr>
<td>NOTE: A cholesterol/HDL ratio &gt;4.5 is associated with increased risk of coronary artery disease.</td>
</tr>
</tbody>
</table>
IMMUNE COMPLEX ASSAY

DETECTED IN:

Collagen-vascular disorders, glomerulonephritis, neoplastic diseases, malaria, primary biliary cirrhosis, chronic acute hepatitis, bacterial endocarditis, vasculitis

IMMUNOGLOBULINS

ELEVATED IN:

- IgA: lymphoproliferative disorders, Berger's nephropathy, chronic infections, autoimmune disorders, liver disease
- IgE: allergic disorders, parasitic infections, immunological disorders IgE myeloma
- IgG: chronic granulomatous infections, infectious diseases, inflammation, myeloma, liver disease
- IgM: primary biliary cirrhosis, infectious diseases (brucellosis, malaria), Waldenstrom's macroglobulinemia, liver disease

DECREASED IN:

- IgA: nephrotic syndrome, protein-losing enteropathy, congenital deficiency, lymphocytic leukemia, ataxia-telangiectasia, chronic eosinopulmonary disease
- IgE: hypogammaglobulinemia, neoplasm (breast, bronchial, cervical) ataxia, telangiectasia
- IgG: congenital or acquired deficiency, lymphocytic leukemia, phenytoin, methylprednisolone, nephrotic syndrome
- IgM: congenital deficiency, lymphocytic leukemia, nephrotic syndrome
### IRON-BINDING CAPACITY (TIBC)

**ELEVATED IN:**
- Iron deficiency anemia, pregnancy, polycythemia

**DECREASED IN:**
- Anemia of chronic disease, hemochromatosis, chronic liver disease, hemolytic anemias, malnutrition (protein depletion)

### LACTATE (BLOOD)

**INCREASED IN:**
- (Without significant acidosis): Muscular exercise, hyperventilation, glucaon, glycogen storage disease, severe anemia, pyruvate infusion, HCO₃ infusion, glucose and insulin infusion.
- (With hypoxia and acidosis): Acute hemorrhage, circulatory collapse, cyanotic heart disease, severe acute CHF, acute anoxemia, extracorpeal circulation, epinephrine
- (Idiopathic): Mild uremia, infections (esp. pyelonephritis), septicemia, cirrhosis, acute pancreatitis (+/-), third trimester of pregnancy, severe vascular disease, leukemia, anemia, chronic alcoholism, subacute bacterial endocarditis, poliomyelitis
LACTATE DEHYDROGENASE (LDH)

ELEVATED IN:
Infarction of myocardium, lung, kidney, Diseases of cardiopulmonary system, liver, collagen, CNS Hemolytic anemias, megaloblastic anemias, transfusions, seizures, muscle trauma, muscular dystrophy, acute pancreatitis hypotension shock, infectious mononucleosis, inflammation, neoplasia, intestinal obstruction, hypothyroidism

LACTATE DEHYDROGENASE ISOENZYMES

ABNORMAL VALUES:
LDH1 > LDH2: MI (can also be seen with hemolytic anemias, pernicious anemia, folate deficiency, renal infarct)
LDH5 > LDH4: liver disease (cirrhosis, hepatitis, hepatic congestion)

LEGIONELLA TITER

POSITIVE IN:
Legionnaire's disease (presumptive: > 1:256 titer; definitive: fourfold titer increase to >1: 128)

LEUKOCYTE ALKALINE PHOSPHATASE (LAP SCORE)

ELEVATED IN:
Leukemoid reactions, neutrophilia secondary to infections
(except in sickle cell crisis/no significant increase in LAP score), Hodgkin's disease, polycythemia vera, hairy cell leukemia, aplastic anemia, Down's syndrome, myelofibrosis

**DECREASED IN:**

Acute and chronic granulocytic leukemia, thrombocytopenic purpura, paroxysmal nocturnal hemoglobinuria (PNH), hypophosphatemia, collagen disorders

**LIPASE**

**ELEVATED IN:**

Acute pancreatitis, perforated peptic ulcer, carcinoma of pancreas (early stage), pancreatic duct obstruction

**LOW DENSITY LIPOPROTEIN (LDL) CHOLESTEROL**

**ELEVATED IN:**

Primary hyperlipoproteinemia, diet high in saturated fats, acute MI, hypothyroidism, primary biliary cirrhosis, nephrosis, diabetes mellitus

