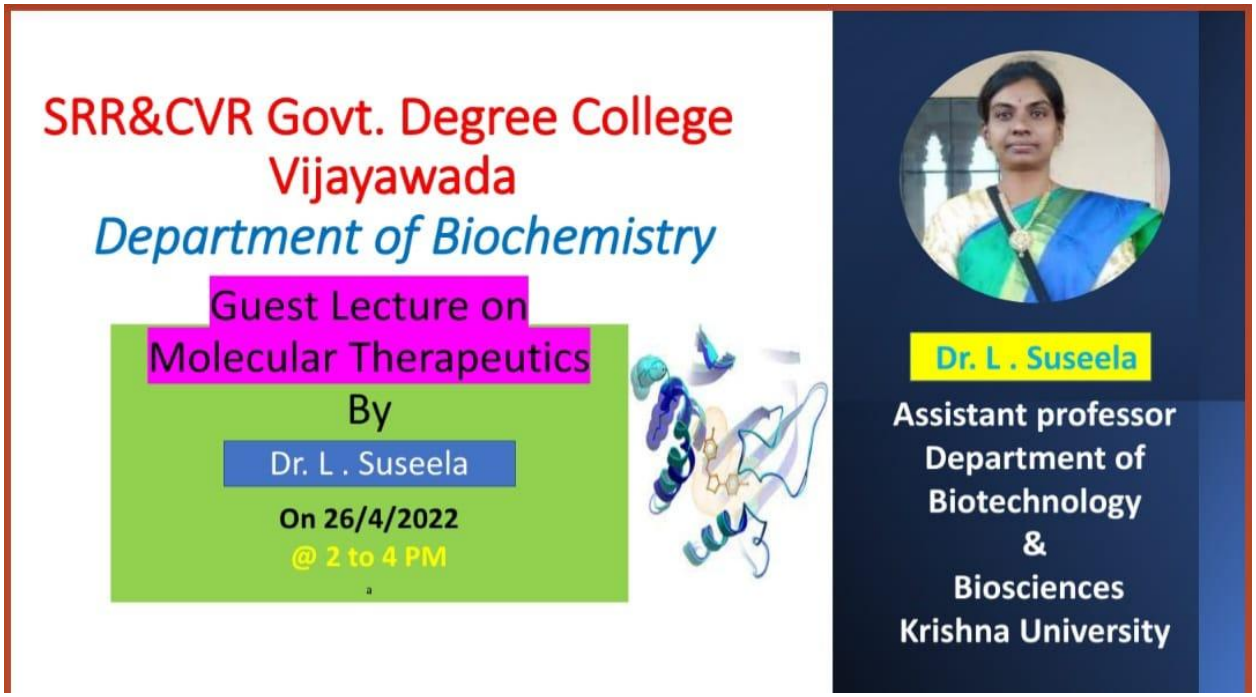
SRR & CVR Govt. Degree College (A), Vijayawada

Department of Biochemistry

GUEST LECTURE ON MOLECULAR THERAPEUTICS **DATE: 26/2/2022**



Department of Biochemistry conducted guest lecture by Dr Sushila from Krishna University on the topic “Molecular Therapeutics” the guest lecture started at 11 a.m. the students of bpth MBC,MBF first second and final year join the guest lecture

She started the lecture by explaining the basic units of genetic material and revised the structure of DNA RNA and chromosome organization in pro and eukaryotes. Gave an introduction to the principles of gene therapy and explained how the therapeutic or transgene enters into the nucleus for the repair of DNA in the target cell.

