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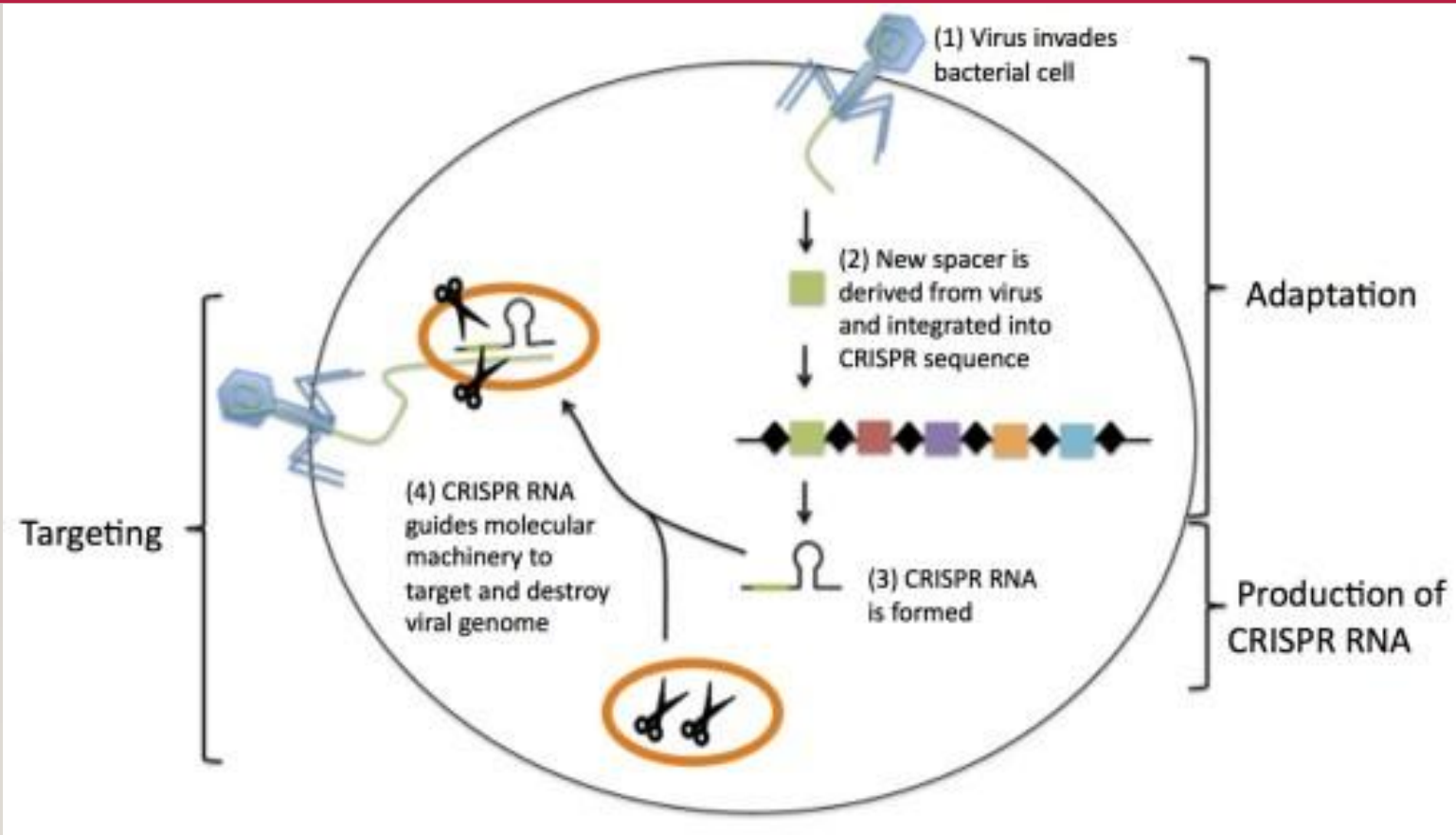
SHWETALI S. JAGTAP(213)

CRISPR

INTRODUCTION

- **CRISPR** (clustered regularly interspaced short palindromic repeats) is a family of DNA sequences found within the genomes of prokaryotic organisms such as bacteria and archaea.
- These sequences are derived from DNA fragments from viruses that have previously infected the prokaryote and are used to detect and destroy DNA from similar viruses during subsequent infections.
- Cas9 (or "CRISPR-associated protein 9") is an enzyme that uses CRISPR sequences as a guide to recognize and cleave specific strands of DNA that are complementary to the CRISPR sequence.
- Cas9 enzymes together with CRISPR sequences form the basis of a technology known as **CRISPR/Cas9** that can be used to edit genes within organisms.
- This editing process has a wide variety of applications including basic biological research, development of biotechnology products, and treatment of diseases.

HOW DOES IT WORK?



