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Cover Photo: The LPCP test utilizes an automated machine vision process for biomarker measurements to rapidly assess primary prostate tissue, allowing machine learning algorithms to objectively analyze biomarker measurements. (A) The LPCP test process of rapidly culturing primary prostate tissue within 72 hours, imaging and quantification of both live and fixed cells, matching live and fixed cell measurements to be input into machine learning algorithms. (B) Live-cell biomarkers are measured via Differential Interference Contrast (DIC) time-course imaging of primary prostate cells rapidly derived from radical prostatectomy samples. (C) Examples of biomarkers measured during live cell analysis: tortuosity, cellular dynamics such as motility, and membrane dynamics that provide information about actin dynamics. Two different phenotypes are presented to show the possible range of phenotypes for tortuosity and cellular dynamics. (D) A representative field of view for label-based fixed-biomarker cell analysis. (E) Example of fixed-biomarker measurements: microtubule organization, protein intensity and modification state, and focal adhesion localization pattern. Two different phenotypes are shown for each example of fixed cell biomarkers. (F) Automated quantification by machine vision algorithms and statistics on cell population for example biomarkers. Abbreviations: DIC, differential interference contrast; LPCP, live primary-cell phenotypic. (Color version available online) (See Page 198).

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