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Epigenetic biomarkers of prostate cancer – looking beyond PSA

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Background: Prostate cancer is the second most common cancer among men worldwide. Presently, the most common non-invasive mode of screening, prognostication and management is estimation of serum PSA. However, the sensitivity of PSA is 42.8 % and specificity is 41.1%. Therefore, a rigorous search for newer biomarkers for early detection of prostate cancer have been warranted.

Methods: Sixteen primary matched tumor and serum were analyzed by fluorogenic quantitative methylation specific PCR (QMSP) to determine analytical and clinical sensitivity of the genes tested (SSBP2, MCAM, ER α , ER β , APC, CCND2, MGMT, GSTP1, p16 and RAR β 2). Additionally, same QMSP assay was employed in serum samples from eighty four cases of prostate cancer, thirty controls and seven cases diagnosed as high grade Prostatic Intraepithelial Neoplasia (HGPIN). ROC curves were plotted for each of the genes to calculate sensitivity and specificity.

Results: The sensitivity and specificity of hypermethylation of MCAM was 65% and 62% respectively which is an improvement from the sensitivity and specificity of PSA. When a panel approach was taken, a combination of MCAM, p16 and ER alpha increased the sensitivity to 70.23 and the specificity remained the same.

Conclusion: Although need to be validated in a larger cohort, promoter DNA methylation of MCAM, p16 and ER alpha have a potential to be utilized as biomarkers for prostate cancer as their sensitivity and specificity is better than serum PSA in our cohort of samples. After validation, our findings may reduce the numbers of unwarranted prostate biopsies which cause morbidity to patients.

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Artesunate induced apoptosis in human breast cancer MCF-7 cells through caspase-dependent pathway

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Artesunate, the most potent semi-synthetic derivative of artemisinin, is an effective antimalarial drug. It is recently used in medical preparations that induce tumor cell apoptosis. Despite several reports of potent anticancer activities of artesunate against different tumors, the mechanism of action is still unclear. The aims of this study were to determine if artesunate could induce apoptosis in human breast cancer MCF-7 cells, and to understand its molecular mechanism. The growth inhibitory effect of artesunate on breast cancer MCF-7 cells was measured by MTT assay. The cells were first treated with various concentrations of artesunate followed by flow cytometry assay. Annexin V-FITC/PI staining was then applied to detect apoptosis. The activity of key apoptotic proteins: Caspase-3, -8 and -9 were also determined using caspase colorimetric assay kits. The MTT results indicated that artesunate could significantly inhibit the growth of MCF-7 cells in a dose- and time-dependent manner. In addition, based on the results from flow cytometry, it was found that anti-proliferative activity of artesunate in MCF-7 cells occurs through apoptosis. On the other hand, caspase colorimetric assays suggested increased cellular levels of both initiators (caspase-8 and -9) and effector caspases (caspase-3) in cells were exposed to artesunate.

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