Cancer is a heterogeneous disease which manifests as different molecular subtypes. Due to the complex nature of tumor initiation, progression and metastasis; cancer in different patients progresses at individual rates via various pathways. Currently, this cancer heterogeneity is largely unexploited, and the concept of precision medicine is to incorporate diagnostic technology to enable tailored treatments for different patients. To allow accurate cancer screening, early detection, therapy and monitoring; the characterization of multiple oncogenic biomarkers is required to characterize individualized cancer molecular subtypes.\textsuperscript{1} Despite the reliability of current multiplexed detection techniques; novel strategies are needed to resolve limitations such as long assay time, complex assay protocols, and difficulty in interpreting broad overlapping spectral peaks associated with conventional fluorescence readouts. Herein we present a rapid (80 min) multiplexed platform strategy\textsuperscript{2} for subtyping prostate cancer (PCA) tumor and urine samples based on their RNA biomarker profiles. This was achieved by combining rapid multiplexed isothermal reverse transcription-recombinase polymerase amplification (RT-RPA) of target RNA biomarkers with surface-enhanced Raman spectroscopy (SERS) nanotags for a “one-pot” assay. This is the first translational application of a RT-RPA/SERS-based platform for multiplexed cancer biomarker detection to address a clinical need. With excellent sensitivity of 200 zmol (100 copies) and specificity, we believe this platform methodology could be a useful tool for rapid multiplexed subtyping of cancers.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{nanosubtyping_platform.png}
\caption{Schematic representation of nano-subtyping platform for rapid multiplexed detection of prostate cancer biomarkers}
\end{figure}

\textbf{References}

\begin{enumerate}
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\end{enumerate}