

PAP, CGA, CEA, and NSE Biomarkers – Importance in Prostate Cancer Diagnosis

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Here is an explanation that should be easy to understand the role of biomarkers PAP, CGA, CEA, and NSE to better understand the extent of a patient's prostate cancer:

PAP, CGA, NSE, and CEA are important biomarkers for patients with validated GS 4+3/7, 8, 9, and 10. Internationally recognized Medical Oncologist Stephen B. Strum, who has specialized specifically in prostate cancer research and treatment since 1983, remarks: "I have advocated testing of the above markers but I see this recommendation has been abused to where it is being routinely tested by a number of physicians despite a validated GS of 6 or (3,4). I have rarely (can't think of one case) seen elevations of these markers in such instances, especially when the GS has been validated by an expert. These markers are most useful in THE CONTEXT of high Gleason scores such as (4,3) or higher (4,4), (4,5), (5,4) or (5,5). This includes:

PAP (Prostatic Acid Phosphatase - concern if over 3.0 - Indicates the disease may not be organ-confined)

CGA (Chromogranin A - concern if over 14.3 - A progressive increase in serum CGA indicates an aggressive clone of PC cells that has an increased tendency to metastasize to lymph nodes, liver and lungs)

NSE (Neuron-Specific Enolase - concern if over 12.5 - Identifies a possibly more aggressive PC)

CEA (Carcinoembryonic antigen - concern if over 4.0 - Identifies PC that may be more aggressive or possibly AIPC)

(Further described below)

Definitions:

Prostatic Acid Phosphatase (PAP) (Normal range 0-3.5) -The PAP should be a part of your baseline PC evaluation. However, as with PSA, the PAP may also be elevated due to the trauma caused by the prostate biopsies. Therefore, you need to wait at least five weeks after the biopsy procedure before testing for PAP unless this test was ordered prior to the diagnostic biopsies. Ideally, both PSA and PAP testing should not be done for at least 48 hours after any sexual activity involving ejaculation, 48 hours after DRE, or 48 hours after riding a bicycle.

Most physicians and patients consider the PSA and PAP to be simply "blood tests." However, the biologic reality is that PC cells elaborate numerous chemical substances that are vital to their growth and well-being and are often related to their function. Many of these cell products are enzymes important to the growth and spread of the cancer. PAP and PSA are just two of many

enzymes that should be regarded beyond that of merely representing commercial laboratory tests. The results of PAP and PSA testing add to the biologic "profile" that an astute patient-physician team uses to accurately decipher the real status of the patient's disease. A PAP level within normal range is indicative the PC may not have migrated and is still confined to the area of the prostatic bed and not beyond the lymph nodes. Here is a April 2008 report in PubMed regarding The Importance of the serum Prostatic Acid Phosphatase (PAP) Test to Determine Cause-Specific Survival in Patients:

<http://www.ncbi.nlm.nih.gov/pubmed/18242384?dopt=Abstract>

CHROMOGRANIN A (CGA) (Normal range, units liter <14.3) - The plasma CGA level is used to help identify patients with an aggressive form of PC. In such patients, the CGA elevations should be documented as progressively increasing and not just a sporadic or stable elevation. This is not as complicated as it may sound. Prostate tissue, both benign and malignant, is comprised of at least four different cell types: basal cells, epithelial cells, neuroendocrine cells and stromal cells. CGA testing involves the measurement of blood levels of chromogranin A, a protein synthesized by the neuroendocrine cell type (i.e. of neurogenic origin with endocrine functions) found in prostate cancer. Neuroendocrine cells in PC are not dependent on androgens as are the epithelial cells (also called luminal cells), which are the cells most commonly involved in PC growth. Serial CGA testing can help track the patient's response to treatment, especially if serum PSA and/or PAP expression is low. Low PSA levels may be seen despite significantly high tumor volumes in situations where the PC has mutated to an aggressive cell type; this is characterized by a high Gleason score of 8-10. In fact, obtaining a full baseline set of biomarkers in situations associated with such an aggressive picture often reveals elevation(s) in plasma CGA.

NEURON SPECIFIC ENOLASE: (NSE) (Normal range <12.5) - a neuroendocrine marker; an enzyme produced by neuroendocrine cells found in more aggressive types of PC).

CARCINOEMBRYONIC ANTIGEN (CEA) (Normal range <4.0) - a fetal antigen or protein that may be expressed by PC that is aggressive and often androgen-independent).

When a progressive increase in any of these biomarkers is documented, there is invariably evidence of mutated aggressive PC. These findings should always be placed in context with the rest of the clinical and pathological picture.

Disclaimer: Please recognize that I am not a Medical Doctor. I have been an avid student researching and studying prostate cancer as a survivor and continuing patient since 1992. **The comments or recommendations I make are not intended to be the procedure for you to now follow; rather, they are to be reviewed along with the comments or recommendations of others for your own further research, study, and discussion with the physician providing your prostate cancer care to come to your own, personal conclusion.**