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New biomarkers of bladder cancer in liquid biopsies

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Introduction & Objectives: Bladder cancer is the fourth most common neoplasia in men in the developed countries. Diagnosis and surveillance are made by bladder examination through cystoscopy making this one of the most expensive on cost per patient. After tumor removal, clinical staging is fundamental for prognosis and for treatment decision as non-muscle invasive (Ta and T1) and invasive (T2+) are treated with a completely different procedure. Nowadays no noninvasive method has enough sensitivity to substitute cystoscopy or histological examination for tumor clinical staging. Our aim is to identify and quantify in urine, proteins that can detect and classify bladder tumors.

Materials & Methods: A biomarker study was conducted using urine samples from: 1) individuals with bladder cancer (stages Ta – 6 patients, T1 – 6 patients and T2+ - 6 patients), 2) individuals with other genitourinary disorders (BPH; lithiasis) – 6 patients and 3) individuals without urological diseases – 6 patients. Using Filter Aided Sample Preparation, urinary proteins were purified and digested. Liquid Chromatography coupled to Mass Spectrometry was used for the identification and quantification of digested urinary peptides.

Results: Several proteins were found to successfully help in the discrimination of the bladder cancer stages Ta, T1 and T2+. Two biomarker-panels were developed, one capable of detecting bladder cancer presence and other able to distinguish Ta, T1 and T2+. In figure 1 and 2 is showed the difference between Ta, T1 and T2+ stages.

Conclusions: Our results show a significant difference between urinary proteome in patients with different bladder cancer stages. This may allow through liquid biopsies predict patients cancer stage. A validation study is on progress to attest these biomarker panels accuracy.