Newly identified protein enables cells to sense surroundings and anchor in the right places

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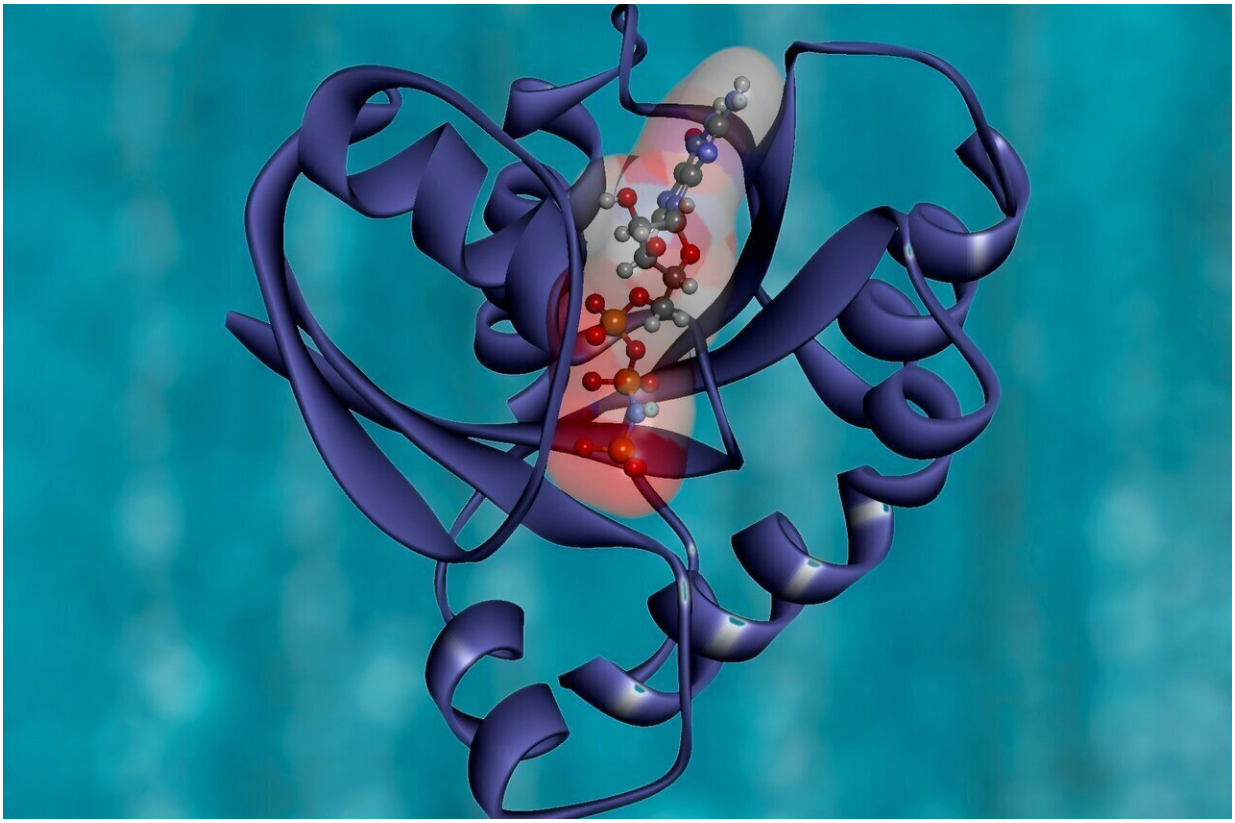

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A combined team of researchers from the University of Geneva and the University of Tampere has identified a protein that plays a major role in enabling cells to perceive their environment and also to anchor in the

right places. In their paper published in the journal *Communications Biology*, the group describes experiments they conducted that involved combining photoactivation, FA isolation and molecular biology to better understand how cells form focal adhesions.

Cells must carry out specific functions in coordination with other cells in order for the human body to work as it does. Prior research has shown that some of those functions involve moving from one place to another, a process that involves not only cell coordination but proper anchoring along the way to keep from being moved off course by other cell movement. The means by which cells know how to do what they do and how they communicate their intentions with other cells has remained largely a mystery. Some have suggested that cells communicate by creating and dispersing hormones, while others report evidence that mechanical signaling is involved. In this new effort, the researchers have identified a protein that plays a significant role in allowing a cell to both perceive its environment and to anchor to other material as a means of moving to where it needs to go.

The protein is called paxillin—it forms on the exterior of cells and provides sensory information about nearby material. It also serves as an anchor to other materials with help from what the researchers describe as "crampons." Crampons are metal plates with spikes affixed to the boots of rock climbers—the spikes allow a climber to anchor his or her foot to rock or ice while climbing.

To better understand the role paxillin plays in cell functions, the researchers carried out a wide variety of experiments that involved combining photoactivation, FA isolation and molecular biology to gain a better understanding of the LIM domains (zinc-binding protein sequences) involved with the protein and also to see how it interacts with the environment in which the cell exists. In so doing, they were able to see that it helped cells to perceive the environment surrounding them and

to make the right anchoring moves when attempting to travel.

More information: Marta Ripamonti et al. Structural and functional analysis of LIM domain-dependent recruitment of paxillin to αvβ3 integrin-positive focal adhesions, *Communications Biology* (2021). DOI: 10.1038/s42003-021-01886-9