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The value of prostate HistoScanning™ in men at risk of prostate cancer

Vincent De Coninck and **Johan Braeckman**
Universitair Ziekenhuis Brussel, Belgium

HistoScanning™ is an ultrasound-based technology that has been developed to distinguish cancerous and noncancerous tissues in solid organs. By extracting and quantifying statistical features from back-scattered ultrasonographic data, it detects specific changes in tissue morphology. This imaging technique was shown to be efficient in a proof of concept study where the images were compared with whole mount pathology. Small tumors above 0.20 mL can be detected, localized and characterized with high accuracy as compared with histology. HistoScanning™ is applied to detect or to exclude prostate cancer to assist in carrying out geographical targeted biopsies and to support the strategy of active surveillance. Since its inception date, its negative predictive value has been very good allowing to obviate biopsies in most cases. The positive predictive value of a suspicious lesion within the prostate is higher than today's standard tests (DRE, PSA, TRUS) and is increasing over the years thanks to increasing experience, improvements of the technology and the possibility of performing real time biopsies.

HistoScanning™ has the potential to become a first line diagnostic test of triage test before biopsy as it is a rather simple, fully available, minimal invasive test that can be done and repeated in the urologists practice.

vincent.deconinck@uzbrussel.be

Antisense technology: A prospective therapeutic strategy for cancer

Pranita roy and **Bhawna Sharma**
Amity Institute of Biotechnology, India

Antisense technology involves development of sequence-specific DNA or RNA strands that can inhibit gene expression by blocking DNA uncoiling, transcription, export of RNA, splicing, RNA stability, or translation. Antisense oligonucleotides, the most commonly used antisense approach, are unmodified or chemically modified single-stranded RNA or DNA molecules specifically designed to hybridize to corresponding RNA molecule. Inappropriate gene expression is basic to the pathophysiology of cancer, including prostate cancer, which emphasizes the need for novel therapeutic strategies targeting these key molecular changes. There is expanding advance in translational oncology and tremendous achievements have been made as evidenced by preclinical and clinical trials. Information obtained from high-throughput technologies is extending our understanding about the molecular and gene network in cancer cells. Also, rapidly emerging in vitro and *in vivo* evidence is highlighting the role of antisense agents as specific inhibitors of the expression of target genes, thus accordingly regulating the response of cancer cells to different therapeutic strategies. Much information is persistently being included into various aspects of molecular oncology and it is now understood that overexpression of antiapoptotic proteins, oncogenes, oncogenic microRNAs (miRNA), and fusion proteins make tumor cells hard to target. Delivery of antisense oligonucleotides has remained a challenge but overcoming the obstacles by improving the ability to penetrate cells, effective and targeted binding to gene sequences, and downregulation of target gene function can be achieved by technological developments. Different delivery systems, including stable nucleic acid lipid particles, have shown potential in enhancing the delivery of oligoucleotides to the target site. Studies have indicated the role of the proto-oncogene c-myc, a key regulator of cell proliferation and differentiation, which encodes a ubiquitously expressed nuclear phosphoprotein of 439 amino acids (c-Myc). The phosphoprotein is found mainly in heterodimeric complexes with the related protein Max. The c-Myc/Max complexes bind to DNA in a sequence-specific manner and activate transcription resulting in enhanced cell transformation and cell cycle progression. A few studies have recognized the significant role of c-myc in prostate carcinogenesis in light of the fact that elevated amounts of c-myc overexpression have been reported in prostate cancer cells and in experimental animal models, as well as in human prostate adenocarcinomas. Several studies report on gene-specific therapy using antisense. Oligonucleotides directed against the c-myc gene, for prostate cancer reveals the down regulation of the expression of c-Myc protein causing significant growth inhibition and cell death with no serious adverse effects in human volunteers. Recent findings suggest that antisense therapeutics have shown potential in resensitizing resistant cancer cells to apoptosis by targeted inhibition of antiapoptotic proteins, oncogenic miRNAs. Thus, it can be safely concluded that antisense therapeutics have a tremendous potential in the field of medical research for the treatment of cancer.

proy@amity.edu