**DECREASED IN:**

Abetalipoproteinemia, advanced liver disease, malabsorption, malnutrition
**LYMPHOCYTES**

**ELEVATED IN:**

Chronic infections, infectious mononucleosis and other viral infections, CLL, Hodgkin's disease, ulcerative colitis, hypoadrenalism, ITP

**DECREASED IN:**

AIDS, ARC, bone marrow suppression from chemotherapeutic agents or chemotherapy, aplastic anemia, neoplasms, steroids, adrenocortical hyperfunction, neurologic disorders (multiple sclerosis, myasthenia gravis, Guillain-Barre syndrome)

**MAGNESIUM (SERUM)**

**INCREASED IN:**

- Renal failure  
- Diabetic coma before treatment  
- Hypothyroidism  
- Addison's disease and after adrenalectomy  
- Controlled diabetes mellitus in older patients  
- Administration of antacids containing magnesium

**DECREASED IN:**

- GI disease showing malabsorption and abnormal loss of GI fluids (e.g., nontropical sprue, small bowel resection, biliary and intestinal fistulas, abdominal irradiation, prolonged aspiration of intestinal contents, celiac disease and other causes of steatorrhea)  
- Acute alcoholism and alcoholic cirrhosis  
- Insulin treatment of diabetic coma  
- Hyperthyroidism  
- Aldosteronism  
- Hyperparathyroidism
Lytic tumors of bone - Diuretic drug therapy (e.g., ethacryninc acid, furosemide) - Some cases of renal disease (e.g., glomerulonephritis, pyelonephritis, renal tubular acidosis) - Acute pancreatitis - Excessive lactation - Idiopathic disorders

Magnesium deficiency may cause apparently unexplained hypocalcemia and hypokalemia; the patients may have neurologic and GI symptoms

**MEAN CORPUSCULAR VOLUME (MCV)**

**ELEVATED IN:**

Vitamin B12 deficiency, folic acid deficiency, liver disease, alcohol abuse, reticulocytosis, hypothyroidism, marrow aplasia, myelofibrosis

**DECREASED IN:**

Iron deficiency, thalassemia syndrome and other hemoglobinopathies, anemia of chronic disease, sideroblastic anemia, chronic renal failure, lead poisoning

**MONOCYTE COUNT**

**ELEVATED IN:**

Viral diseases, parasites, infections, neoplasms, inflammatory bowel disease, monocytic leukemia, lymphomas, myeloma, sarcoidosis

**DECREASED IN:**

Aplastic anemia, lymphocytic leukemia, glucocorticoid
NEUTROPHIL COUNT

ELEVATED IN:
Acute bacterial infections, acute MI, stress, neoplasms, myelocytic leukemia

DECREASED IN:
Viral infections, aplastic anemias, immunosuppressive drugs, radiation therapy to bone marrow, agranulocytosis, drugs (antibiotics, antithyroidals), lymphocytic and monocytic leukemias

OSMOLALITY, SERUM

It can be estimated by the following formula: $2([\text{Na}] + [\text{K}]) + \frac{\text{Glucose}}{18} + \frac{\text{BUN}}{2.8}$

ELEVATED IN:
Dehydration, hypernatremia, diabetes insipidus, uremia, hyperglycemia, mannitol therapy, ingestion of toxins (ethylene glycol, methanol ethanol)

DECREASED IN:
SIADH, hyponatremia, overhydration
### PH, BLOOD

**INCREASED IN:**
Metabolic alkalosis, respiratory alkalosis

**DECREASED IN:**
Metabolic acidosis, respiratory acidosis

### PARTIAL THROMBOPLASTIN TIME (PTT), ACTIVATED PARTIAL THROMBOPLASTIN TIME (APTT)

**ELEVATED IN:**
Heparin therapy, coagulation factor deficiency (I, II, V, VIII, IX, X, XI XII), liver disease, vitamin K deficiency, DIC, circulating anticoagulant, warfarin therapy, specific factor inhibition (PCN reaction, rheumatoid arthritis), thrombolytic therapy

**NOTE:** Useful to evaluate the intrinsic coagulation system.

### PHOSPHATASE, ALKALINE; SEE ALKALINE PHOSPHATASE PHOSPHORUS (SERUM)

**ELEVATED IN:**
Renal failure, dehydration, Addison's disease, myelogenous leukemia, hypervitaminosis D, hypoparathyroidism, pseudohypoparathyroidism, bone metastases, sarcoidosis, milk-alkali syndrome, immobilization, magnesium deficiency, transfusions, hemolysis
### DECREASED IN:

