

Jumping genes

April 13, 2020

Why in news?

Scientists have recently discovered a technique using “jumping genes” for genetic editing. It could offer a seamless, safer alternative to CRISPR-Cas9 process.

The technique:

- The technique could allow edited genes to be more precisely inserted into genomes, possibly addressing concerns with current CRISPR systems that can lead to off-target editing and random deletions or even cancer.
- Gene editing is the modification of the DNA code in some sections. It can rectify, remove or insert new parts in this code for disease prevention.
- CRISPR tools are now used to cut out and delete a part of the genetic code with **enzymes such as Cas9 and Cas13**, using their cell-back function to glue together the cutting strands.
- The process is not always effective as repairs are sometimes incomplete or incorrect and the damage caused by cutting can be adverse.
- Whereas the hopping/jumping genes also known as **transposons** jump spontaneously, by using proteins, or transposases (enzymes), from one site to another.
- Despite cuts, it can easily slip into the genome.
- The jumping gene has all of the chemical properties required for direct insertion or integration without a double-strand break in DNA.
- A guide could effectively program the jumping gene and could insert it into user-defined sites in the genome with incredible precision.