

# How flies flip around on take-off from an upside-down position

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Credit: Anna Verbe

Flies are able to right themselves very quickly when taking off from an upside-down position. Scientists from the CNRS and from The Institute of Movement Science (ISM) at Aix-Marseille Université studying this phenomenon discovered the surprising way these insects begin by turning their bodies before their heads on take-off. The research will be published on 15 July 2020 in the *Journal of Experimental Biology*.

With its legs pointing up and its wings down towards the floor, a fly can

casually rest upside-down on a ceiling, but on take-off, it will right itself very quickly. Researchers from the CNRS and Aix-Marseille Université looked at how the insect flips itself around when taking off. With the aid of a high-speed camera, the scientists discovered that, contrary to cats which land on their feet by first turning their heads, flies begin by turning their bodies. The insect reorients itself within six [wing](#) beats at a speed of  $10,000^\circ/\text{s}$ , or approximately 30 revolutions per second. The whole movement takes approximately 0.05 s with the head turning 0.016 s later than the body.

According to the scientists, during take-off flies flip their bodies before their heads due to an inherent stabilization reflex. Small stabilizers near the wings function as a type of gyroscope. Humans have a similar reflex which kicks in when they continue to stare at something despite turning their bodies around. In the study, the team included modeling which suggested that, during reorientation, the insect stabilizes its visual system before resuming normal flight. The research aims to elucidate how [flies](#) orient themselves relative to a [vertical axis](#). The scientists will now further their research to investigate the effect of light on a fly's orientation.

**More information:** Anna Verbe et al, How do hoverflies use their righting reflex?, *The Journal of Experimental Biology* (2020). [DOI: 10.1242/jeb.215327](#)

Provided by CNRS

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