

Innovative technologies for cancer research

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The next-generation sequencing (NGS) and clustered regularly interspaced palindromic repeats (CRISPR)-Cas9 gene editing are innovative technologies used in genetics and molecular biology which have been revolutionizing the field of cancer research.

Next-generation sequencing (NGS) is defined by modern sequencing technologies that allow to sequence millions of DNA and RNA strands much more quickly and cheaply than the conventional Sanger sequencing. These methodologies have raised the knowledge of the cancer genomes contributing for the improvement of the personalized medicine.

CRISPR-Cas9 technology is a powerful methodology, which provides unparalleled potential for editing human and non-human genomes. Bacteria use CRISPR naturally as an anti-viral defense immunity mechanism. CRISPR DNA sequences are transcribed into RNAs that in turn can destroy very specific viral DNA sequences via the Cas9 nuclease. Due the specificity of this method, CRISPR-Cas9 may be used in several potential applications in cancer biology: correction of genetic mutations, rapid generation of mouse models and gene therapy.

These innovative technologies offer exciting cues in the understanding of cancer genomes and with great opportunities in the improvement of the cancer treatment.