

Blood Tests – What are they for?

The following is a brief description of blood tests that your doctor may order during your course of treatment. Those tests underlined and in **bold** can be performed in the Dattoli Cancer Center's on site clinical laboratory.

PSA (Prostatic Specific Antigen) - Useful in detecting prostate cancer. The Dattoli Cancer Center utilizes the DPC Immulite 2000 Chemiluminescent Immunoassay System. May be transiently elevated due to other factors such as sexual activity, prostatic massage, biopsy, etc.

3rd Generation PSA - Useful in detecting metastatic or persistent disease in patients following treatment of prostate cancer. The Center utilizes the DPC Immulite 2000, Chemiluminescent Immunoassay System.

Testosterone, Total and Bioavailable Testosterone - Testosterone and dihydrotestosterone (DHT) circulate in plasma either unbound, free (approximately 2-3%), or bound to plasma proteins. The binding proteins include the specific sex hormone-binding globulin (SHBG) and nonspecific proteins such as Albumin. The measurement of free testosterone or Bioavailable testosterone more accurately reflects the level of bioactive testosterone than does the measurement of total serum testosterone. In aging men, total serum testosterone is often normal. While free testosterone or bioavailable testosterone is low. Testosterone levels are helpful in the assessment of androgen status in males. Increased testosterone level is seen with androgen resistance. Decreased testosterone is seen with male hypogonadism, men with Cushing's disease, and men receiving glucocorticoid therapy.

SHBG (Sex Hormone Binding Globulin) - A β -globulin that transports testosterone, dihydrotestosterone (DHT), and estradiol in plasma. It tightly binds approximately 60% of plasma testosterone and DHT. SHBG has the highest affinity for DHT and the lowest for Estradiol. The measurement of SHBG in serum can be useful in interpreting levels of testosterone.

Androstenedione - Produced by both the gonads and adrenals and is an androgen having biologic activity less than that of testosterone (about one-third) but greater than DHEA. Levels are found to be higher in the morning.

PAP (Prostatic Acid Phosphatase) - The prostate gland in men is a rich source of Acid Phosphatase. It normally contributes a small amount to the serum concentration. The clinical use of this prostate-specific fraction is in cases of prostate adenocarcinoma, where it is elevated most commonly in men with metastatic disease (about 60% of the cases). It is a much less sensitive test in men with localized disease (10-40% depending upon clinical grade). PAP will be transiently elevated following prostatic massage, needle biopsy, cystoscopy, and radiation.

DHEA-so4 - An excellent direct indicator of adrenal androgen output.

Estradiol - Secreted by the testes; elevated in gynecomastia. Decreased in hypogonadism.

Prolactin – is a hormone that stimulates the proliferation and growth of prostate cancer directly and by potentiating the action of testosterone. Dostinex blocks the production of Prolactin; therefore this level will be decreased while on this drug.

LH - Stimulates Leydig cells of the testes to produce testosterone. If LH (and FSH) levels are elevated, primary gonadal failure is present.

IGF-1 (Insulin-like Growth Factor-1 or Somatomedin C) – An important protein that is a signaling pathway in prostate cancer cells that plays a major role in prostate cancer progression and development of hormone resistance.

BSAP (Bone Specific Alkaline Phosphatase) - Although not totally understood, BSAP is believed to be involved in the mineralization of bone. The measurement of BSAP in serum provides information useful in the evaluation and treatment of patients with Paget's disease, osteoporosis, and metastases to bone.

DHT (Dihydrotestosterone) - A primary androgenic hormone and is formed by the peripheral action of 5- α -reductase on testosterone. Avodart and Proscar inhibits 5- α -reductase activity and reduces serum DHT concentrations.

NTX (N-Telopeptide, Cross-Linked) - These biochemical markers of bone turnover exhibit significant changes during formation and resorption. These markers are useful in the management of patients' bone disease, allow earlier evaluation of treatment and are predictors of the risk of osteoporotic fractures.

NSE (Neuron Specific Enolase) - A monoclonal antibody used as a tumor marker. Co-expression of NSE and Chromagranin-A are common in neuroendocrine neoplasms anywhere in the body, including the prostate and can indicate a mutated form of cancer.

CgA (Chromagranin A) - An excellent supplemental marker in the diagnosis and management of patients with neuroendocrine tumors. Studies have shown elevated serum CgA levels in advanced stages of prostate cancer in patients receiving no hormonal treatment, yet an early rise in patients receiving such treatment. The determination of CgA as a tumor marker for neuroendocrine tumors. The assay provides a means of determining serum CgA levels for aiding in the diagnosis and prognosis of such diseases, and for the monitoring of patients' response to therapy.

CK-ISO (Creatine Kinase Isoenzymes) - Isoenzymes can be used to evaluate disorders other than cardiac or skeletal muscle. CK-BB activity can be evaluated in a variety of tumors (GI tract, prostate, testes, bladder, kidney, breast, ovary, uterus, CNS, leukemia, lymphomas, sarcomas).