She explained about stem cell therapy. Stem cells can be used for making different types of organs, such as kidney, liver, heart, lungs and brain. Stem cell can become any one of the 220 different cells in the body. The lecture was about the adenovirus which can be used in gene therapy as a vector to carry genes

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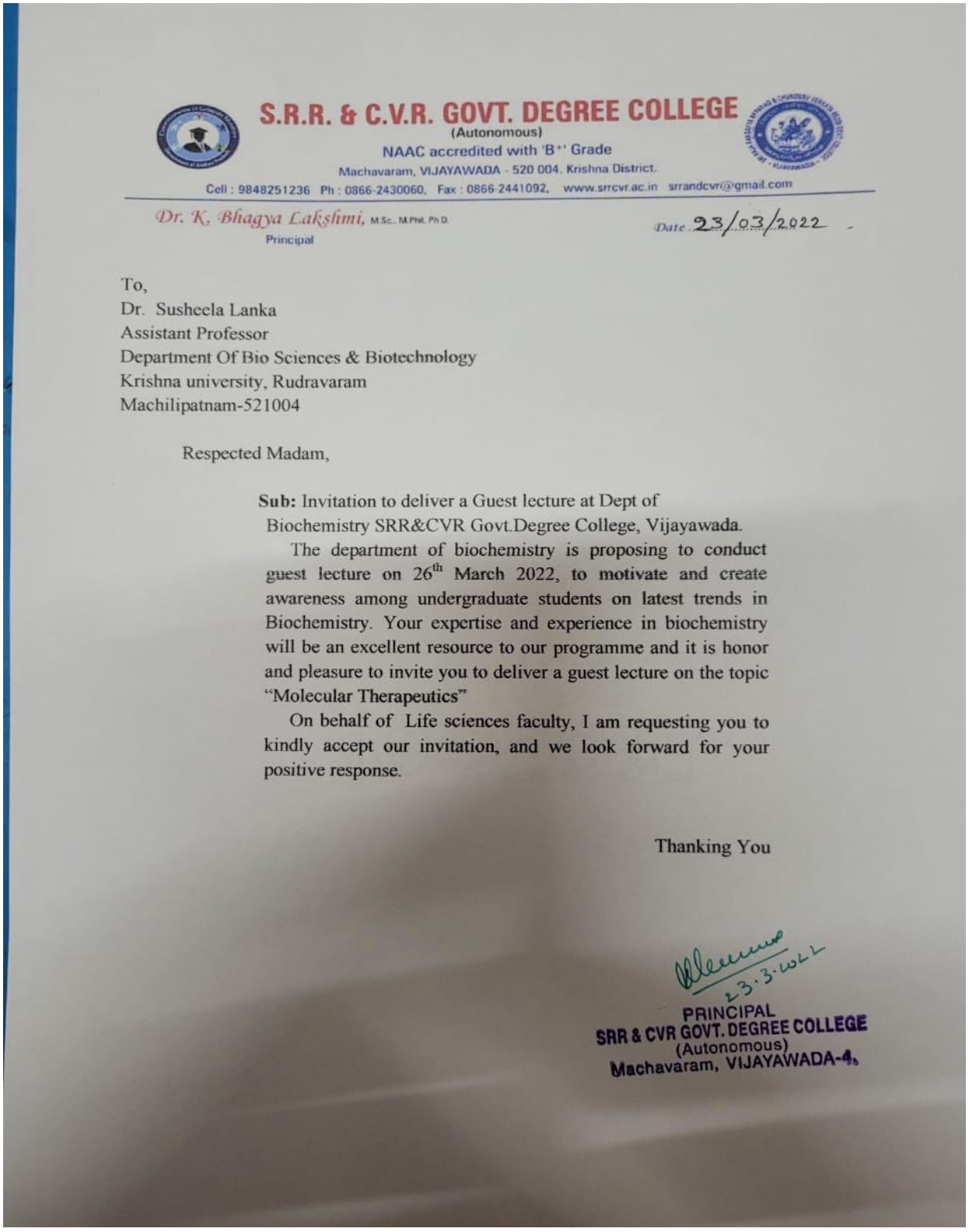

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Dr. K, Bhagya Lakshmi, M.Sc., M.Phil, Ph.D.
Principal

Date 23/03/2022

To,
Dr. Susheela Lanka
Assistant Professor
Department Of Bio Sciences & Biotechnology
Krishna university, Rudravaram
Machilipatnam-521004

Respected Madam,

Sub: Invitation to deliver a Guest lecture at Dept of Biochemistry SRR&CVR Govt.Degree College, Vijayawada.

