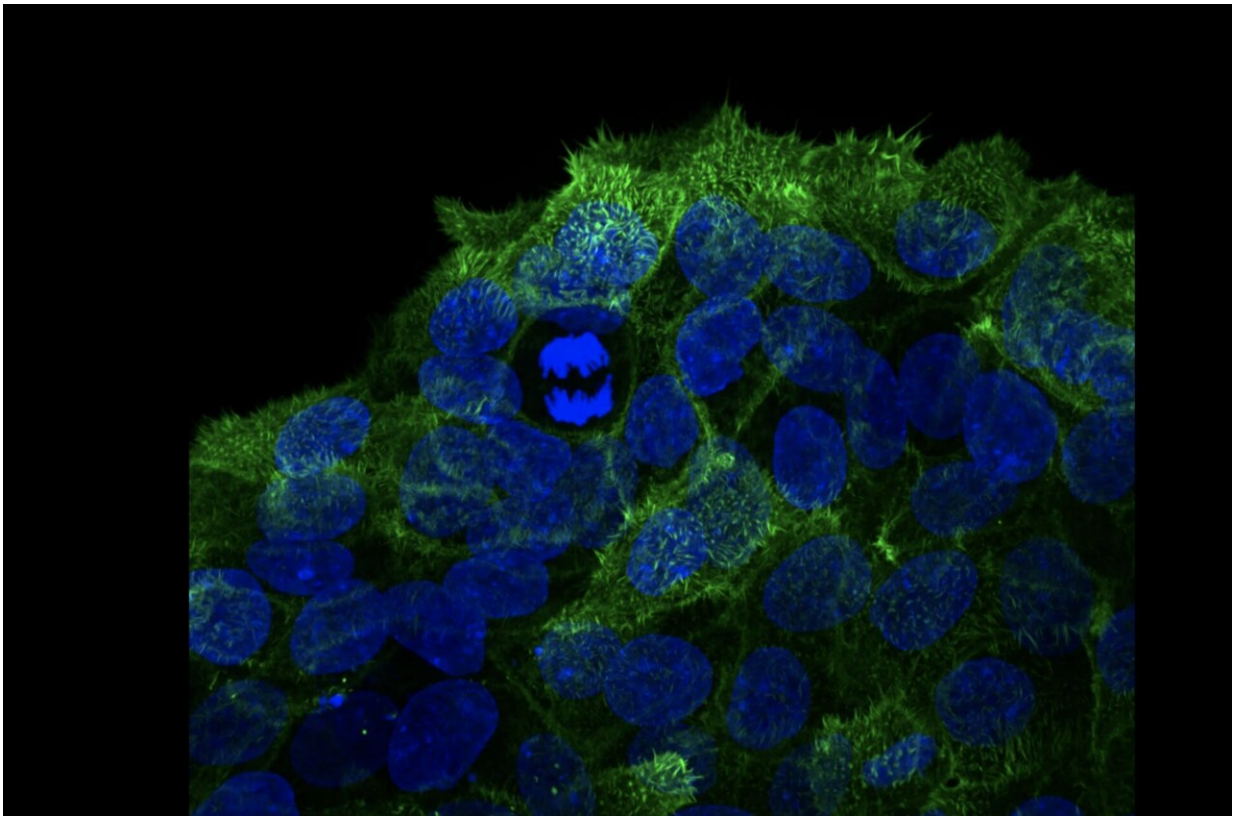


Discovery within cell cycle process to bring understanding of cellular diseases

August 3 2021, by Sam Wood



A cell undergoing division within a layer of cells. Credit: Åbo Akademi

Research from the School of Biosciences and the University of Manchester has uncovered an essential mechanism coordinating the processes of cell division and adhesion within humans. This discovery

has profound potential for advancing understanding of cell adhesion signaling in cancerous tumor progression and metastasis.

The research, published in the *Journal of Biological Chemistry*, identifies the long sought link within the cell cycle between the mechanism for cell division, the proliferation that enables all [living organisms](#) to function and regenerate, and the cell adhesion that holds them in the correct position within the organism's structure.

For cell division to occur inside humans, the cell must release its adhesions to the surroundings at the exact moment the cell starts to divide. This synchronization of the cell adhesion and the cell cycle is critical for the correct functioning of cells in tissues and to prevent uncontrolled cell division in processes such as cancer.

Researchers found that CDK1, the master regulator of the cell cycle binds directly to, and modifies, the core protein talin that is essential to the process of cell adhesion. This interaction represents a coupling of the cell proliferation and adhesion processes. This indicates a unifying mechanism by which the processes of cell division and adhesion are controlled.

Discovering the initial mechanism of this vital process in the tissues of humans is the first-step in a new branch of understanding [health issues](#) relating to the [cell cycle](#), including cancerous tumors.

Dr. Ben Goult, Reader in Biochemistry at the University of Kent and a Principal Investigator of the paper said: "The potential of this discovery is huge as it provides a new understanding of how [cell division](#) is coordinated within the confines of a complex multicellular organism. Cell division needs to be tightly coupled to the [cell adhesion](#) to allow our cells to divide without disrupting the integrity of our tissues and organs. This research is vital in our understanding of other cellular diseases and

of cancer's ability to spread within the human body."

The paper, "Talin mechanosensitivity is modulated by a [direct interaction](#) with cyclin-dependent kinase-1," is published in the *Journal of Biological Chemistry*

More information: Rosemarie E. Gough et al, Talin mechanosensitivity is modulated by a direct interaction with cyclin-dependent kinase-1, *Journal of Biological Chemistry* (2021). [DOI: 10.1016/j.jbc.2021.100837](#)

Provided by University of Kent

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