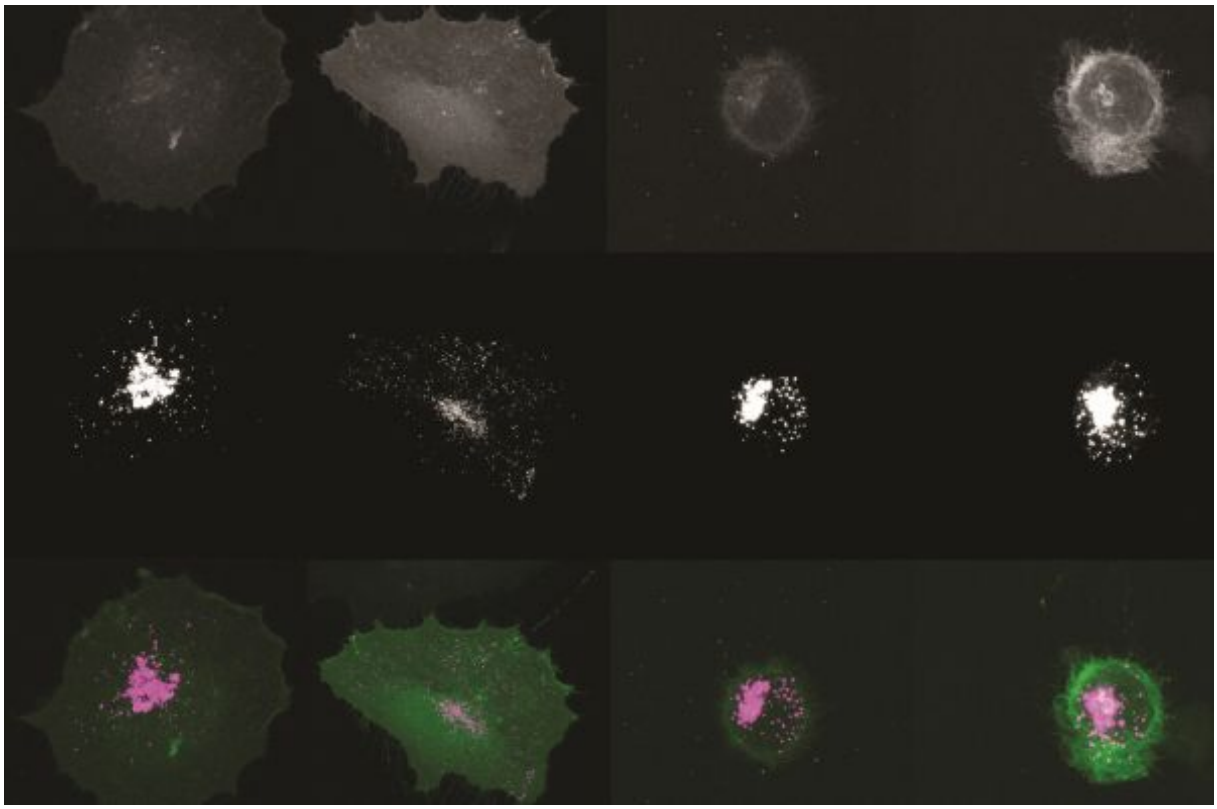

The Golgi feels and responds to mechanical forces from outside the cell

ICFO and CNRS researchers have discovered that the Golgi apparatus, an internal organelle, is not a passive observer of how cells respond to mechanical forces, but actively senses and adapts to them. The results are published in the Journal of Cell Biology.

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Cells are not fixed objects; they are constantly spreading, stretching, and physically adapting to external conditions. The surface and the nucleus have been largely believed to be the main structures responsible for sensing and responding to these mechanical cues, but researchers at ICFO **Dr. Javier Vera Lillo, Dr. Eugenia Almacellas, Dr. Nicolas Mateos**, **Dr. Jessica Angulo Capel**, **Adam Wolowczyk**, **ICREA Prof. Maria F. Garcia Parajo**, and **Prof. Dr. Felix Campelo** have now broadened this picture. In collaboration with CNRS, IBEC, Tokyo University of Pharmacy and Life Sciences, UB and UPF, the team has shown that **the Golgi apparatus, an internal organelle, can also actively sense and respond to mechanical forces, and** that its own

activity, in turn, **can affect how the cell physically behaves**.

? The study, published in the Journal of Cell Biology and recently highlighted by the same journal, therefore introduces a new role for the Golgi complex, whose main function is to collect the proteins made in the endoplasmic reticulum, process them, sort them, and pack them into small vesicles that will finally fuse with the cell's membrane to release their contents. By applying different mechanical stimuli to cells, the team observed that Golgi export changed; and by chemically and genetically blocking such export, the team found that the cell lost its ability to properly spread and adapt mechanically to its surroundings.

? Thus, the cell's mechanical properties modify the activity in the Golgi, which in turn affec s the mechanical properties of the cell. ¡½That **feedback loop** is the novel conceptual contribution,¡½ explains Dr. Javier Vera Lillo, first co-author of the article. ¡½It positions the Golgi as an active player in mechanoadaptation, not just a downstream factory.¡½

? For instance, the researchers observed that physically stretching the cell increased the umber of secretory carriers leaving the Golgi, and that when the cell was spreading on s iffer substrates, the Golgi's membrane tension increa ed. The team notes that this newly discovered mechanical sensitivity of the Golgi could have **implications for contexts in which cells experience altered mechanics, such as cancer invasion and fibrosis**. ¡½Identifying molecular nodes in this pathway could eventually off r new angles for therapeutic intervention, targeting aberrant secretion in these disea e states,¡½ says Dr. Felix Campelo, senior author of the article. ¡½We hope that usin more localized, quantitative tools to dissect how mechanical forces are spatially and temp rally translated into the Golgi will help us further elucidate this potential connectio

Reference:?

Chandini Bhaskar Naidu et. al.; Mechanical forces stimulate Golgi export.?J Cell Biol?5 October 2026; 225 (10): e202510026.

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