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Fluorescence in situ hybridization (FISH): An increasingly demanded tool for biomarker research and personalized medicine

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Extensive studies conducted over the last two decades have identified recurrent genomic abnormalities as potential driving factors underlying a variety of cancers. With respect to biomarker detection, a series of innovative high-throughput molecular tests, such as array-based comparative genome hybridization (aCGH), single nucleotide polymorphism (SNP) arrays and next generation sequencing, have recently been developed and incorporated into routine clinical practice. However, although it is a classical low-throughput cytogenetic test, fluorescence in situ hybridization (FISH) does not show signs of fading; on the contrary, it plays an increasingly important role in detecting specific biomarkers in solid and hematologic neoplasms and has therefore become an indispensable part of the rapidly developing field of personalized medicine. For example, FISH has become gold standards for detecting cancer biomarkers, such as BCR-ABL1, PML-Rara, Her-2, EML4-ALK, BRAF, ROS1 and FGFR. Many of these FISH assays are actually the companion diagnostic tests directly involved in the targeted therapies and personalized medicine. Furthermore, FISH, especially quantitative multi-gene FISH has been increasingly used for molecular pathology subtyping, disease stratification, therapeutic guidance and prognosis evaluation. In this talk, I will summarize recent advances in FISH application for both de novo discovery and routine diagnosis for chromosomal rearrangements and amplification or deletion of genomic components that are associated with the pathogenesis of various hematopoietic and non-hematopoietic malignancies. I will also briefly review the recent developments in FISH methodology. Finally, I will introduce a new methodology-sequential FISH that we have developed recently for multi-gene analysis at the single-cell level.

Biography

Weimin Miao has obtained the Medical degree from Shanghai Second Military Medical University and has completed his PhD from Fudan University in China. He did his Post-doctoral studies from Harvard Medical School in US and McGill University in Canada. He used to work as an Assistant Professor in University of Tennessee. Currently, he is Professor of Chinese Academy of Medical Sciences and Peking Union Medical College, a top medical research organization. He has published more than 50 papers in reputed journals. He also served as a Chief Scientist in VCANBIO company, developing advanced molecular diagnostic products for clinical use.

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