Starvation (e.g., alcoholics), DKA, TPN, continuous IV dextrose administration, vitamin D deficiency, hyperparathyroidism, pseudohyperparathyroidism, antacids containing aluminum hydroxide, insulin administration, nasogastric suctioning, vomiting, diuretics, steroids, gram-negative septicemia

### PHOSPHORUS (SERUM)

#### INCREASED IN:

- Hypoparathyroidism (Idiopathic, Surgical, Pseudohypoparathyroidism)  
- Excess vitamin D intake  
- Secondary hyperparathyroidism (renal rickets)  
- Bone disease (Healing fractures, Multiple myeloma (some patients), Paget's disease (some patients), Osteolytic metastatic tumor in bone (some patients))  
- Addison's disease  
- Acromegaly  
- Childhood  
- Myelogenous leukemia  
- Acute yellow atrophy  
- High intestinal obstruction  
- Sarcoidosis (some patients)  
- Milk-alkali (Burnett's) syndrome (some patients)  
- Artifactual increase by hemolysis of blood

#### DECREASED IN

- Alcoholism*  
- Diabetes mellitus*  
- Hyperalimentation*  
- Nutritional recovery syndrome* (rapid refeeding after prolonged starvation)  
- Alkalosis, respiratory (e.g., gram-negative bacteremia) or metabolic  
- Acute gout  
- Salicylate poisoning  
- Administration of glucose intravenously (e.g., recovery after severe burns, hyperalimentation)  

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* indicates a possible decrease in serum phosphorus levels due to specific conditions or treatments.
Administration of anabolic steroids, androgens, epinephrine, glucagon, insulin -Acidosis (especially ketoacidosis) -Hyperparathyroidism -Renal tubular defects (e.g., Fanconi syndrome) -Hypokalemia -Hypomagnesemia -Administration of diuretics -Prolonged hypothermia (e.g., open heart surgery) -Malabsorption -Vitamin D deficiency and/or resistance, osteomalacia -Malnutrition, vomiting, diarrhea -Administration of phosphate-binding antacids* -Primary hypophosphatemia *Indicates conditions associated with severe hypophosphatemia. Mechanisms of hypophosphatemia are intracellular shift of phosphate, increased loss (via kidney or intestine), or decreased intestinal absorption; usually associated with prior phosphorus depletion. Often, more than one mechanism is operative.

**PLATELET COUNT**

**ELEVATED IN:**

Neoplasms (GI tract), CML, polycythemia vera, myelofibrosis with myeloid metaplasia, infections, after splenectomy, postpartum, after hemorrhage, hemophilia, iron deficiency, pancreatitis, cirrhosis

**POTASSIUM (SERUM)**

**INCREASED IN:**

- Renal failure: (Acute with oliguria or anuria; Chronic end-stage with oliguria (glomerular filtration rate <35 ml/minute); Chronic nonoliguric associated with dehydration, obstruction, trauma, or excess potassium)
- Decreased mineralocorticoid activity: (Addison's disease; Hypofunction of renin-angiotensin-aldosterone system; Pseudohypoaldosteronism; Aldosterone antagonist (e.g., spironolactone))

- Increased supply of potassium: (Red blood cell hemolysis (transfusion reaction, hemolytic anemia); Excess dietary intake or rapid potassium infusion; Striated muscle (status epilepticus, periodic paralysis); Potassium-retaining drugs (e.g., triamterene); Fluid-electrolyte imbalance (e.g., dehydration, acidosis))

- Laboratory artifacts (e.g., hemolysis during venipuncture, conditions associated with thrombocytosis, incomplete separation of serum and clot)

**DECREASED IN:**

- Renal and adrenal conditions with metabolic alkalosis: (Administration of diuretics, Primary aldosteronism, Pseudoaldosteronism, Salt-losing nephropathy, Cushing's syndrome)

- Renal conditions associated with metabolic acidosis: (Renal tubular acidosis, Diuretic phase of acute tubular necrosis, chronic pyelonephritis, Diuresis following relief of urinary tract obstruction)

- Gastrointestinal conditions: (Vomiting, gastric auctioning; Villous adenoma; Cancer of colon; Chronic laxative abuse; Zollinger-Ellison syndrome; Chronic diarrhea; Ureterosigmoidostomy)
**PROLACTIN**

