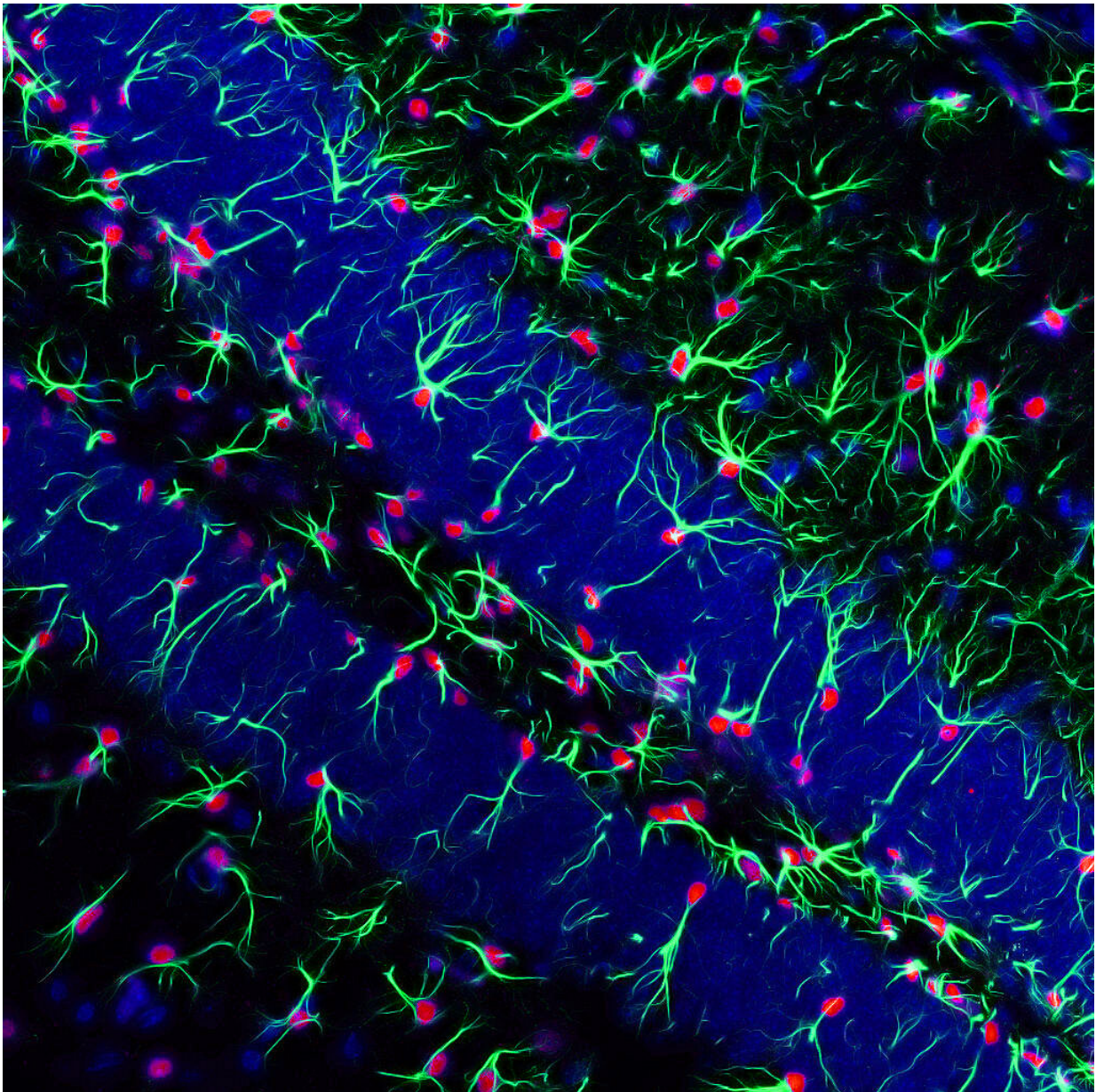


# Mice born to fathers put on exercise regimen show improvements in some brain functions

April 23 2019, by Bob Yirka

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Staining for neural stem cells expressing SOX2 (red) and GFAP (green) in the subgranular zone of the dentate granule cell layer of an adult male mouse hippocampus. Credit: Patricia Tezanos.

A large team of researchers with members affiliated with multiple institutions across Spain has found that putting mice on an exercise regimen before allowing them to procreate, gave their offspring a boost in brain functions. In their paper published in *Proceedings of the National Academy of Sciences*, the group outlines their study of mice and what they found.

