



## Latest News on CRISPR/Cas9 Technology

Leila Norouzi<sup>1</sup>, Rasoul Salehi<sup>2</sup>, Mohammad Sarookhani<sup>1</sup>, Mohammadreza Sharifi M<sup>2</sup>, Sahar Moghbelinejad<sup>1</sup>

<sup>1</sup>Department of Molecular Medicine, School of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>2</sup>Department of Genetics and Molecular Biology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

**Introduction:** CRISPR/Cas9 is one of the most revolutionary tools in biotechnology, with tremendous implications for a broad range of biological and medical disciplines. This technology is a promising approach for the treatment of a wide range of diseases. Here, we will have a glance on the latest research in the field of medicine using the CRISPR/Cas9 system.

### Description:

**Duchenne muscular dystrophy:** The CRISPR/Cas9 *genome-editing* platform is a promising technology to correct the genetic basis of hereditary diseases. In a new study, using the multiplex capability of CRISPR/Cas9, up to 62% of DMD mutations were corrected and expression of the dystrophin gene in cells carrying the mutation was restored.

**Engineered T cells:** Researchers are engineering T cells using the CRISPR/Cas9 to attack cancer cells. T cells will harvest from cancer patients and perform several edits on them with the following objectives: insertion of a gene for a protein engineered to target cancer cells, also deletion of the genes coding some proteins that identify the T cells as immune cells and prevent the cancer cells from disabling them.

**Generation of Pig Organs Safe to Human:** Recently, researchers used CRISPR to remove 62 copies of porcine endogenous retroviruses (PERVs), which are embedded in the genome of the pig. PERVs can potentially cause disease in human transplant recipients. This modified pig organs can become better matches for human transplants.

**Controlling Zika Virus:** CRISPR/Cas9 is a novel avenue to combat mosquito-borne diseases like Zika. CRISPR/Cas9 gene drive strategy is growing to stop the transmission of the virus and eradicate the mosquitoes in many media outlets.

**Discussion and Conclusion:** CRISPR/Cas9 can manipulates precisely the genome to achieve a therapeutic effect including correction of diseases mutations, the addition of therapeutic genes to specific sites and the removal of deleterious genes from genome sequences.

**Key words:** CRISPR/Cas9, Duchenne, Zika