基因技術平台的最新進展

The latest progress of genetic technology platform

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Genetic testing is becoming one of the fundamental tools not only in basic research but also in clinical practice. Massive parallel sequencing or next generation sequencing (NGS) is becoming a standard clinical practice in many countries, and effects of target and immunotherapies are directly related to the genomic changes of individual patients.

The era of NGS began in 2005 with the introduction of Roche 454 machine, followed by a rapid improvement of sequencing technology lead by Solexa/Illumina, Ion Torrent, and MGI platform. The cost of NGS is becoming acceptable and gene panel, RNA-Seq, whole exome sequencing, and whole genome sequencing became a standard patient care in many places.

The main limitation of traditional NGS was using bulk sample containing a mixture of cancer and various normal cells, this lead to an “average” genetic signal which was greatly affected by the tumor percentage and also caused interpretation difficulties. The era of single cell sequencing started in 2012 with the introduction of Fluidigm C1, and many other devices, including 10x Chromium, BD rhapsody, and Nadir, along with lower sequencing cost and international Cell Atlas Consortium facilitated this new wave of genetic research. This single cell sequencing technology may provide a chance to solve the above problem and provide information of disease mechanism, cell-cell interactions, role of different microenvironments, and disease biomarkers in the future treatment and patient care.