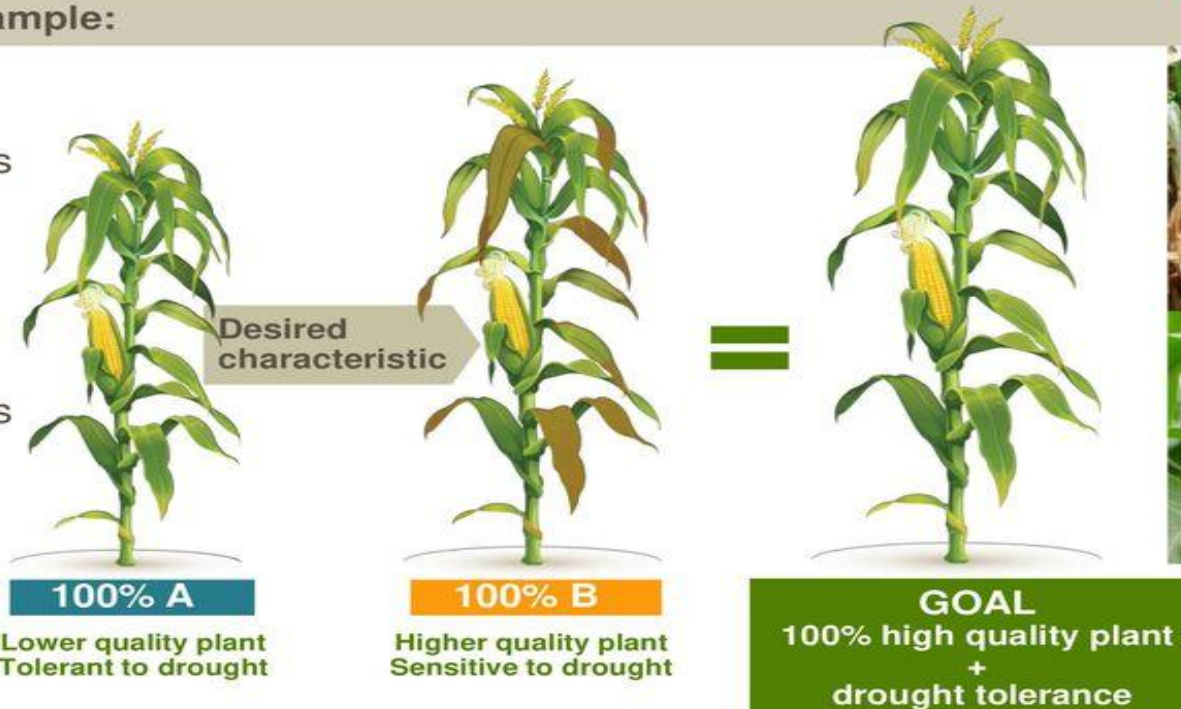
USE OF CRISPR

CRISPR-Cas Enables Efficient Introduction of Desired Characteristics

Drought tolerance example:

FROM: Incorporating desired characteristics in multiple cycles of common breeding practices

TO: Incorporating desired characteristics in as little as 1 to 2 cycles via CRISPR-Cas advanced breeding



LIMITATIONS OF CRISPR

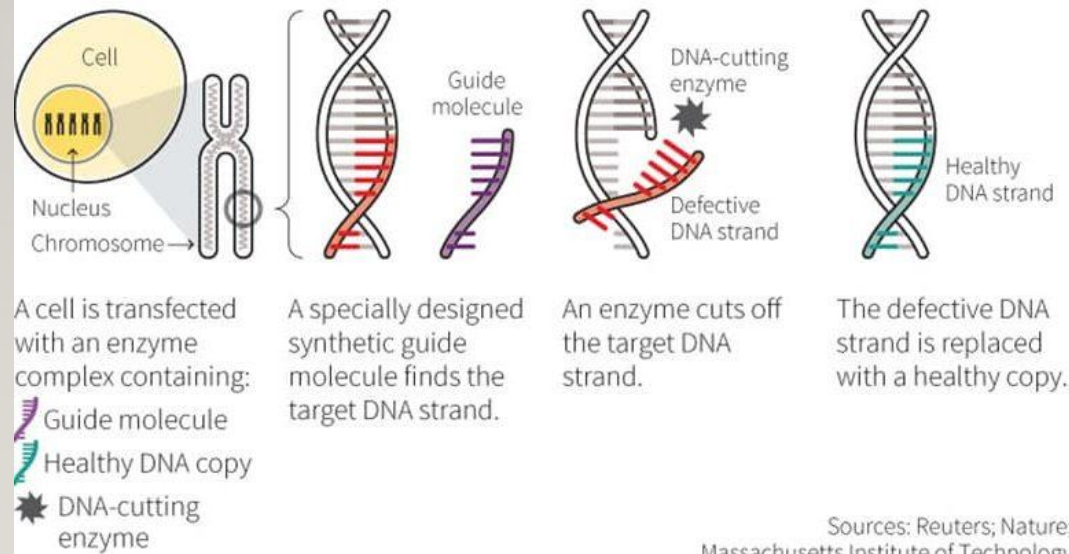
- Target editing of a gene.
- Applicable to crop plants.
- Easy to carry out.
- Target multiple homologous genes.

CAUSE OF CRISPR

DNA editing

A DNA editing technique, called CRISPR/Cas9, works like a biological version of a word-processing programme's "find and replace" function.

HOW THE TECHNIQUE WORKS



Sources: Reuters; Nature;
Massachusetts Institute of Technology

W. Foo, 24/04/2015

REUTERS



CLINICAL SIGNIFICANCE

- **Blindness:**

CRISPR is a great candidate to treat genetic blindness. For many hereditary forms of blindness, the specific mutations causing the disease are known making it easy to instruct CRISPR-Cas9 to target and modify that gene.

- **Cancer:**

One of the first applications of CRISPR could be in cancer. One of the first and most advanced CRISPR clinical trials, which is currently running in China, is testing the potential of the gene editing tool in patients with advanced cancer of the esophagus.

- Crispr technique is used in process to cure AIDS, Muscular Dystrophy



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THANK YOU