Session 7: Cancer prevention and target organs III: Prostate cancer

S29. Biomarkers for monitoring dietary and pharmacological prevention trials in prostate cancer

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Prostate specific antigen (PSA) is widely acknowledged to be the most important tumor marker in Medicine for the last 20 years. The clinical use of this biomarker is basically twofold: First for screening and early detection of prostate cancer and secondly for monitoring the disease after any kind of therapy.

In early detection programs, the ability to discriminate cancer from benign disease is hampered by a considerable lack of specificity. Several static concepts for improving the specificity – PSA density, age-specific reference ranges, ratio of free to total PSA, complexed PSA – are of limited value. Dynamic concepts like PSA velocity (PSAV) and PSA doubling time (PSADT) are more promising and are currently under investigation in large, prospective screening trials. Furthermore the recently discovered prostate cancer antigen 3 (PCA3) has been quantitated in urine sediments obtained after prostatic massage. This new biomarker has potential in reducing the number of unnecessary prostatic biopsies.

PSA is well established as auxiliary marker after surgery, external beam irradiation, low dose rate brachytherapy, androgen ablation, chemo- and immunotherapy of prostate cancer. However, it is not yet proven that changes in serum PSA level truly reflect changes in tumor burden.

The role of PSA in prevention trials is more controversial. Prostate cancer is basically an ideal candidate for exogenous preventive measures, such as dietary and pharmacological prevention, due to some specific features: high prevalence, long latency, endocrine dependency, availability of biomarkers (PSA ...) and histological precursor lesions like prostatic intraepithelial neoplasia. Dietary/nutritional factors that may influence disease development include total energy intake (as reflected by body mass index), dietary fat, cooked meat, micronutrients and vitamins (carotenoids, retinoids, vitamins C, D and E), fruit and vegetable intake, minerals (calcium, selenium), and phytoestrogens (isoflavonoids, flavonoids, lignans). Pharmacological prevention may use drugs that act on intraprostatic testosterone metabolism (finasteride, dutasteride), induce apoptosis and inhibit tumor growth and metastasis (statins) or block competitively androgen receptors (bicalutamide, flutamide, nilutamide). An approach that combines PSA-based clinical trials with experimental human xenograft studies to evaluate potential preventive agents would be of great interest.