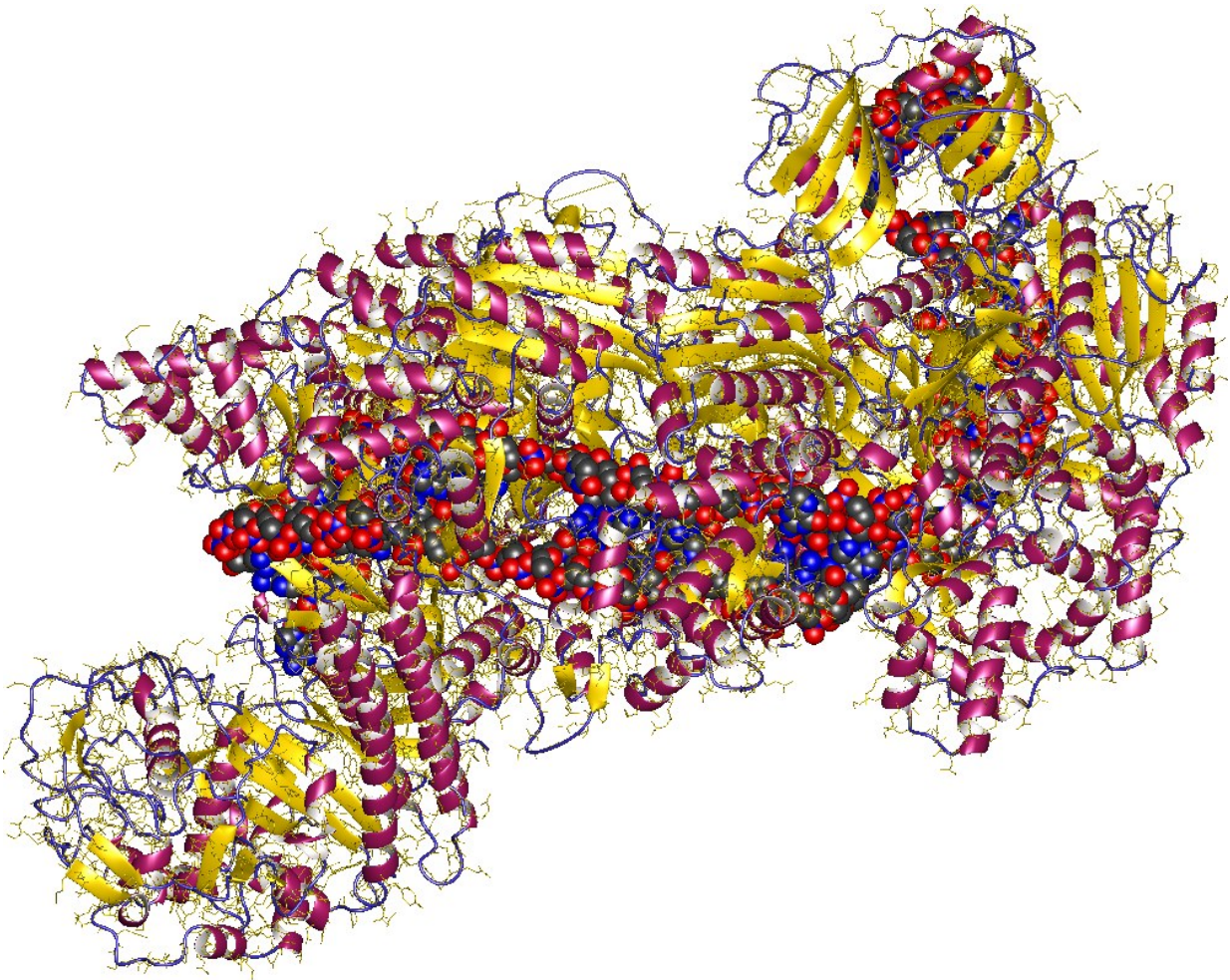


Three new studies show unwanted changes in human embryo genome after CRISPR-Cas9 editing

June 29 2020, by Bob Yirka



CRISPR (= Clustered Regularly Interspaced Short Palindromic Repeats) + DNA fragment, E.Coli. Credit: Mulepati, S., Bailey, S.; Astrojan/Wikipedia/ CC BY 3.0

Three teams working independently to test the possibility of using CRISPR–Cas9 gene editing to remove genetic defects in human embryos report finding unwanted changes in the genomes. The first team, working at the Francis Crick Institute, edited mutations that can have a major impact on fetal development. The second, working at Columbia University tried to use the gene editor to fix a mutation known to cause blindness. And the third was a team working at Oregon Health & Science University—they were attempting to fix a mutation known to cause a certain heart problem. All three groups have written papers describing their efforts and findings, and have posted them on the bioRxiv preprint server while they await peer-review.

The CRISPR–Cas9 gene editing technique has been in the news for several years now as researchers have been using it on test animals to test the possibility of safely using the technique on humans. Medical scientists have been hoping the technique might be used to fix mutations in embryos that lead to health problems later in life. Some have even suggested the technique might someday be used to enhance human abilities.

Unfortunately, testing the technique in lab animals has been met with both good and bad news: in many cases, [mutations](#) have been fixed and embryos have grown to adulthood without a mutation that would otherwise have caused a medical disorder. The [bad news](#) is that the technique has proven to be far less precise than hoped: other parts of the genome get snipped, resulting in "off-target" gene-editing; sometimes, the snipped portion of the genome heals in unexpected ways. Such problems are considered to be too severe to allow use on humans. But scientists hope that the technique might work better in humans than in other animals. Notably, researchers or the intuitions where they operate must receive permission from the government before carrying out such

research. They must also destroy all of the embryos after they have been studied: none are allowed to grow beyond the embryonic stage.

The first team found a large number of unwanted changes near the targeted site in a large number of cases. The second team found large segments of chromosomes unexpectedly disappeared and the third group found multiple unwanted changes near the target site.

More information: Gregorio Alanis-Lobato et al. Frequent loss-of-heterozygosity in CRISPR-Cas9-edited early human embryos, (2020). [DOI: 10.1101/2020.06.05.135913](https://doi.org/10.1101/2020.06.05.135913)

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