**ELEVATED IN:**

Prolactinomas (level >200 highly suggestive), drugs (phenothiazines, cimetidine, tricyclic antidepressants, metoclopramide, estrogens, antihypertensives [methyldopa], verapamil, haloperidol), postpartum, stress, hypoglycemia, hypothyroidism

**PROTEIN (SERUM)**

**ELEVATED IN:**

Dehydration, multiple myeloma, Waldenstrom's macroglobulinemia, sarcoidosis, collagen-vascular diseases

**DECREASED IN:**

Malnutrition, low-protein diet, overhydration, malabsorption, pregnancy, severe burns, neoplasms, chronic diseases, cirrhosis, nephrosis

**PROTEIN ELECTROPHORESIS (SERUM)**

**ELEVATED:**

-Albumin: dehydration -a-l: neoplastic diseases, inflammation -a-2: neoplasms, inflammation, infection, nephrotic syndrome -b: hypothyroidism, biliary cirrhosis, diabetes mellitus -y: see IMMUNOGLOBULINS
DECREASED:
- Albumin: malnutrition, chronic liver disease, malabsorption, nephrotic syndrome, burns, SLE -a-l: emphysema (a-l antitrypsin deficiency), nephrosis -a-2: hemolytic anemias (Decreased haptoglobin), severe hepatocellular damage -b: hypocholesterolemia, nephrosis -y: see IMMUNOGLOBULINS

PROTHROMBIN TIME (PT)

ELEVATED IN:
Liver disease, oral anticoagulants (Warfarin), heparin, factor deficiency (I, II, V, VII, X), DIC, vitamin K deficiency, afibrinogenemia, dysfibrinogenemia, drugs (salicylates, chloral hydrate, diphenylhydantoin, estrogens, antacids, phenylbutazone, quinidine, antibiotics, allopurinol, anabolic steroids)

DECREASED IN:
Vitamin K supplementation, thrombophlebitis, drugs (gluthetimide, estrogens, griseofulvin, diphenhydramine)

PROTOPORPHYRIN (FREE ERYTHROCYTE)

ELEVATED IN:
Iron deficiency, lead poisoning, sideroblastic anemias, anemia of chronic disease, hemolytic anemias, erythropoietic protoporphyria
RED BLOOD CELL COUNT

ELEVATED IN:
Polycythemia vera, smokers, high altitude, cardiovascular disease, renal cell carcinoma and other erythropoietin-producing neoplasms, stress, hemoconcentration/dehydration

DECREASED IN:
Anemias, hemolysis, chronic renal failure, hemorrhage, failure of marrow production

RED BLOOD CELL DISTRIBUTION WIDTH (RDW)

NORMAL RDW AND... ELEVATED MCV:
aplastic anemia, preleukemia

Normal MCV: normal, anemia of chronic disease, acute blood loss or hemolysis, CLL, CML, nonanemic enzymopathy or hemoglobinopathy

Decreased MCV: anemia of chronic disease, heterozygous thalassemia

Elevated RDW and... Elevated MCV: vitamin Bl2 deficiency, folate deficiency, immune hemolytic anemia, cold agglutinins, CLL with high count, liver disease

NORMAL MCV:
Early iron deficiency, early vitamin Bl2 deficiency, early folate deficiency, anemic globinopathy Decreased MCV:
iron deficiency, RBC fragmentation, Hb H. thalassemia intermedia

### RED BLOOD CELL MASS (VOLUME)

**ELEVATED IN:**

- Polycythemia vera, hypoxia (smokers, high altitude, cardiovascular disease), hemoglobinopathies with high 2 B affinity, erythropoietin-producing tumors (renal cell carcinoma)

**DECREASED IN:**

- Hemorrhage, chronic disease, failure of marrow production anemias, hemolysis

### RETICULOCYTE COUNT

**ELEVATED IN:**

- Hemolytic anemia (sickle cell crisis, thalassemia major, autoimmune hemolysis, hemorrhage, postanemia therapy (folic acid, ferrous sulfate, vitamin B12)

**DECREASED IN:**

- Aplastic anemia, marrow suppression (sepsis, chemotherapeutic agents radiation), hepatic cirrhosis, blood transfusion, anemias of disordered maturation (iron deficiency anemia, megaloblastic anemia, sideroblastic anemia, anemia of chronic disease)
**RHEUMATOID FACTOR**

Present in titer >1:20:

Rheumatoid arthritis, SLE, chronic inflammatory processes, old age, infection, liver disease

