DISTINGUISHING PROSTATE CANCER FROM HYPERPLASIA

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Enlargement of the prostate is an age-related, physiological process that is unique in human tissue. The prostate gland is the most common site of neoplastic disorders in men. Despite the growing impact of the various prostate diseases in terms of morbidity and mortality, the pathogenesis of benign prostate hyperplasia (BPH) and prostate cancer remains poorly understood. This reflects the complex composition of the gland with different anatomic, cellular and functional compartments that are differentially involved in benign and malignant disease processes.

It is known that trace elements play an important role in a number of biological processes therefore the knowledge of trace elements concentrations in healthy and neoplastic tissues might help in diagnostic tests and in the etiology and development of cancer.

X-ray fluorescence analysis using synchrotron radiation seems to be an appropriate technique to study the elemental composition of biological tissues. The measurements presented in this paper were carried out on the L-beam line at the HASYLAB, DESY.

Samples were taken from patients (56- to 72-years-old) who have been operated due to prostate cancer diseases and from patients being oncologically observed on the occasion of hyperplastic process in the prostate gland. Additionally the results of the analysis of trace elements content in prostate tissues practically healthy men were used as control group.

Our results confirmed that the elements such as K, Ca, Cu, Fe and Zn are valuable indicators and they should be considered as tracers for the identification of pathological disorders in prostate tissues. The concentrations of K, Ca, Cu, Fe and Zn are significantly higher in cancerous tissues, as compared to normal and hyperplastic ones. Our results reveal also existence of the two types of hyperplasia.

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