The department of biochemistry is proposing to conduct guest lecture on 26th March 2022, to motivate and create awareness among undergraduate students on latest trends in Biochemistry. Your expertise and experience in biochemistry will be an excellent resource to our programme and it is honor and pleasure to invite you to deliver a guest lecture on the topic "Molecular Therapeutics"

On behalf of Life sciences faculty, I am requesting you to kindly accept our invitation, and we look forward for your positive response.

Thanking You

23.3.2022

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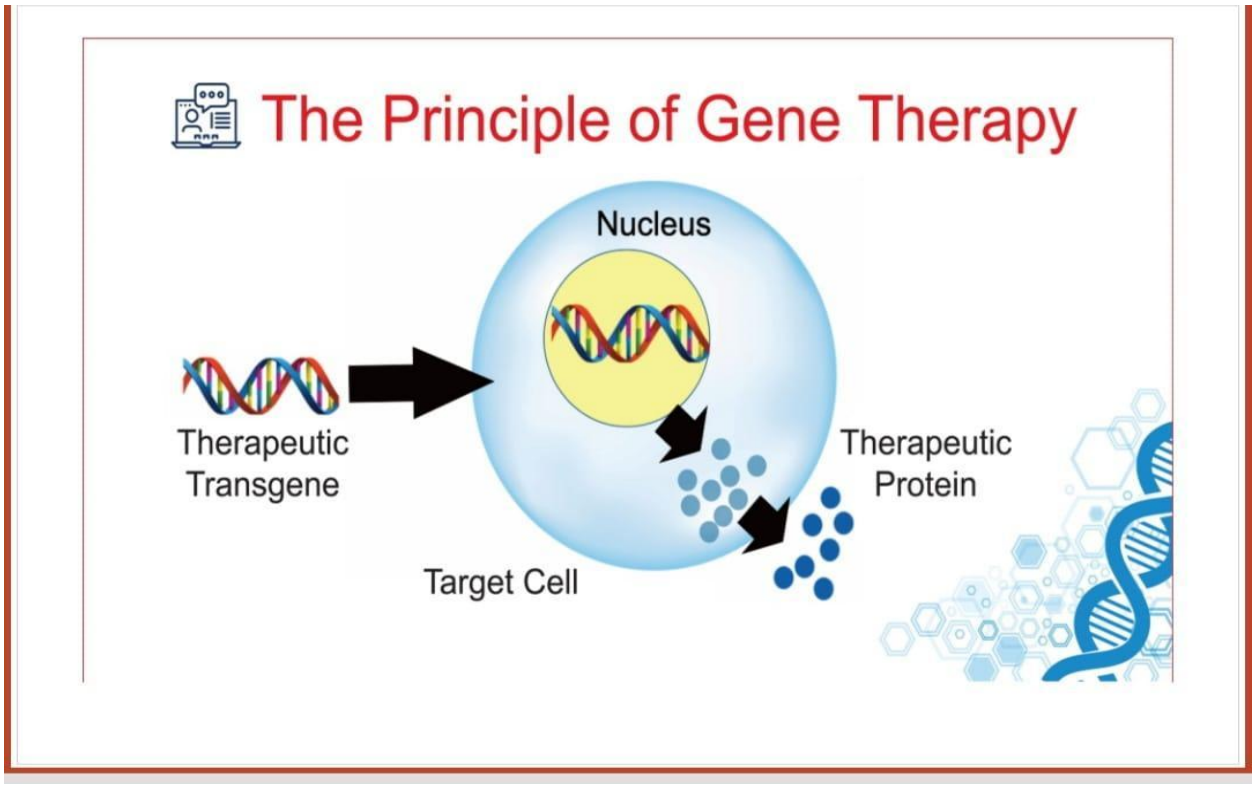
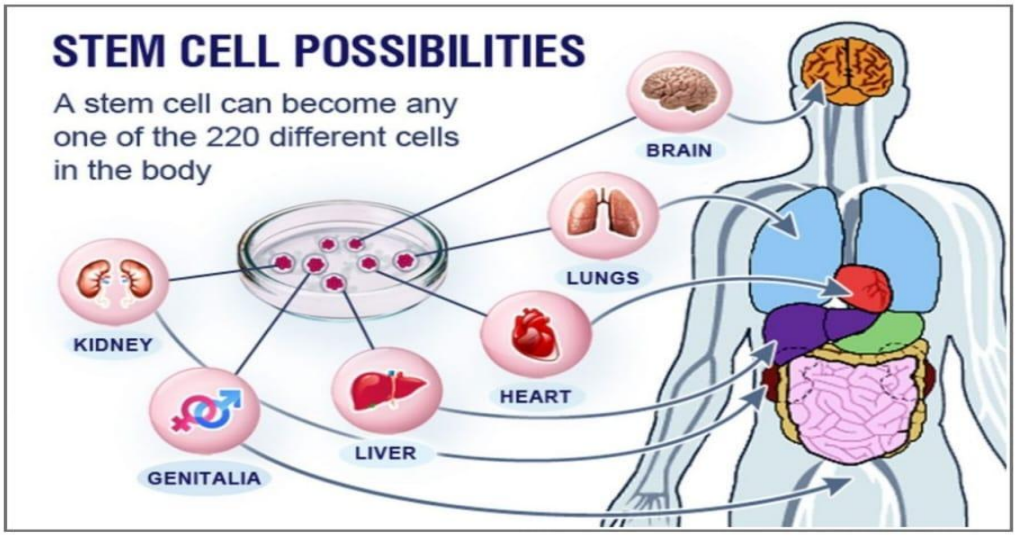
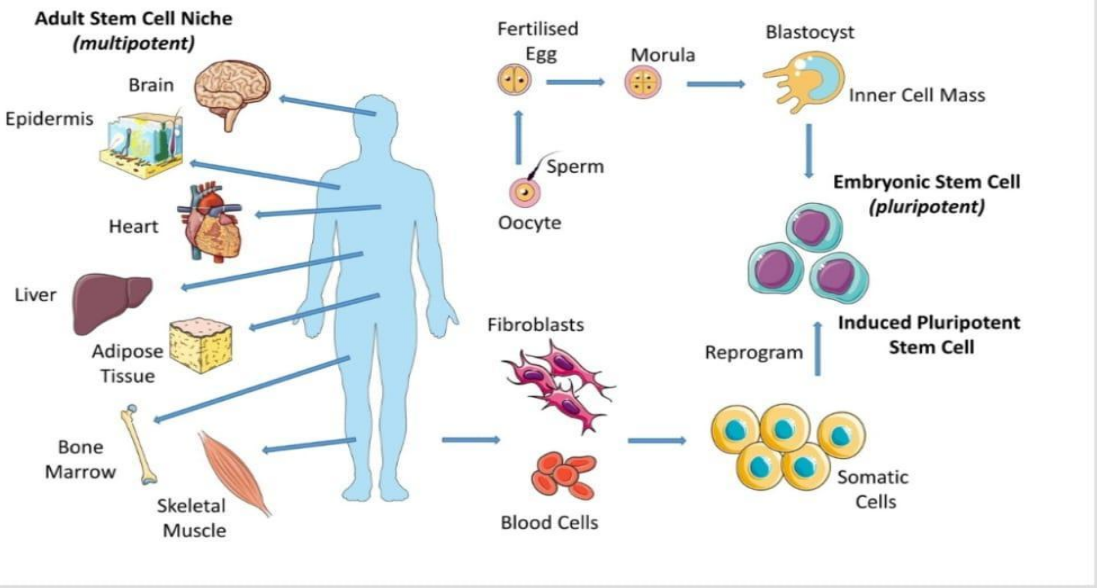
Machavaram, VIJAYAWADA-4.