**SMOOTH MUSCLE ANTIBODY (ANTI-SMOOTH MUSCLE ANTIBODY)**

Present in:

Chronic active hepatitis (>1:80), primary biliary cirrhosis (<1:80), infectious mononucleosis

**SODIUM (SERUM)**

Increased in:

Excess loss of water... - Conditions that cause loss via gastrointestinal tract (e.g., in vomiting), lung (hyperpnea), or skin (e.g., in excessive sweating) - Conditions that cause diuresis (Diabetes insipidus, Nephrogenic diabetes insipidus, Diabetes mellitus, Diuretic drugs, Diuretic phase of acute tubular necrosis, Diuresis following relief of urinary tract obstruction, Hypercalcemic nephropathy, Hypokalemic nephropathy) Excess administration of sodium (iatrogenic), e.g., incorrect replacement following fluid loss. ""Essential"" hypernatremia due to hypothalamic lesions
DECREASED IN:
(sodium osmolality is decreased): - Dilutional: (e.g., congestive heart failure, nephrosis, cirrhosis with ascites) - Sodium depletion: (Loss of body fluids (e.g., vomiting, diarrhea, excessive sweating) with incorrect or no therapeutic replacement, diuretic drugs (e.g., thiazides); Adrenocortical insufficiency; Salt-losing nephropathy; Inappropriate secretion of antidiuretic hormone) - Spurious (sodium osmolality is normal or increased): (Hyperlipidemia; Hyperglycemia (sodium decreases 3 mEq/L for every increase of serum glucose of 100 mg/100 ml))

SUCROSE HEMOLYSIS TEST (SUGAR WATER TEST)

POSITIVE IN:
Paroxysmal nocturnal hemoglobinuria (PNH)

FALSE POSITIVE:
Autoimmune hemolytic anemia, megaloblastic anemias

FALSE NEGATIVE:
May occur with use of heparin or EDTA

T3 (TRIIODOTHYRONINE)

DECREASED IN:
Starvation, trauma, surgery, may be an adaptive response to illness, drugs (PTU)
**T3 RESIN UPTAKE (T3RU)**

This test should be used only with a simultaneous measurement of serum T4 to exclude the possibility that an increased T4 is due to an increase in T4-binding globulin.

Measurement of serum T-3 concentration should be done by radioimmunoassay for diagnosis of hyperthyroidism

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<tr>
<th>INCREASED IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Hyperthyroidism</td>
</tr>
<tr>
<td>-Certain drugs (e.g., testosterone, androgens, anabolic steroids, prednisone, heparin, Dicumarol, salicylates, Butazolidin, penicillin, Dilantin)</td>
</tr>
<tr>
<td>-Threatened abortion</td>
</tr>
<tr>
<td>-Infants (up to about age 2 months)</td>
</tr>
<tr>
<td>-Severe nephrosis</td>
</tr>
<tr>
<td>-Metastatic neoplasms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DECREASED IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Hypothyroidism</td>
</tr>
<tr>
<td>-Pregnancy (from about tenth week of pregnancy until up to 12th week postpartum)</td>
</tr>
<tr>
<td>-Certain drugs (e.g., estrogens alone or in birth control pills, large amounts of iodine, propylthiouracil in hyperthyroidism)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NORMAL IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Pregnancy with hyperthyroidism</td>
</tr>
<tr>
<td>-Nontoxic goiter</td>
</tr>
<tr>
<td>-Carcinoma of thyroid</td>
</tr>
<tr>
<td>-Diabetes mellitus</td>
</tr>
<tr>
<td>-Addison's disease</td>
</tr>
<tr>
<td>-Anxiety</td>
</tr>
<tr>
<td>-Certain drugs (mercurials, iodine)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VARIABLE IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver disease</td>
</tr>
</tbody>
</table>
**T4, FREE (FREE THYROXINE)**

This determination gives corrected values in patients in whom the total thyroxine (T-4) is altered on account of changes in serum proteins or in binding sites. (Pregnancy; Drugs (e.g., androgens, estrogens, birth control pills, Dilantin); Altered levels of serum proteins (e.g., nephrosis))

This is the best single screening test for thyroid dysfunction. It is paralleled by the free thyroxine factor.

