Genome editing is now cheap and easy, question of who owns technology is not

By ACSH Staff — July 24, 2015

Biology is undergoing a revolution because of a technique called CRISPR-Cas9 (stands for clustered repeating interspaced short palindromic repeats - Cas9 is a protein). CRISPR-Cas9 is a genome editing technique [1] that will have wide-reaching effects from agriculture to genetic diseases to pest management. It is easy to use and fairly inexpensive.

Interestingly, its discovery was not by researchers looking to edit genomes; it was discovered by basic science researchers that were investigating the origins of life. They were studying archaea (single celled organisms that are similar but distinct from bacteria) and they noted that almost all of the species had these short regularly interspaced palindromic repeats in their genomes. Later work by scientists working with the dairy industry revealed that these sequences existed in bacteria as well, and that they were similar to those in the genomes of bacteriophages (a type of virus that exclusively infects bacteria and archaea). This revelation led to the discovery that the CRISPR sequences were a type of memory-based immune system for archaea and bacteria.

If one of these organisms survived an infection from a specific bacteriophage (phage for short), they inserted into their genome a sequence from the phage's genome. The sequence is expressed as a strand of RNA called the guide RNA. If a genetically similar phage infected the bacteria, the CRISPR sequence would bind complementary to the viral genome. These guide RNA sequences associate closely with a protein called Cas9, which when the guide RNA binds to a viral genome activates Cas9 to chop up the viral genome, rendering it ineffective.

Researchers are working on ways to perfect the technique so we can use it for a variety of mechanisms including [2]: knocking out a gene, adding a gene into an organism's genome, repairing a mutation in a gene, and even altering the epigenome, but there are also a whole host of potential legal and ethical questions associated with CRISPR-Cas9. Regardless of CRISPR-Cas9's eventual role in research and society, the question of ownership is hotly debated. Researchers at both MIT and the University of California want to own the patent on the technology, and both institutions make interesting cases for who should own CRISPR. Whoever is
awarded the patent stands to make billions from it. You can read about the claim each stakes in CRISPR over at wired.com. [3]

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