She elaborated the reasons why adenoviruses were first considered as vectors for gene therapy and vaccines. Ad vectors can deliver genetic cargo to cells very efficiently, so that therapeutic levels can be achieved with fewer viral particles. Persistence of the vector is important to allow the genetic payload to be delivered, transcribed, and expressed as therapeutic proteins.

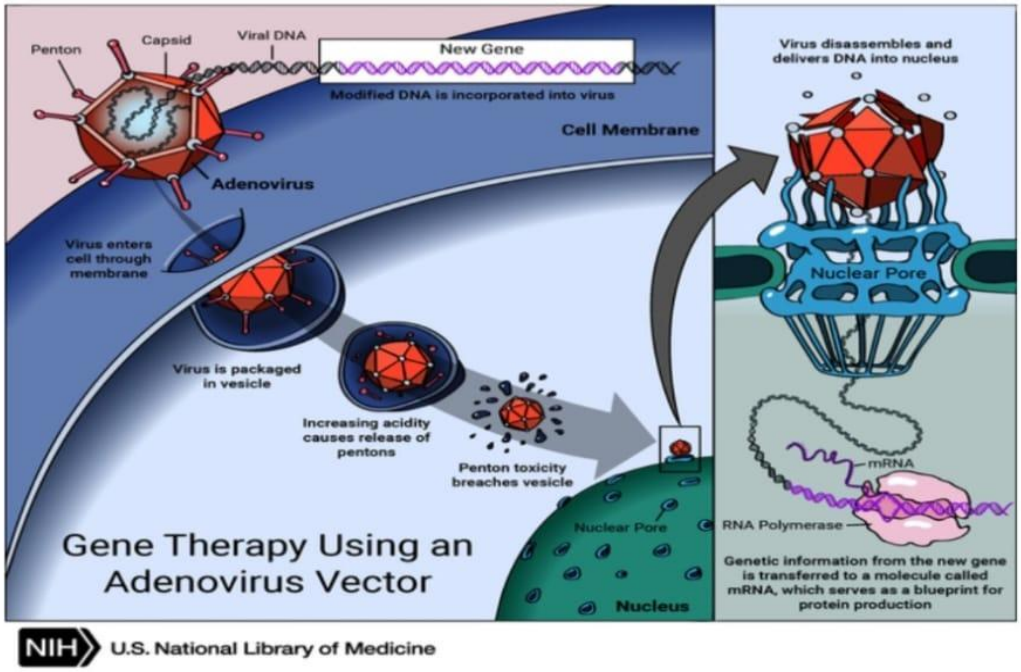
She emphasized about the ability of adenovirus to persist, these therapies would not be present long enough to be effective. However, a common mode of persistence for viruses is chromosomal integration. This is often undesirable or unnecessary in gene therapy and carries many safety concerns specifically for DNA vectors. Because Ad vectors do not integrate into the chromosome of the host cells, there is no risk that they will permanently alter the host genetic make-up. Students arised few doubts on the present applications of this therapy.




STEM CELL POSSIBILITIES
A stem cell can become any one of the 220 different cells in the body
BRAIN
LUNGS
KIDNEY
HEART
LIVER
GENITALIA