**INCREASED IN:**
- Hyperthyroidism
- Hypothyroidism treated with thyroxine
- Very ill euthyroid patients (frequently)

**DECREASED IN:**
- Hypothyroidism
- Hypothyroidism treated with triiodothyronine

**THROMBIN TIME (TT)**

**ELEVATED IN:**
- Thrombolytic and heparin therapy
- DIC
- Hypofibrinogenemia
- Dysfibrinogenemia

**THYROID STIMULATING HORMONE (TSH)**

**ELEVATED IN:**
- Hypothyroidism
- Drugs (haloperidol, chlorpromazine, metoclopramide, domperidone)
- TSH antibodies
- Pituitary resistance to thyroid hormone
### THYROXINE-BINDING GLOBULIN (TBG)

**INCREASED IN:**
- Pregnancy
- Excess TBG, genetic or idiopathic
- Hypothyroidism
- Certain drugs (estrogens, birth control pills)
- Gross iodine contamination
- Acute intermittent porphyria

**DECREASED IN:**
- Nephrosis and other causes of marked hypoproteinemia
- Deficiency of TBG, genetic or idiopathic
- Certain drugs (androgenic and anabolic steroids)

An increase of TBG is associated with an increase in PBI, BEI, and T-4 by column and a decrease in T-3; converse association for decrease of TBG.

### THYROXINE (T4)

**INCREASED IN:**
- Hyperthyroidism
- Pregnancy
- Certain drugs (estrogens, birth control pills, d-thyroxine, thyroid extract, TSH)
<table>
<thead>
<tr>
<th>Condition</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DECREASED IN:</strong></td>
<td></td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>Decreased in activity</td>
</tr>
<tr>
<td>Hypoproteinemia</td>
<td></td>
</tr>
<tr>
<td>Certain drugs</td>
<td></td>
</tr>
<tr>
<td>(phenytoin sodium [Dilantin], triiodothyronine, testosterone, ACTH, corticosteroids)</td>
<td></td>
</tr>
<tr>
<td><strong>NOT AFFECTED BY:</strong></td>
<td></td>
</tr>
<tr>
<td>Radiopaque substances for x-ray studies</td>
<td>Unaffected by the condition.</td>
</tr>
<tr>
<td>Mercurial diuretics</td>
<td></td>
</tr>
<tr>
<td>Nonthyroidal iodine</td>
<td></td>
</tr>
<tr>
<td><strong>TRANSFERRIN</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ELEVATED IN:</strong></td>
<td></td>
</tr>
<tr>
<td>Iron deficiency anemia</td>
<td>Elevated in transferrin levels</td>
</tr>
<tr>
<td>Oral contraceptive administration</td>
<td></td>
</tr>
<tr>
<td>Viral hepatitis</td>
<td></td>
</tr>
<tr>
<td><strong>DECREASED IN:</strong></td>
<td></td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td>Decreased in transferrin levels</td>
</tr>
<tr>
<td>Liver disease</td>
<td></td>
</tr>
<tr>
<td>Hereditary deficiency</td>
<td></td>
</tr>
<tr>
<td>Protein malnutrition</td>
<td></td>
</tr>
<tr>
<td>Neoplasms</td>
<td></td>
</tr>
<tr>
<td>Chronic inflammatory states</td>
<td></td>
</tr>
<tr>
<td>Chronic illness thalassemia</td>
<td></td>
</tr>
<tr>
<td><strong>TRIGLYCERIDES</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ELEVATED IN:</strong></td>
<td></td>
</tr>
<tr>
<td>Hyperlipoproteinemia (Types I, IIb, III, IV, V)</td>
<td>Elevated in triglyceride levels</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td></td>
</tr>
<tr>
<td>Pregnancy</td>
<td></td>
</tr>
<tr>
<td>Estrogens</td>
<td></td>
</tr>
<tr>
<td>Acute MI</td>
<td></td>
</tr>
<tr>
<td>Pancreatitis</td>
<td></td>
</tr>
<tr>
<td>Alcohol intake</td>
<td></td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>Glycogen storage disease</td>
<td></td>
</tr>
</tbody>
</table>
DECREASED IN:
Malnutrition, congenital abetalipoproteinemias, drugs (e.g., gemfibrozil, nicotinic acid, clofibrate)

UREA NITROGEN (BUN)

ELEVATED IN:
-Drugs (aminoglycosides and other antibiotics, diuretics, lithium, corticosteroids), dehydration, gastrointestinal bleeding, -Decreased renal blood flow (shock, CHF, MI), renal disease (glomerulonephritis pyelonephritis, diabetic nephropathy), urinary tract obstruction (prostatic hypertrophy)

