Lessons from biomarker-driven oncology trials: Case studies of bench-to-bedside translation

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ABSTRACT

Advances in sequencing and computational biology have revealed the extensive heterogeneity of cancer genomes, accelerating the evolution of precision oncology. Our research focuses on developing integrative, clinically applicable approaches to enhance cancer diagnosis and treatment stratification. Here, I present two active cases demonstrating the feasibility of bench-to-bedside translation. First, we developed strategies to identify pathogenic variants within Asian-specific polymorphisms and correlated these findings with real-world clinical outcomes. This enabled the design of biomarker-driven clinical trials incorporating cell-free molecular testing for patient stratification. Second, we applied serum proteomics to identify circulating biomarkers predictive of early treatment response. This work leveraged insights from randomized, open-label trials showing synergistic effects between VEGF and PD-1 pathway inhibition in nasopharyngeal carcinoma. Together, these studies highlight the clinical value of liquid biopsy-based proteogenomics in improving diagnostics, informing therapeutic decisions, and advancing personalized cancer care.

Keywords: Asian cancer, proteogenomics, bench to bedside translation, head and neck cancers