TPS4615 Poster Session

# Transforming kidney cancer treatment through AI-enabled functional precision medicine: The PEAR-TREE2 trial.

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**Background:** Advanced renal cell carcinoma (RCC) presents a significant clinical challenge, with limited predictive biomarkers for treatment response. Pear Bio's innovative platform utilizes 3D immune-microtumors and computer vision to predict therapeutic responses using patient-derived tumor and blood samples. This study builds upon the initial PEAR-TREE trial, aiming to validate the platform's predictive capabilities for systemic therapies, including immune checkpoint inhibitors and tyrosine kinase inhibitors, in advanced RCC. **Methods:** PEAR-TREE2 (NCT06264479) is a multicenter, observational trial conducted in the UK and US, enrolling up to 200 patients with metastatic RCC. Participants must provide fresh tumor biopsies and blood samples prior to initiation of the next line of systemic therapy. Samples are cultured in Pear Bio's platform, which uses time-lapse microscopy and AI-driven computer vision analysis to assess functional metrics including viability, cell killing, migration, culture size, immune infiltration and clustering. Predictive metrics for overall response rate (ORR) based on RECIST 1.1 criteria are the primary endpoints. Secondary objectives include predictive accuracy for progression-free survival (PFS), durable response rates, and overall survival (OS). Exploratory analyses will evaluate molecular biomarker correlations (e.g. protein expression of therapeutic target, cell subpopulation analysis, etc.) and subgroup dynamics. Statistical methods include Receiver Operating Characteristic (ROC) curve analysis and subgroup logistic regression. Patient enrollment commenced in June 2024, with interim analyses planned after 50 and 100 enrollments. Eligibility criteria include patients aged ≥18 years with advanced RCC eligible for systemic therapy. Exclusion criteria comprise early-stage RCC, patients who have commenced treatment, or non-RCC diagnoses. Additional core needle biopsies (minimum 4x 18G cores) and blood samples (40 mL) are mandatory. Recruitment is ongoing at 7 trial sites, with a target duration of 4.5 years. This novel assay could fill the gap in predictive biomarkers by enabling personalized therapy selection. By validating its patient stratification potential, the study paves the way for interventional trials, with the promise of optimizing treatment regimens and improving outcomes for kidney cancer patients. We have ongoing trials in other high-unmet-need indications including early-stage breast cancer (NCT05435352), metastatic breast cancer (NCT06182306) and gliomas (NCT06038760) hoping to revolutionize precision oncology via improved treatment selection. Clinical trial information: NCT06264479. Research Sponsor: Ourotech (t/a Pear Bio).