

Quest Through the Archives

Directions: After reading the article "[The difference makers](http://www.sciencenews.org)," use the archives at www.sciencenews.org to answer the related questions.

1. Though evolutionary biologist Josefa González notes that "transposable elements have been with us since the beginning of evolution," research on transposons is relatively new to the world of science. Search for the earliest published article that mentions transposons. What does it say?
2. Barbara McClintock was the first researcher to identify "jumping genes." Search for an article about her Nobel Prize and summarize it. What year did she receive the Nobel Prize? What year was the article published?
3. Transposons can change genetic sequences in ways that disrupts normal coding or can forge new genetic variety. CRISPR is based on a system for bacterial immunity that can prevent this form of gene editing. Search for an article about CRISPR. Explain it.

Responses to Quest Through the Archives

1. Though evolutionary biologist Josefa González notes that “transposable elements have been with us since the beginning of evolution,” research on transposons is relatively new to the world of science. Search for the earliest published article that mentions transposons. What does it say? Possible student response: The article “[In and out chromosomes](#),” published 6/17/1978, discusses research on insertable elements that change the genetic code of organisms. It states that transposons are large movable elements that can be drug resistant and contain insertion codes at either end of their sequence. They seem to insert at preferred sites in a sequence.

2. Barbara McClintock was the first researcher to identify “jumping genes.” Search for an article about her Nobel Prize and summarize it. What year did she receive the Nobel Prize? What year was the article published? Possible student response: The article “[Nobel prize to McClintock and her Mobile Elements](#),” published 10/15/1983, discusses Barbara McClintock’s research with corn. Prior to her work, it was thought that DNA was arranged in a fixed linear sequence. McClintock learned that some segments of DNA that control other genes could jump from one area to another. Her work led the way for subsequent investigations of mobile elements. The article was published in the same year Barbara McClintock won the Nobel Prize.

3. Transposons can change genetic sequences in ways that disrupts normal coding or can forge new genetic variety. CRISPR is based on a system for bacterial immunity that can prevent this form of gene editing. Search for an article about CRISPR. Explain it. Possible student response: The article “[CRISPR had a life before it became a gene-editing tool](#),” published 4/15/2017, describes how CRISPR helps bacteria defend against invaders by retaining a memory of these invaders. More specifically, when an invader injects its genetic material into a bacterium’s DNA, the cell adds a DNA sequence called a spacer into its CRISPR cluster. RNA copies of the spacer are transcribed into guide RNA, and with the help of Cas proteins, can recognize and disable phage DNA. Researchers are trying to study this mechanism so they can better understand immunity.