

Personalized diagnostics for systemic cancers powered by next-generation-sequencing technology

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The innovative clinical application of next-generation-sequencing (NGS) technology to develop individualized diagnostics for systemic cancers has been recognized recently. Recent development of NGS technology has enabled us to sequence dozens of genes in various patient samples using a simple workflow. We have tested the Ion AmpliSeq™ Cancer Panel, of which the gene expression levels and mutations can be confirmed within just one day, starting with a single-tube reaction and 10 ng of RNA or DNA. This targeted gene re-sequencing procedure can be completed in 3.5 hours of total time, with less than 10 minutes of hands-on time, as fast and simple as standard qPCR or PCR. This NGS technology permits deep sequencing of a panel of mutations at the same time of measuring the relative quantities of these genes. Our testing of this new technology has allowed detection of gene expression variation, as well as known gene mutations in tissue, blood and saliva samples. It can detect variations and mutations at frequencies as low as 5 percent with short turn around time and low cost. This could be an ideal solution and hold a great potential for diagnostic applications. In principle, this NGS-based test could potentially be developed for any cancer patient, and used not only for early detection of recurrent cancer in the same patient in the future, but also to monitor an individual's response to different therapeutic options. This method represents an important foray into offering truly personalized cancer diagnostics.

Biography

Dr. Lei Zhang's primary research focuses on cancer diagnostic biomarker development, using next-generation-sequencing, microarray, and other Omics technologies. His cutting edge work has introduced a new means for battling systemic cancers, i.e. saliva as a diagnostic tool that may aid in early detection. His original findings have been published in international peer-reviewed scientific journals. Five patents have been filed or granted internationally. Dr. Zhang, as the Principal Investigator, has been awarded grants from the California Breast Cancer Research Program and the Tobacco-Related Disease Research Program.

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