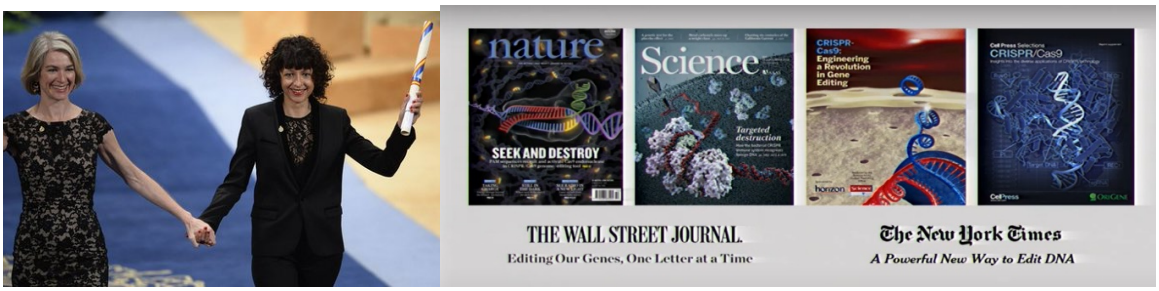
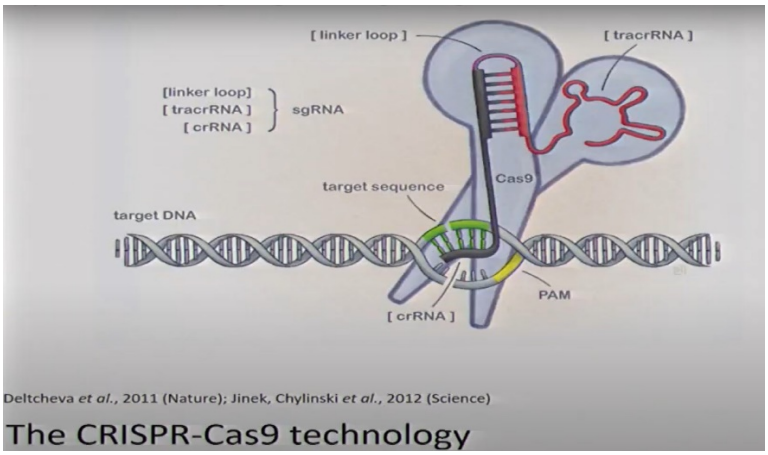
The CRISPR/Cas9 system occurs naturally in bacteria and gets its DNA-cutting abilities from its role as part of the bacterial immune system. Snippets of DNA from invading viruses are cut and stored in the bacterial genome as part of the CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) array. The Cas9 protein (short for CRISPR associated protein 9) uses those snippets to recognize future invaders and cuts their genetic material, killing them. The CRISPR/Cas9 array allows the bacteria to recognize future attacks and, because it becomes part of the bacterial genome, to pass that immunity on to its offspring.



Scientists were aware of CRISPR sequences in the bacterial genome in the 1980s, but it wasn't until the mid-2000s that they worked out their function. In the late 2000s, Doudna's lab at the University of California at Berkeley began to examine the molecular mechanisms at work, as well as potential applications in eukaryotic cells, and began to collaborate with the lab of French scientist Emmanuelle Charpentier.

They worked out how to simplify the natural CRISPR/Cas9 array and to use changeable "guide RNA" to direct it to cut particular places in the genome. Judging by its widespread adoption, the resulting system is relatively easy for geneticists to use.



Dr. Jennifer Doudna and Dr. Emmanuelle Charpentier won the Nobel Prize but their work was based on the previous work by Spanish biologist Francisco Mojica. But it was Jennifer and her partner Emmanuelle who further enhanced the research and displayed it to the world. Additionally, Doudna and Charpentier also discovered that different RNAs that could be used to program it for editing and cutting DNAs of several kinds.