Non-invasive Cancer Gene Detection – introduction of EFIRM

The EFIRM (Electric Field Induced Release and Measurement) technologies were developed by Dr. David Wong's laboratory at UCLA under the sponsorship of two cycles of NIH UO1 grant support. The nine years of efforts resulted in a highly sensitive and specific multiplexible lab assay for protein and nucleic acids biomarkers in saliva. The complete set of core technologies include 1) the technology to design nucleic acid probe to be able to specifically amplify electrochemical signals from very few amount of target (~100 molecules) without sample extraction and amplification; 2) the technology significantly improves the biocompatibility and probe surface density through electrode modification; 3) the technology to facilitate and enhance the process of incubation through electric waveform.

While UCLA's platform demonstrated the ability to detect targets at concentrations as low as pg/ml for protein and fM for DNA, it became evident that EFIRM reader which was finished by EZlife Bio Inc. in 2015 would be more suitable for evaluating liquid-biopsy applications due to low cost, system simplicity and size, high sensitivity, and automation integration capability. The EFIRM reader has passed analytical validation and gone through multiple sites clinical validation for lung cancer EGFR mutation tests in both plasma and saliva samples. Moreover, EFIRM platform can be applied to the detection of exosome, virus, bacteria, microRNA, mRNA, protein and small molecules etc.