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Scott Kelly Spent a Year in Space and Now His DNA Is Different From His Identical Twin's

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By [FLORA CARR](#)

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Astronaut Scott Kelly, who spent [a full year in space as part of a groundbreaking NASA mission](#), is no longer an exact genetic match with his identical twin brother Mark Kelly, according to [a new study](#).

Scientists found that Scott Kelly, who set the record for most consecutive days spent in orbit, underwent an “unexpected” genetic change. Post-flight, NASA investigators found “hundreds of unique mutations.” Some involved the circulation of so-called cell-free DNA in the blood. Others involved changes in the epigenome — a sort of genetic control system that determines how genes are expressed. Still others involved a lengthening of telomeres, the caps on the ends of chromosomes that help regulate the aging process.

About 93% of the changes were temporary, with Kelly’s genetic profile returning to normal comparatively quickly after his return to Earth; in the case of the telomeres, the lengthening vanished within 48 hours. But about

7% of the changes have remained in the two years since he returned to Earth. Those involved genes relate to Kelly's "immune system, DNA repair, bone formation networks, hypoxia, and hypercapnia", the study says.

The results form part of NASA's "[Twins Study](#)," as Kelly's genes were compared to his identical twin brother Mark, who remained on Earth as a control factor in the experiment.

Scott Kelly recently took to Twitter to marvel at the report himself. He joked that it's "good news" because he no longer has to call Mark his identical twin.



[Scott Kelly](#)

✓ [@StationCDRKelly](#)

What? My DNA changed by 7%! Who knew? I just learned about it in this article. This could be good news! I no longer have to call [@ShuttleCDRKelly](#) my identical twin brother anymore. <http://www.newsweek.com/scott-kelly-astronauts-nasa-dna-838535> ...
[9:47 AM - Mar 11, 2018](#)



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[Seven percent of Scott Kelly's genes did not return to normal when he got home.](#)
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NASA, though, made clear nothing has changed in the Kellys' genetic relationship.

“Mark and Scott Kelly are still identical twins,” the agency said in a statement. “Scott’s DNA did not fundamentally change. What researchers did observe are changes in gene expression, which is how your body reacts to your environment. This likely is within the range for humans under stress, such as mountain climbing or SCUBA diving. The change related to only 7 percent of the gene expression that changed during spaceflight that had not returned to preflight after six months on Earth. This change of gene expression is very minimal. We are at the beginning of our

understanding of how space flight affects the molecular level of the human body. NASA and the other researchers collaborating on these studies expect to announce more comprehensive results on the twins studies this summer.”

The new findings matter for reasons that go well beyond the Kelly brothers’ genes and overall health. A mission to Mars will take up to three years, depending on how long astronauts remain on the Red Planet. Only when we fully understand the punishment the body takes during long-duration space flight will that be a mission we can safely attempt.