

After flying with virtual wings for one week, the brain learns to accept the impossible

May 10 2026, by Paul Arnold



Credit: Image generated by the editorial team using AI for illustrative purposes.

The human brain is an incredible organ, capable of constant adaptation and incredible flexibility. It can learn new skills and incorporate new experiences. And, according to a paper [published](#) in the journal *Cell*

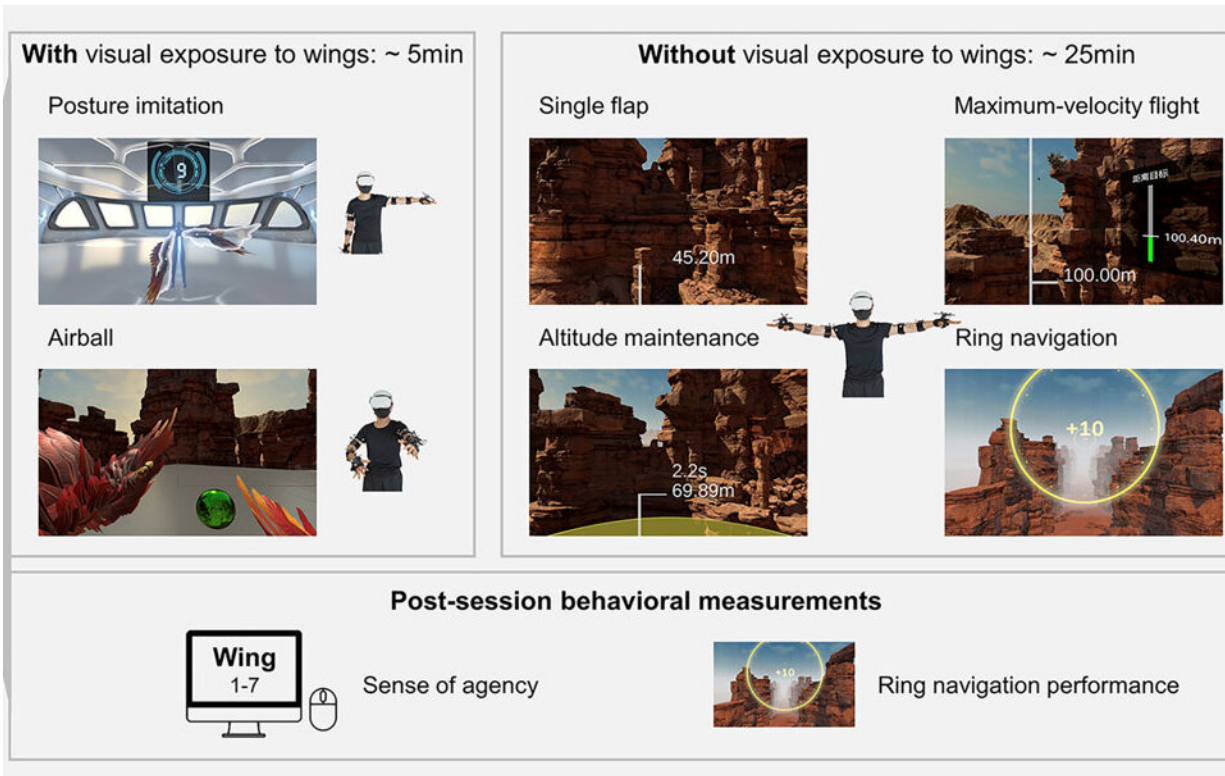
Reports, it may even be able to adjust how it represents body parts that we were not born with, such as wings.

Obviously, in the real world, humans cannot fly. But in the virtual world, technology can have us soaring through clouds, over buildings, and beyond the constraints of our own evolution. That got researchers in China thinking. They wanted to know if the brain could incorporate entirely artificial body parts, specifically VR wings, into its own body representation system.