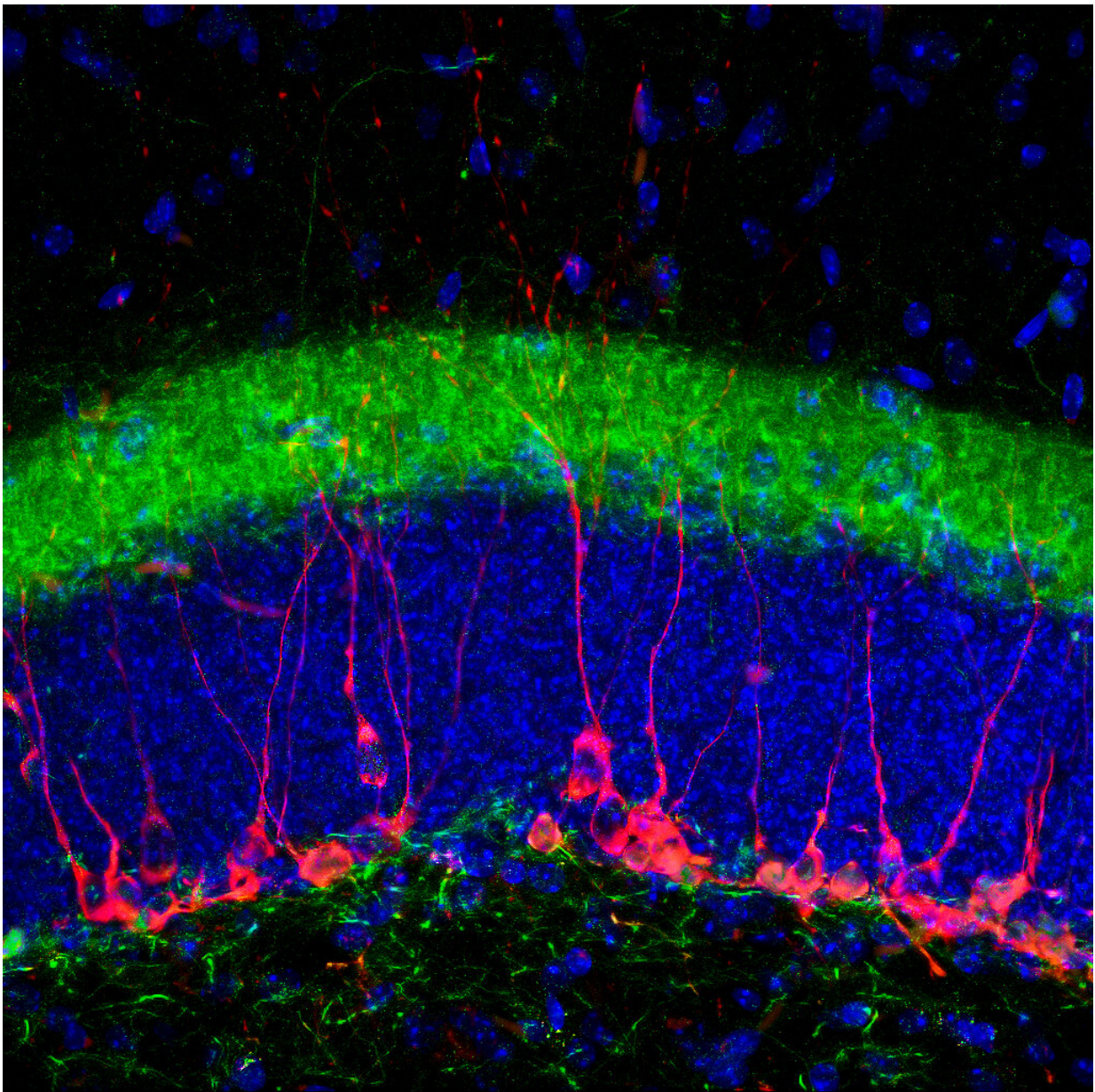
In recent years, several studies have provided evidence of male mice passing on negative characteristics to their offspring if they have them themselves. In this new effort, the researchers have found the same can be true of positive characteristics.

The researchers note that their work was part of an overall effort to understand the impact on offspring of lifestyle choices made by parents. As part of that effort, they undertook a study of the impact of exercise by male parents prior to them procreating.

The work by the researchers involved giving [memory tests](#) to a group of male mice—the tests measured both long and short-term memory capabilities. Next, some of the males were put on a six-week [exercise regimen](#) and some were not. Afterward, both groups were given access to female mice for mating purposes. And after that, they were all give the same memory tests again.

The researchers report that they found that the male mice that engaged in the exercise regimen scored better on the second memory tests than they did on their first iteration and also did better than those mice that

were not made to exercise. A closer look revealed [small changes](#) in the brains of the mice that had exercised as well—and an increase in some brain cell numbers in some parts of their brain—more evidence of neurogenesis in adults.



Staining for immature neuronal markers doublecortin (red) and calretinin (green) in the hippocampal dentate gyrus of an adult male mouse. Credit: Kerry R.

McGreevy.

The researchers report also that [mice](#) born to the fathers who had been on the exercise regimen did better on the memory tests than control groups. And they too showed increases in [nerve cells](#) in their brains—along with some difference in gene expression, compared to siblings. They suggest that changes in offspring brains were brought about by microRNA, giving them some of the benefits of exercise, even in sedentary offspring.

**More information:** Kerry R. McGreevy et al. Intergenerational transmission of the positive effects of physical exercise on brain and cognition, *Proceedings of the National Academy of Sciences* (2019). [DOI: 10.1073/pnas.1816781116](https://doi.org/10.1073/pnas.1816781116)

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