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Clinical next generation sequencing of tumors: Potential, advantages and future prospects

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Next Generation Sequencing (NGS) represents a revolutionary high throughput sequencing technology, which enables massive parallel sequencing of tens and hundreds of genes utilizing a single investment of low quantity of DNA. This technology represents a major advantage over the single gene and low throughput sequencing platforms, which when needed to screen for multiple markers are labor intensive, have high DNA requirements and expensive. As the number of markers to be routinely screened in cancer diagnostics is increasing, NGS is being rapidly adapted for routine mutational screening of both solid tumors and hematological malignancies in diagnostic labs. However, application of these technologies in diagnostic arena also presents several challenges, which includes rigorous validation of these relatively new technologies to assess their suitability for routine diagnostics, evolving guidelines for validation and application and need for special bioinformatics and clinical reporting infrastructure. Rapid changes and improvements of the wet bench and analytical technology also warrant frequent revalidations before induction for clinical use. The need for changes in billing and reimbursement format to accommodate NGS into the model of single-gene tests and reporting of incidental findings also raise financial and ethical challenges, respectively.

Biography

Rajesh Singh has a Ph.D. in Biochemistry from The University of Mysore, India and Postdoctoral research experience from University of Texas, MD Anderson Cancer Center. He has extensive experience in cancer biology focusing on the deregulated oncogenic and tumor suppressor pathways in the origin and maintenance of solid tumors and hematological malignancies. He is an Assistant Professor in the molecular diagnostics laboratory at MD Anderson, where he supervises the development team involved in design and validation of the NGS assays for routine mutational screening of tumors. He has published more than 36 papers and 3 review articles in reputed journals.

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