IL-6 (Interleukin-6) - A cytokine that regulates growth and differentiation of various types of malignant tumors, including prostate carcinomas. The level of IL-6 is elevated in sera of patients with metastatic prostate cancer.

Calcidiol (Vitamin D 25 or 25-hydroxycholecalciferol or Calcifediol or 25- hydroxyl-vitamin D) – Used to determine if bone weakness, bone malformation, or abnormal metabolism of calcium is occurring as a result of a deficiency or excess of vitamin D. This test measures the bloodstream levels of a prehormone produced by the metabolism of Vit. D, which is converted by the kidneys into *calcitriol*.

Calcitriol (Vitamin D 1,25 or 1,25-dihydroxycholecalciferol) - Used to determine if bone weakness, bone malformation, or abnormal metabolism of calcium is occurring as a result of a deficiency or excess of vitamin D. This test measures active Vitamin D. (Data suggests that low Vitamin D levels increase the risk and mortality from prostate cancer.)

TSH (Thyroid Stimulating Hormone) - Used to diagnose a thyroid disorder in a person with symptoms.

PTH (Parathormone) - Measured to determine if PTH levels are responding normally to fluctuations in blood calcium levels, to distinguish the cause of calcium imbalances, and to evaluate parathyroid function.

CEA (Carcinoembryonic Antigen) - Used as a tumor marker and to monitor treatment of cancer patients.

CBC (Complete Blood Count) - Provides important information about the kinds and numbers of cells in the blood: red blood cells, white blood cells, and platelets.

- WBC (White blood cell count) - A count of the actual number of white blood cells per volume of blood. Both increases and decreases can be significant.
- White blood cell differential - Looks at the types of white blood cells present. There are five types of white cells: neutrophils, lymphocytes, monocytes, eosinophils and basophils. All with its own function in protecting us from infection.
- RBC (Red blood cell count) - A count of the actual number of red cells per volume of blood. Both increases and decreases can point to abnormal conditions.
- Hemoglobin - Measures the amount of oxygen-carrying protein in the blood.
- Hematocrit - Measures the amount of space red blood cells takes up in the blood.
- Platelet count - The number of platelets in a given volume of blood. Both increases and decreases can point to abnormal conditions of excess bleeding or clotting.

CMP (Comprehensive Metabolic Profile) - A group of 14 tests that gives your doctor important information about the current status of your kidneys, liver, and electrolyte and acid/base balance as well as of your blood sugar and blood proteins.

- Glucose - To determine if your blood glucose level is within normal range; to screen for, diagnose, and monitor diabetes, pre-diabetes and hypoglycemia.
- Calcium - Tested to screen for, diagnose and monitor a range of conditions relating to the bone, heart, nerves, kidney, and teeth.

- Albumin -To screen for liver disorders or kidney disease or to evaluate nutritional status.
- Total Protein - To determine your nutritional status or to screen for certain liver and kidney disorders as well as other diseases.
- Sodium - Used to monitor high or low blood pressure, dehydration, or edema.
- Potassium - Performed to diagnose levels of potassium that are too high (hyperkalemia) or too low (hypokalemia).It is so important to heart function; it is a part of all complete routine evaluations.
- CO2 -Part of an electrolyte panel to screen for an electrolyte or acid-base imbalance.
- Chloride - To determine if there is a problem with your body's acid-base and to monitor treatment.
- BUN (Blood Urea Nitrogen) - The BUN level, usually along with Creatinine, is measured to evaluate kidney function as part of a routine panel or when someone has non-specific complaints, or when someone is on certain drugs.
- Creatinine - To determine if your kidneys are working normally. It is also used to monitor your kidney function while on certain drugs.
- ALT, AST, ALP and Total Bilirubin make up the rest of the 14 tests in this panel. They are defined below.

Hepatic Profile (Consists of the seven tests listed below)

Ordered on patients with symptoms or to monitor liver function during certain drug treatments.

- ALT (Alanine aminotransferase) - An enzyme mainly found in the liver; the best test for detecting hepatitis.
- AST (Aspartate aminotransferase) - An enzyme found in the liver, heart and other muscles.
- ALP (Alkaline Phosphatase) - An enzyme related to the bile ducts; often increased when they are blocked.
- Total Bilirubin - Measures all the Bilirubin in the blood.
- Direct Bilirubin - Measures the form made in the liver.
- Albumin - Measures the main protein made by the liver.
- Total Protein - Measures albumin and all other proteins in blood, including antibodies made to help fight infections.

UA - Urinalysis - Consists of three testing phases:

Physical: Evaluates to color and clarity and concentration of the specimen.

Chemical: Tests for 9 substances that provide valuable information about health and disease.

UC – Urine Culture: Used to diagnose a urinary tract infection (UTI). If negative, usually there is no infection. If positive, a susceptibility test will be performed on the bacteria isolated to determine the best drug treatment.

NMP22 - Nuclear Matrix Protein 22 - A rapid urine test for diagnosis and monitoring of bladder cancer.

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