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Q99

What is Cas9 protein that is often mentioned in news? (a) A molecular scissors used in targeted gene editing (b) A biosensor used in the accurate detection of pathogens in patients (c) A gene that makes plants pest-resistant (d) A herbicidal substance synthesized in genetically **Official key: A.**

UPSC Civil Services Prelims 2019 · General Studies · 2 marks · Science and Technology

Science, technology, space, defence, IT - Prelims GS Paper I.

Explanation**(a) Official key**

(a) Cas9 is a molecular scissors: an RNA-guided endonuclease from CRISPR systems that cuts DNA at a targeted site so that gene editing (NHEJ or HDR) can follow. That is the official key.

(b)

(b) A biosensor for pathogens is a different class of device (antigen tests, CRISPR diagnostics exist, but Cas9-as-such is not "a biosensor"). Not the key.

(c)

(c) Pest-resistance genes (Bt cry genes, for example) are not Cas9. Cas9 is the cutting enzyme, not a plant trait gene. Not the key.

(d)

(d) A herbicidal substance made in a genetically modified plant is not Cas9. Not the key.

Summary

Official key is (a). Cas9 is the CRISPR-associated nuclease that cuts targeted DNA. It is not a pathogen biosensor, not a pest-resistance gene, and not a herbicide. Honour (a).

Related possible facts

These can be asked in a future Prelims paper.

CRISPR-Cas9

Adaptive immune system of bacteria/archaea, adapted for editing

gRNA

Guide RNA that programs Cas9 to a sequence

Doudna / Charpentier

Nobel Prize in Chemistry 2020

Cas12 / Cas13

Other Cas enzymes; some used in diagnostics

Off-target cuts

Main safety concern in therapeutic editing

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