DECREASED IN:
Liver disease, malnutrition, third trimester of pregnancy, overhydration

URIC ACID (SERUM)

ELEVATED IN:
Renal failure, gout, excessive cell lysis (chemotherapeutic agents, radiation therapy, leukemia, lymphoma, hemolytic anemia), hereditary enzyme deficiency (hypoxanthine-guanine-phosphoribosyl transferase) acidosis, myeloproliferative disorders, diet high in purines or protein drugs (diuretics, low doses of ASA, ethambutol, nicotinic acid), lead poisoning, hypothyroidism, Addison's disease,
nephrogenic diabetes insipidus, active psoriasis, polycystic kidneys

**DECREASED IN:**

Drugs (allopurinol, high doses of ASA, probenecid, warfarin, corticosteroid), deficiency of xanthine oxidase, SIADH, renal tubular deficits (Fanconi’s syndrome), alcoholism, liver disease, diet deficient in protein or purines, Wilson's disease, hemochromatosis

**URINE 5-HYDROXYINDOLE-ACETIC ACID (URINE 5-HIAA)**

**ELEVATED IN:**

Carcinoid tumors, after ingestion of certain foods (bananas, plums, tomatoes, avocados, pineapples, eggplant, walnuts), drugs (MAO inhibitors, phenacetin, methyldopa, glycerol guaiacolate, acetaminophen, salicylates, phenothiazines, imipramine, methocarbamol, reserpine, metamphetamine)

**URINE AMYLASE**

**ELEVATED IN:**

Pancreatitis, carcinoma of the pancreas

**URINE BILE (BILIRUBIN, URINE)**

**ABNORMAL:**

Urine bilirubin: Hepatitis (viral, toxic, drug-induced), biliary obstruction Urine urobilinogen: Hepatitis (viral, toxic, drug-
induced), hemolytic jaundice, liver cell dysfunction (cirrhosis, infection, metastases)

<table>
<thead>
<tr>
<th>URINE CALCIUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVATED IN:</td>
</tr>
<tr>
<td>Primary hyperparathyroidism, hypervitaminosis D, bone metastases multiple myeloma, increased calcium intake, steroids, prolonged immobilization, sarcoidosis, Paget's disease, idiopathic hypercalciuria renal tubular acidosis</td>
</tr>
<tr>
<td>DECREASED IN:</td>
</tr>
<tr>
<td>Hypoparathyroidism, pseudohypoparathyroidism, vitamin D deficiency vitamin D-resistant rickets, diet low in calcium, drugs (thiazide diuretics, oral contraceptives), familial hypocalciuric hypercalcinemia, renal osteodystrophy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>URINE CATECHOLAMINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVATED IN:</td>
</tr>
<tr>
<td>Pheochromocytoma, neuroblastoma, severe stress</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>URINE CHLORIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVATED IN:</td>
</tr>
<tr>
<td>Corticosteroids, Bartter's syndrome</td>
</tr>
<tr>
<td>DECREASED IN:</td>
</tr>
<tr>
<td>Chloride depletion (vomiting, diuretics), colonic villous</td>
</tr>
</tbody>
</table>
adenoma

**URINE COPPER**

**INCREASED IN:**

Wilson's disease

**URINE CORTISOL, FREE**

**ELEVATED:**

Refer to CORTISOL (serum)

**URINE CREATININE (24 HR)**

**NOTE:** Useful test as an indicator of completeness of 24 hr urine collection.

**URINE GLUCOSE (QUALITATIVE)**

**PRESENT IN:**

Diabetes mellitus, renal glycosuria (decreased renal threshold for glucose), glucose intolerance

**URINE HEMOGLOBIN, FREE**

**PRESENT IN:**

Hemolysis (with saturation of serum haptoglobin binding capacity and renal threshold for tubular absorption of hemoglobin)
URINE HEMOSIDERIN

PRESENT IN:
Paroxysmal nocturnal hemoglobinuria (PNH), chronic hemolytic anemia, hemochromatosis

URINE INDICAN

PRESENT IN:
Malabsorption secondary to intestinal bacterial overgrowth

URINE KETONES (SEMIQUANTITATIVE)

PRESENT IN:
DKA, alcoholic ketoacidosis, starvation, isopropanol ingestion

URINE METANEPHRINES

ELEVATED IN:
Pheochromocytoma, neuroblastoma, drugs (caffeine, phenothiazines, MAO inhibitors), stress

