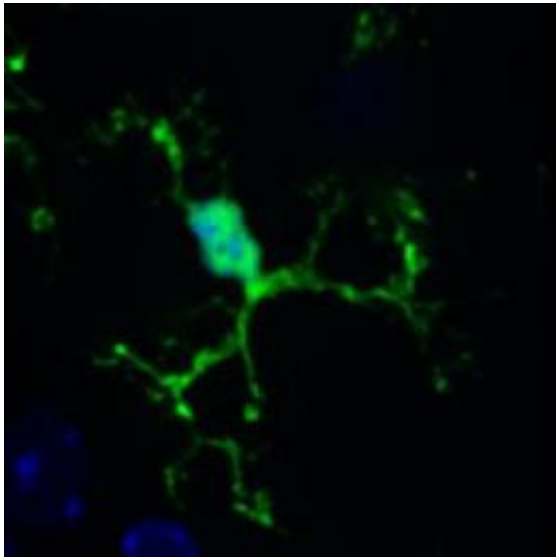


# Gardening in the brain: Specialist cells prune connections between neurons

21 July 2011



This is microglia (green) in a mouse brain. The nuclei of all cells in the brain are labeled blue. Credit: EMBL/R.Paolicelli

Gardeners know that some trees require regular pruning: some of their branches have to be cut so that others can grow stronger. The same is true of the developing brain: cells called microglia prune the connections between neurons, shaping how the brain is wired, scientists at the European Molecular Biology Laboratory (EMBL) in Monterotondo, Italy, discovered. Published online today in *Science*, the findings could one day help understand neurodevelopmental disorders like autism.

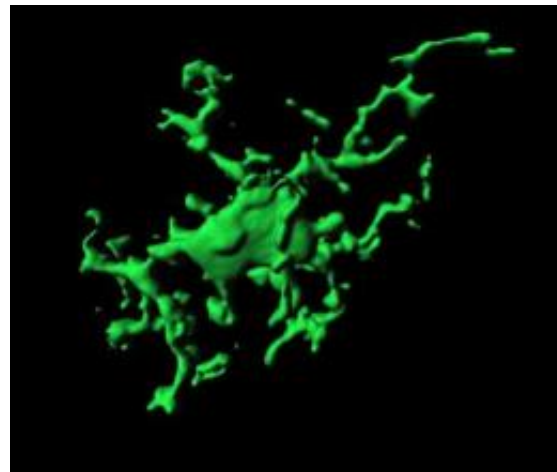
"We're very excited, because our data shows microglia are critical to get the connectivity right in the brain," says Cornelius Gross, who led the work: "they 'eat up' [synapses](#) to make space for the most effective contacts between neurons to grow strong."

Microglia are related to the [white blood cells](#) that engulf pathogens and cellular debris, and

scientists knew already that microglia perform that same clean-up task when the brain is injured, 'swallowing up' dead and dying neurons. Looking at the developing mouse brain under the microscope, Gross and colleagues found proteins from synapses - the connections between neurons - inside microglia, indicating that microglia are able to engulf synapses too.

To probe further, the scientists introduced a mutation that reduced the number of microglia in the developing mouse brain.

"What we saw was similar to what others have seen in at least some cases of [autism](#) in humans: many more connections between [neurons](#)," Gross says. "So we should be aware that changes in how microglia work might be a major factor in [neurodevelopmental disorders](#) that have altered brain wiring."



This is a 3-dimensional reconstruction of a single microglia cell. Credit: EMBL/ R.Paolicelli

The microglia-limiting mutation the EMBL scientists used has only temporary effects, so eventually the number of microglia increases and the mouse brain

establishes the right connections. However, this happens later in development than it normally would, and Gross and colleagues would now like to find out if that delay has long-term consequences. Does it affect the behaviour of the mice behaviour, for example? At the same time, Gross and colleagues plan to investigate what microglia do in the healthy adult brain, where their role is essentially unknown.

Provided by European Molecular Biology  
Laboratory

APA citation: Gardening in the brain: Specialist cells prune connections between neurons (2011, July 21) retrieved 19 September 2019 from <https://medicalxpress.com/news/2011-07-gardening-brain-specialist-cells-prune.html>

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