**(Poster #156)**

**A NOVEL LIVE CELL MICROFLUIDIC DIAGNOSTIC USING PHENOTYPIC BIOMARKERS WITH OBJECTIVE ALGORITHMS FOR PROSTATE, KIDNEY, BLADDER CANCER RISK STRATIFICATION.**

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**Methodologies**

**Objectives:**

- Evaluate our ability to culture patient cell samples.
- Assess and automate biomarker measurement from live and fixed cells, and objectively analyze the cancer's disease stage and potential for progression through a proprietary machine vision-based algorithm.

**Methods:**

- Conditions were optimized for reliably culturing primary cancer cells in vitro by simulating in vitro conditions on a specialized and proprietary extra-cellular matrix (ECM) formulation.
- We developed a novel, proprietary microfluidic device that we use to culture live tumor biopsy samples ex vivo, thus enabling automated imaging of label-free and label-based, molecular and biophysical biomarkers.

**Results:**

- Following the results of a study in prostate cancer (n=178) that showed AUC > 0.95 in predicting adverse pathology potential (APP, Local Adverse Pathology Potential (LAPP), & Metastatic Adverse Pathology Potential (MAPP) using unbiased machine learning algorithms, Concordance analysis supports that LAPP, MAPP, derived from primary biomarkers, are useful for distinguishing between normal and malignant cells, predicting stage, and predicting adverse pathology states such as lympho-vascular invasion in kidney (n=20) and bladder (n=10) cancer samples.

**Conclusion:**

- The ultimate result of the exploratory study yield specificities and sensitivities greater than 90% when predicting stage and lympho-vascular invasion.

- This study's findings support the development of a novel diagnostic platform that can be used to predict adverse pathology states for kidney and bladder cancer patients.

- Ultimately, this diagnostic platform will be utilized to better stage & risk-stratify cancer patients towards optimized treatment.

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**Introduction and Objectives:**

- Prostate, kidney, and bladder cancer diagnoses currently insufficient. Biomarkers to effectively assess disease aggressiveness and metastatic potential. Utilizing a new diagnostic platform incorporating molecular and cellular data, we aim to develop a more comprehensive approach to understanding disease stage and potential for progression through a proprietary machine vision-based algorithm.

**Methods:**

- Conditions were optimized for reliably culturing primary cancer cells in vitro by simulating in vitro conditions on a specialized and proprietary extra-cellular matrix (ECM) formulation.
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