

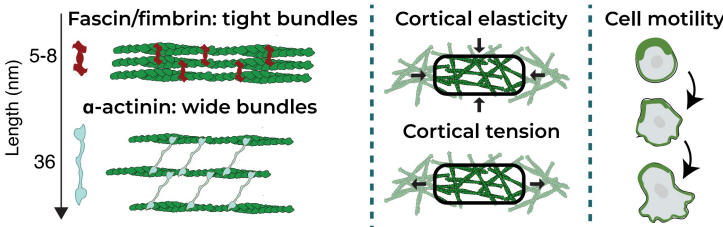
Actin crosslinking regulates cortical mechanics and cell polarity in a length-dependent manner

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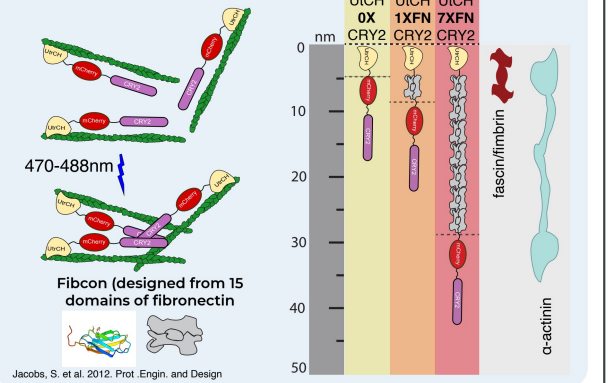
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Background

- Actin crosslinker length, concentration and spatiotemporal regulation endow actin networks with diverse mechanical and dynamic properties.
- Employment of different crosslinkers of different lengths over time and space in a physiological context remains unclear
- We have designed optogenetic actin crosslinkers of 3 different lengths (similar to physiological crosslinkers) and assessed their impact in cell surface mechanics and polarity.

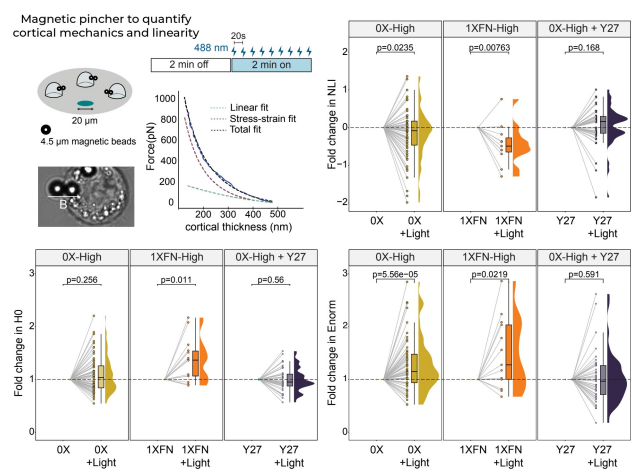


CRY2 oligomerization system

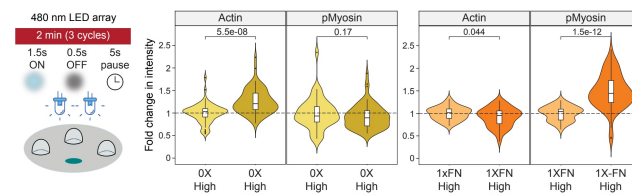


1. Regulation of cortical mechanics by crosslinker

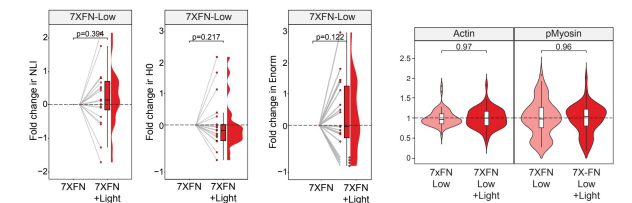
Crosslinkers increase cortical linearity, thickness, and stiffness in length-dependent manner (from 0X to 1X)



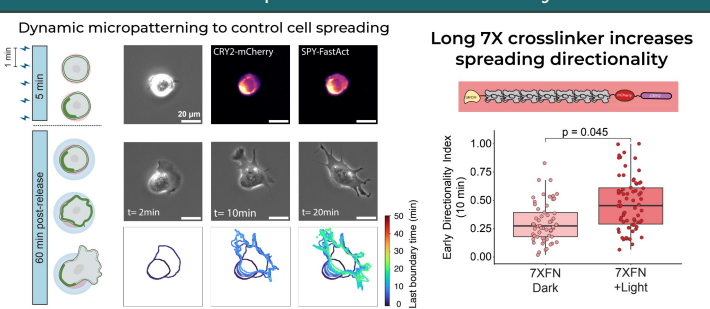
Crosslinker length determines actin vs phospho-myosin cortical recruitment



Long crosslinker (7X) has no mechanical phenotype at low expression

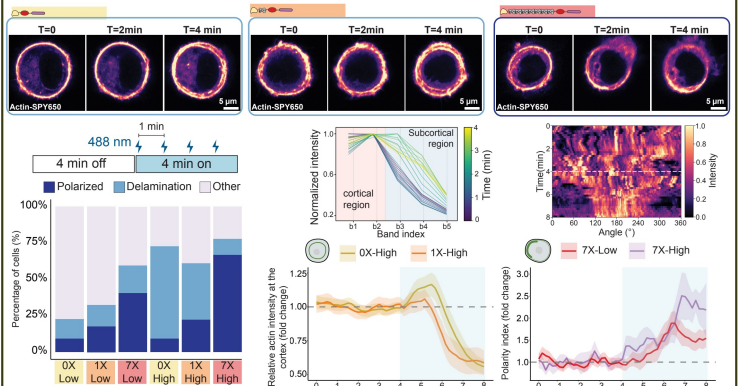


3. Effects of crosslinker polarization in cell motility

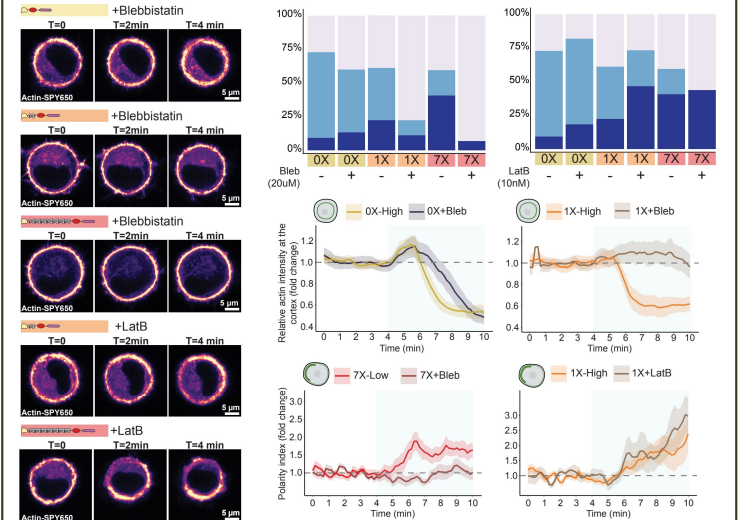


2. Crosslinker length in cortical dynamics and polarization

Long crosslinker (7X) leads to cortical polarization and symmetry breaking; shorter crosslinkers (0X,1X) preferentially trigger delamination



Polarization depends on myosin activity and can be promoted for 1X crosslinker by decreasing actin connectivity



Conclusions