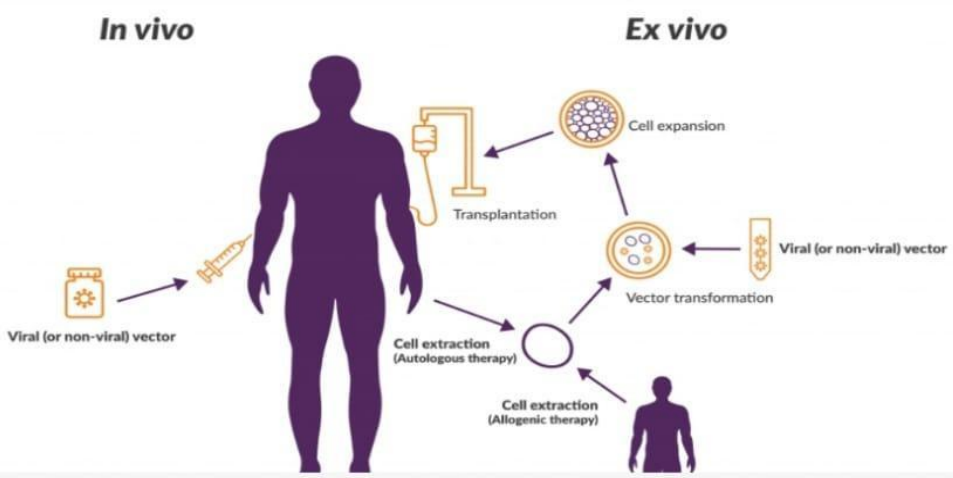

Adult Stem Cell Niche
(multipotent)
Brain
Epidermis
Heart
Liver
Adipose Tissue
Bone Marrow
Skeletal Muscle
Fertilised Egg
Morula
Blastocyst
Inner Cell Mass
Sperm
Oocyte
Embryonic Stem Cell
(pluripotent)
Induced Pluripotent Stem Cell
Reprogram
Fibroblasts
Blood Cells
Somatic Cells

