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Title:	Resolving the molecular mechanism of cadherin catch bond formation
Authors:	Rakshit, S. (/jspui/browse?type=author&value=Rakshit%2C+S.)
Keywords:	Cadherin Mechanism Embryogenesis
Issue Date:	2014
Publisher:	Nature Publishing Group
Citation:	Nature Communications,5.
Abstract:	Classical cadherin Ca^{2+}-dependent cell-cell adhesion proteins play key roles in embryogenesis and in maintaining tissue integrity. Cadherins mediate robust adhesion by binding in multiple conformations. One of these adhesive states, called an X-dimer, forms catch bonds that strengthen and become longer lived in the presence of mechanical force. Here we use single-molecule force-clamp spectroscopy with an atomic force microscope along with molecular dynamics and steered molecular dynamics simulations to resolve the molecular mechanisms underlying catch bond formation and the role of Ca^{2+} ions in this process. Our data suggest that tensile force bends the cadherin extracellular region such that they form long-lived, force-induced hydrogen bonds that lock X-dimers into tighter contact. When Ca^{2+} concentration is decreased, fewer de novo hydrogen bonds are formed and catch bond formation is eliminated.
Description:	Only IISERM authors are available in the record.
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