The team designed a custom [virtual reality](#) environment and recruited 25 volunteers for a week-long experiment. Participants wore VR headsets and motion tracking sensors on their arms. When they moved their elbows and wrists in the real world, their virtual wings flapped in the VR setting.

A week in the virtual clouds

During the course of four sessions, these volunteers practiced using their virtual wings to fly. This involved learning the [physics of flight](#), such as flapping down to generate lift and tucking their wings to reduce drag. They had to perform various tasks, including imitating wing postures in front of a virtual mirror, deflecting air balls, and navigating through rings in the air.



Experimental design. Credit: *Cell Reports* (2026). DOI: 10.1016/j.celrep.2026.117320

To see whether this VR flying actually changed the brain, the scientists performed functional MRI scans of the occipitotemporal cortex (OTC) before and after the training week. This is a key part of the brain involved in visual processing, including the recognition of body parts and forms.

Following training, the OTC showed changed responses when volunteers looked at pictures of wings. Perhaps most surprisingly, the patterns of neural activity triggered by seeing these wings became more similar to the brain's response to upper limbs, as the researchers note in their paper: "The OTC incorporates illusionary effectors into body

representations that transcend lower-level sensorimotor congruence."

The study authors also discovered increased communication between the brain's visual body processing areas and regions involved in movement and touch. This suggests that the brain was strengthening the functional links between seeing the wings and the systems used for controlling and sensing the body.

"Our findings extend the understanding of embodiment as a hierarchical process in which abstract, functional coding in the OTC interacts with frontoparietal networks to reconcile atypical multimodal congruence with existing body representations."

Virtual Reality training of flying

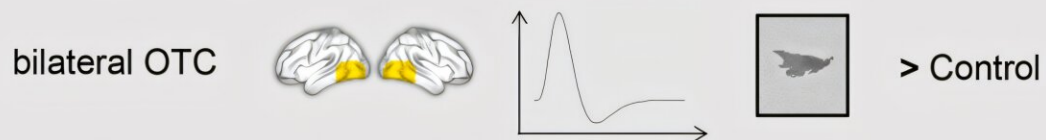


Detecting neural responses to wings

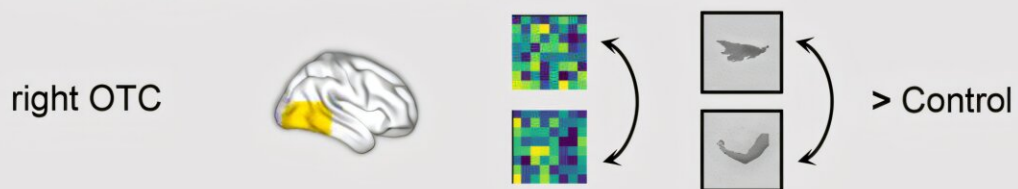


Wing-related neural changes

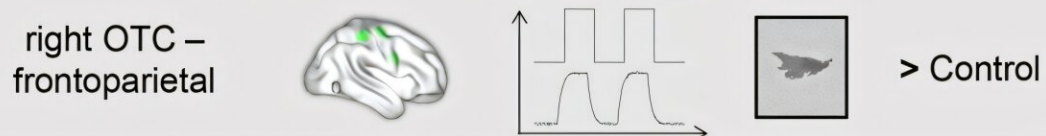
A Wing-selective univariate activation



B Wing-upper-limb multi-voxel similarity



C Wing-selective functional connectivity



Graphical abstract. Credit: *Cell Reports* (2026). DOI: 10.1016/j.celrep.2026.117320

Potential for advanced prosthetics

The scientists believe that the type of neural flexibility demonstrated in

their research could help people better use advanced prosthetics. They suggest it could lead to the development of [assistive technologies](#), such as robotic limbs, that the brain may more easily integrate as functional extensions of the human body.

More information: Ziyi Xiong et al, Virtual flying experience changes neural responses to seeing wings, *Cell Reports* (2026). [DOI: 10.1016/j.celrep.2026.117320](#)

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