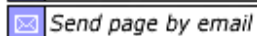
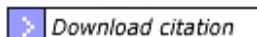


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EndNote



### Mechanical tugging force regulates the size of cell-cell junctions.

Liu Z, Tan JL, Cohen DM, Yang MT, Sniadecki NJ, Ruiz SA, Nelson CM, Chen CS  
*Proc Natl Acad Sci U S A* 2010 Jun 1 **107**(22):9944-9 [[abstract on PubMed](#)]

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Research Institute of  
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 Developmental Biology

Confirmation

Tech Advance

**How do tissues survive mechanical stress? Large-scale movements during morphogenesis and the function of most organs involve significant pushing and pulling. Despite these forces, tissues remain intact. This paper shows that adhesion between cells scales with the tugging force applied to the cells. Mechanical stress is coupled to a structural change that resists the stress.**

This study looks at how cell-cell junctions in endothelial cells respond to manipulations of cortical tension and intercellular tugging. A microneedle force-sensor chamber allowed an indirect measurement of how much pulling force two cells exert on each other. The size of cell-cell junctions corresponded positively to the strength of intercellular tugging, and manipulating pulling strength -- by increasing or decreasing myosin contractility or physically pulling on a cell -- changed the size of cell-cell junctions. Thus tugging forces regulate adhesion -- and on time scales of only a few minutes. On the other hand, disrupting cell-cell junctions reduced pulling forces, implying bidirectional cooperation between mechanical stress and adhesion. This link between physical force and tissue architecture generates a system that can quickly adapt to changing mechanical environments. A similar force sensor in migrating cells mediates adhesion to the substrate. In the crowded, squeezed, and shuffling environment of a developing embryo or a respiring, digesting, pumping organ, the forces experienced are substantial and such force-responsive mechanisms are essential.

Competing interests: None declared

Evaluated 1 Jul 2010

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1) To cite all the evaluations for this article:

Faculty of 1000 Biology: evaluations for Liu Z et al *Proc Natl Acad Sci U S A* 2010 Jun 1 107 (22) :9944-9 <http://f1000biology.com/article/id/3781956/evaluation>

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Carrie Cowan: Faculty of 1000 Biology, 1 Jul 2010 <http://f1000biology.com/article/id/3781956/evaluation>

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