

Next Generation Technologies – Basics and Applications

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Abstract

Demand has never been greater for revolutionary technologies that deliver fast, inexpensive, and accurate genome information. This challenge has catalyzed the development of next-generation sequencing (NGS) technologies.

The primary advantage is the production of inexpensive volumes of sequence data over conventional methods. A technical review of template preparation, sequencing and imaging, and genome alignment and assembly approaches as well as recent advances in current and near-term commercially-available instruments from Roche/454, Illumina/Solexa, Life Technologies, Helicos, and Pacific Biosciences will be presented. A broad range of applications will also be discussed that have employed NGS technologies along with highlights from the Watson and Lupski personal genome projects, characterized by the BCM-HGSC. The impact of big science projects such as the 1,000 Genomes Project and The Cancer Genome Atlas will also be presented as well as with guidelines users should consider when selecting an NGS platform to address biological questions of interest.

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