

Istanbul in history, especially the last few

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AhmedStudent ID - 212272681 CRISPR What is CRISPR? Simply put, CRISPR is not a new but also the most promising and advanced genome editing tool.

Recent Studies on genetically-engineered human-embryos have made this method of editing even more popular in recent times. But when you look back in history, especially the last few decades, you will come across studies where scientists have been editing genomes. So why is CRISPR suddenly making headlines? What makes it stand out from all other editing tools? With CRISPR, scientists are allowed to edit genomes with pinpoint accuracy (Unprecedented precision), efficiency and flexibility. With this method scientists can literally create new life from other beings with targeted mutations. With recent developments in Bioengineering and Biomedical equipments, the potential is high and risks are low. If used correctly and ethically, CRISPR has the potential to cure diseases both genetic and man-made. In other words, CRISPR among other genome editing tools, is a far better technique. Who created CRISPR? Or Should we say who invented it? How was it invented? Surprisingly, CRISPR was neither created nor invented by a human being.

In-fact, CRISPR has been in nature from since the beginning of life form on earth. The bacteria is one of the oldest living organisms on earth thanks to their ability to survive the extremely harsh atmosphere that existed about 3 billion years ago. As time passed, viruses came to be, and just like human beings, The bacteria evolved into extremely complex organisms while viruses evolved into simpler ones. One of the main reasons for CRISPR to exist is for the bacteria to protect themselves from viruses.

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But how exactly does CRISPR work? How do bacteria's use CRISPR to protect themselves from viruses? " The CRISPR method is based on a natural system used by bacteria to protect themselves from viruses. When the bacterium detects the presence of virus DNA(Deoxyribonucleic acid), it produces two types of short RNA(Ribonucleic acid) one of which contains a sequence that matches that of the invading virus. These two RNA's form a complex with a protein with called Cas9. Cas9 is a nuclease, a type of enzyme that can cut DNA. When a matching sequence known as a guide RNA finds its target within the viral genome, the Cas9 cuts the target DNA disabling the virus." Simply put, when a virus attacks a bacteria, the bacteria uses its CRISPR array to produce segments of RNA, one of which is called a guide RNA to target the virus DNA. Once the new RNAs have attached themselves to the virus, the bacteria uses a protein called Cas9 or a similar enzyme to cut the viruses DNA, rendering it useless.

In humans tests, Recent research has led to scientists realizing that this CRISPR-Cas9 system can be engineered to cut not just viral DNA but any DNA sequence at a precisely chosen location by changing the guide RNA to match the target. This can not only be done in test tubes but also in a living cells nucleus.