

Sección temática: SECUENCIACIÓN MASIVA

Título: NGS Y METAGENÓMICA

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The Next Generation Sequencing (NGS) allows to sequence the whole genome of an organism, compared to Maxam and Gilbert and Sanger sequencing that only allow to sequence, hardly, a single gene. Removing the separation of DNA fragments by electrophoresis, and the development of techniques that let the parallelization (analysing simultaneously several DNA fragments) have been crucial for the improvements of this process. The new companies in this ambit, Roche and Illumina, bet for different protocols to achieve these goals. Illumina bets for the sequencing by synthesis (SBS), requiring the library preparation and the use of adapters. Likewise, Illumina has replaced Roche because its lower rate of misincorporation, making it ideal for studies of genetic variability, transcriptomic, epigenomic, and metagenomic, in which this study will focus.

However, it is noteworthy that the last progress in sequencing is carried out by the third generation sequencing, using nanotechnology to design small sequencers that sequence the whole genome of an organism quickly and inexpensively. Moreover, they provide more reliable data than current systems because they sequence a single molecule, solving the problem of synchronisation. In this way, PacBio and Nanopore allow a great progress in diagnostic and personalized medicine.

Metagenomics provide to make a qualitative and quantitative analysis of the various species present in a sample. The main advantage of this technique is the no necessary isolation and growth of the species, allowing the analysis of nonculturable species. The Illumina protocol studies the variable regions of the 16S rRNA gene, which contains variable and not variables regions providing a phylogenetic classification. Therefore, metagenomics is a topic of interest to know the biodiversity of complex ecosystems and to study the microbiome of patients given the high involvement with certain microbial profiles on the condition of certain metabolic diseases.