URINE MYOGLOBIN

PRESENT IN:
Severe trauma, hyperthermia, polymyositis/dermatomyositis, carbon monoxide poisoning
<table>
<thead>
<tr>
<th><strong>URINE NITRITE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRESENT IN:</strong></td>
</tr>
<tr>
<td>Urinary tract infections</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>URINE OCCULT BLOOD</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POSITIVE IN:</strong></td>
</tr>
<tr>
<td>Trauma to urinary tract, renal disease (glomerulonephritis, pyelonephritis), renal or ureteral calculi, bladder lesions (carcinoma, cystitis), prostatitis, prostatic carcinoma, menstrual contamination, hematopoietic disorders (hemophilia, thrombocytopenia), anticoagulants, ASA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>URINE OSMOLALITY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEVATED IN:</strong></td>
</tr>
<tr>
<td>SIADH, dehydration, glycosuria, adrenal insufficiency, high-protein diet</td>
</tr>
<tr>
<td><strong>DECREASED IN:</strong></td>
</tr>
<tr>
<td>Diabetes insipidus, excessive water intake, IV hydration with D5W acute renal insufficiency, glomerulonephritis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>URINE PH</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEVATED IN:</strong></td>
</tr>
<tr>
<td>Bacteriuria, vegetarian diet, renal failure with inability to form ammonia, drugs (antibiotics, sodium bicarbonate,</td>
</tr>
</tbody>
</table>
acetazolamide)

**DECREASED IN:**

Acidosis (metabolic, respiratory), drugs (ammonium chloride, methenamine mandelate), diabetes mellitus, starvation, diarrhea

**URINE POTASSIUM**

**ELEVATED IN:**

Aldosteronism (primary, secondary), glucocorticoids, alkalosis, renal tubular acidosis, excessive dietary potassium intake

**DECREASED IN:**

Acute renal failure, potassium-sparing diuretics, diarrhea, hypokalemia

**URINE PROTEIN (QUANTITATIVE)**

**ELEVATED IN:**

Renal disease (glomerular, tubular, interstitial), CHF, hypertension, neoplasms of renal pelvis and bladder, multiple myeloma, Waldenstrom's macroglobulinemia

**URINE SODIUM (QUANTITATIVE)**

**ELEVATED IN:**

Diuretic administration, high sodium intake, salt-losing
nephritis, acute tubular necrosis, vomiting, CHF, hepatic failure. Addison's disease, SIADH, hypothyroidism

**URINE SPECIFIC GRAVITY**

**ELEVATED IN:**

Dehydration, excessive fluid losses (vomiting, diarrhea, fever) x-ray contrast media, diabetes mellitus, CHF, SIADH, adrenal insufficiency, decreased fluid intake

**DECREASED IN:**

Diabetes insipidus, renal disease (glomerulonephritis, pyelonephritis), excessive fluid intake or IV hydration

**URINE VANILLYLMANDELIC ACID (VMA)**

**ELEVATED IN:**

Pheochromocytoma, neuroblastoma, ganglioblastoma, drugs (isoproterenol, methocarbamol, levodopa, sulfonamides, chlorpromazine), severe stress, after ingestion of bananas, chocolate, vanilla, tea, coffee

**DECREASED IN:**

Drugs (MAO inhibitors, reserpine, guanethidine, methyldopa)
<table>
<thead>
<tr>
<th><strong>VDRL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POSITIVE TEST:</strong></td>
</tr>
<tr>
<td>Syphilis, other treponemal diseases (yaws, pinta, bejel)</td>
</tr>
<tr>
<td><strong>NOTE:</strong> A false-positive test may be seen in patients with SLE and other autoimmune diseases, infectious mononucleosis, atypical pneumonia, malaria, leprosy.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>VISCOSITY</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>ELEVATED IN:</strong></td>
</tr>
<tr>
<td>Monoclonal gammopathies (Waldenstrom's macroglobulinemia, multiple myeloma), hyperfibrinogenemia, SLE, rheumatoid arthritis, polycythemia, leukemia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Y-GLUTAMYL TRANSFERASE (GGT; GAMMA-GLUTAMYL TRANSFERASE )</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELEVATED IN:</strong></td>
</tr>
<tr>
<td>Chronic alcoholic liver disease, neoplasms (hepatoma, metastatic disease to the liver, carcinoma of the pancreas), SLE, CHF, trauma, nephrotic syndrome, sepsis, cholestasis. drugs (phenytoin, barbiturates)</td>
</tr>
</tbody>
</table>