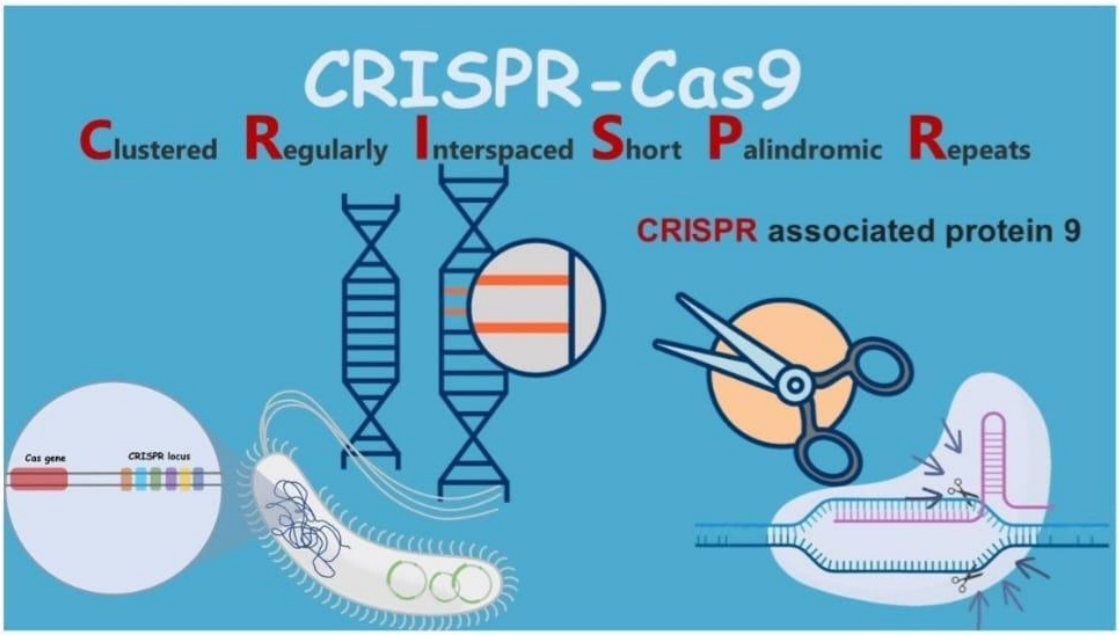
Carriers of Genes

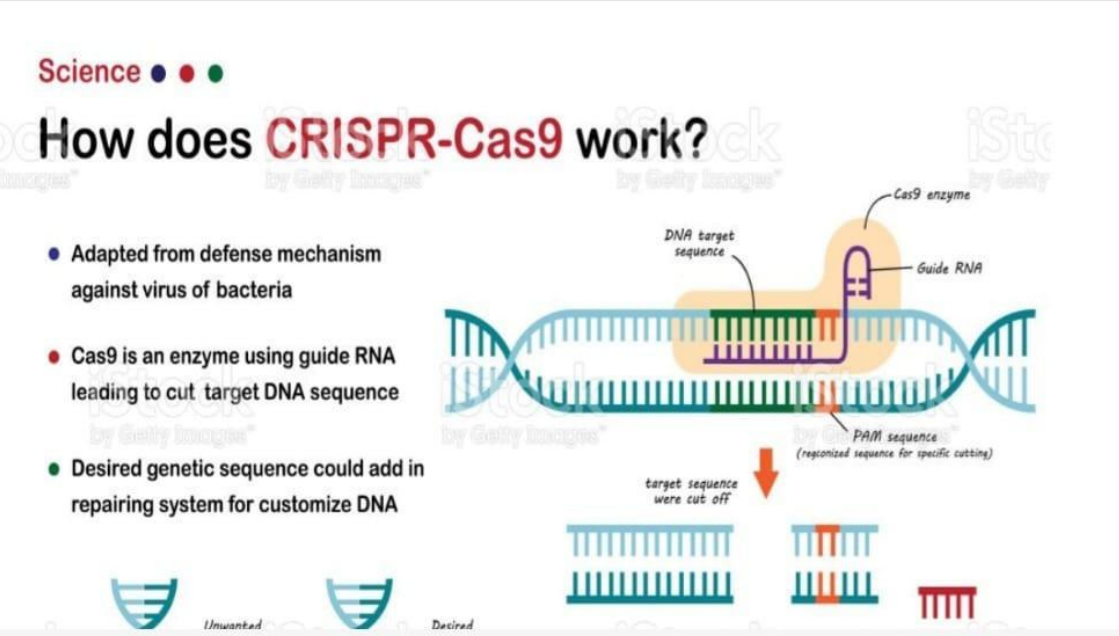


NIH U.S. National Library of Medicine

Types of Gene therapy




CRISPR-Cas9
Clustered Regularly Interspaced Short Palindromic Repeats
CRISPR associated protein 9
Cas gene
CRISPR locus


Science
How does CRISPR-Cas9 work?
Adapted from defense mechanism against virus of bacteria
Cas9 is an enzyme using guide RNA leading to cut target DNA sequence
Desired genetic sequence could add in repairing system for customize DNA
Cas9 enzyme
DNA target sequence
Guide RNA
PAM sequence
(regconized sequence for specific cutting)
target sequence were cut off
Unwanted
Desired

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She introduced the CRISPR-Cas9 technology to students that enables geneticists and medical researchers to edit parts of the genome? by removing, adding or altering sections of the DNA? sequence. It is currently the simplest, most versatile and precise method of genetic manipulation

She asked students about CRISPR-Cas9?

One of the students replied that CRISPR-Cas9 is a genome editing tool

Yes, that is creating a buzz in the science world. It is faster, cheaper and more accurate than previous techniques of editing DNA and has a wide range of potential applications.

It is currently the simplest, most versatile and precise method of genetic manipulation and is therefore causing a buzz in the science world.

She explained that the CRISPR-Cas9 system consists of two key molecules that introduce a change (mutation?) into the DNA. These are:

an enzyme? called Cas9. This acts as a pair of 'molecular scissors' that can cut the two strands of DNA at a specific location in the genome so that bits of DNA can then be added or removed.

a piece of RNA, called guide RNA (gRNA). This consists of a small piece of pre-designed RNA sequence (about 20 bases long) located 'guides' Cas9 to the right part of the genome. This makes sure that the Cas9 enzyme cuts at the right point in the genome.

She concluded her lecture by revising and briefing all the points she discussed.

In the query section many doubts were asked by the students, they also interacted with madam regarding career guidence.

Acknowledgement: We thank our principal Dr. K Bhagya Lakshmi, for encouraging us to conduct the guest lecture and our thanks to Dr. Suseela, resource person, who came from Krishna University to deliver the lecture, and gave career guidance to students.

By

Dr. Syed Vaziha Tahaseen

I/C Dept. Biochemistry

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