

Center for Engineering MechanoBiology: “Studying the *Force* from Within”

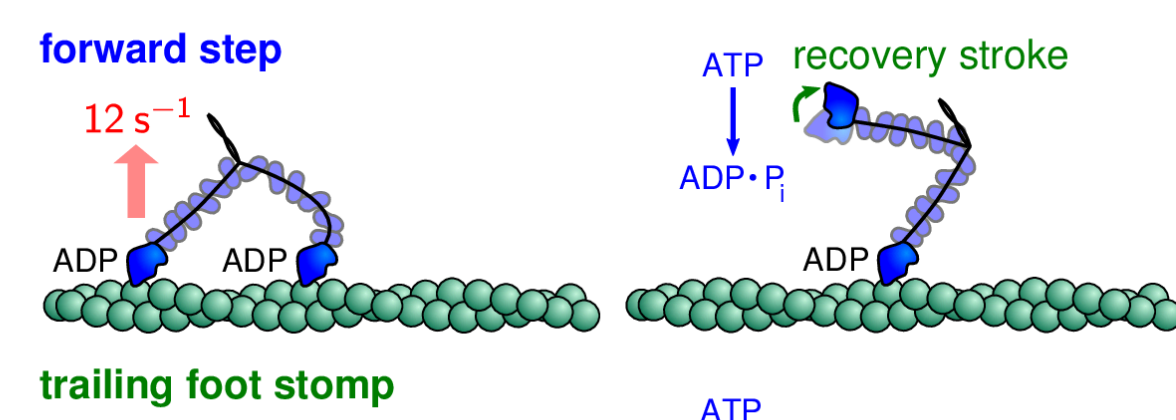
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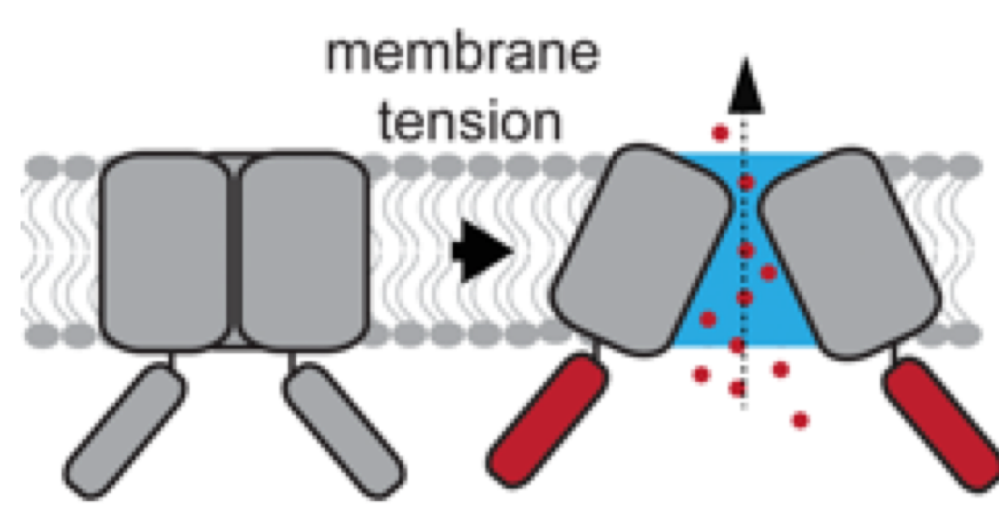
James McGonigle, Managing Director, jmcgon@seas.upenn.edu

1. How do cells *sense* their mechanical environment?

Computational models for mechanosensitive structures

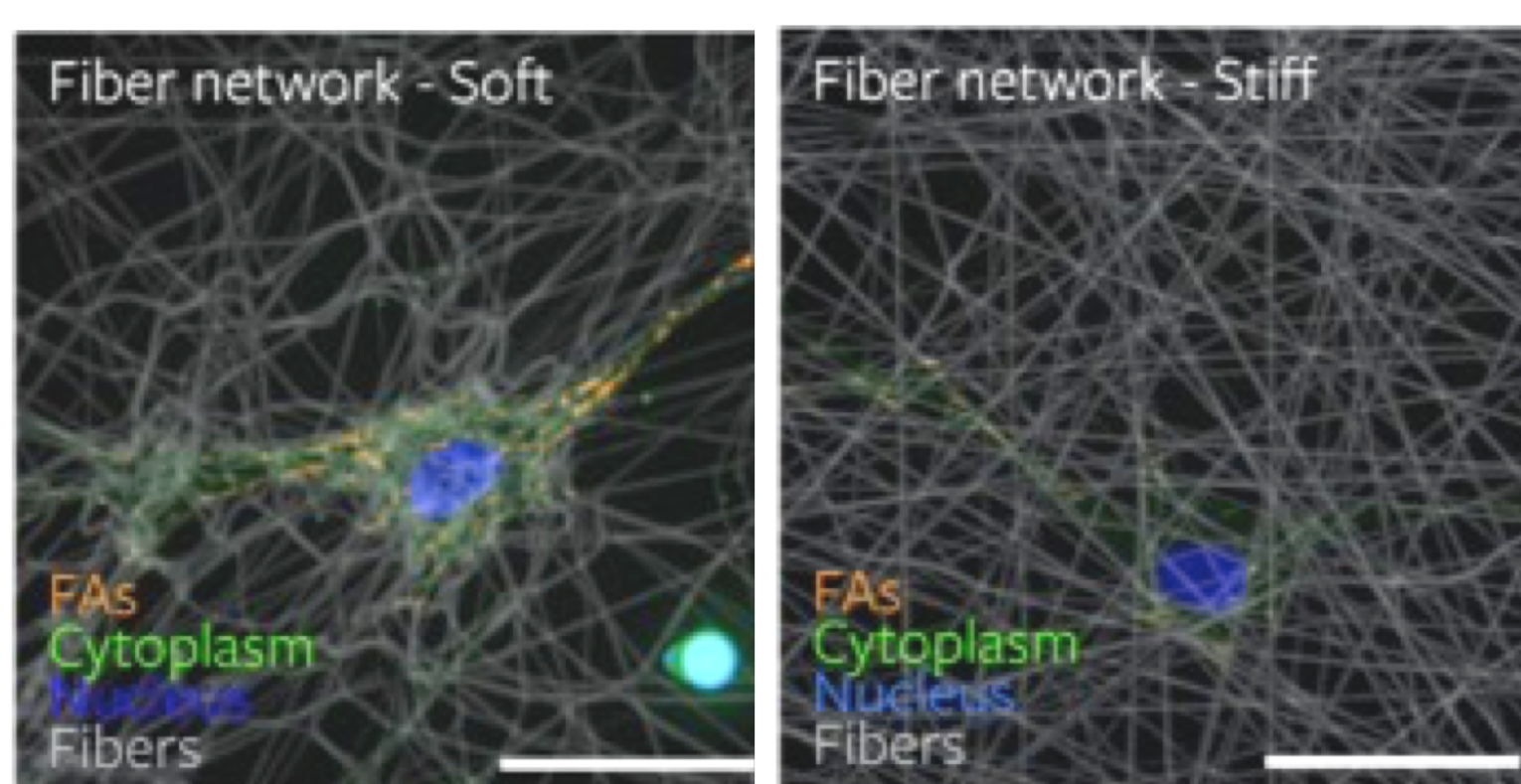


Mechanosensitive ion channels

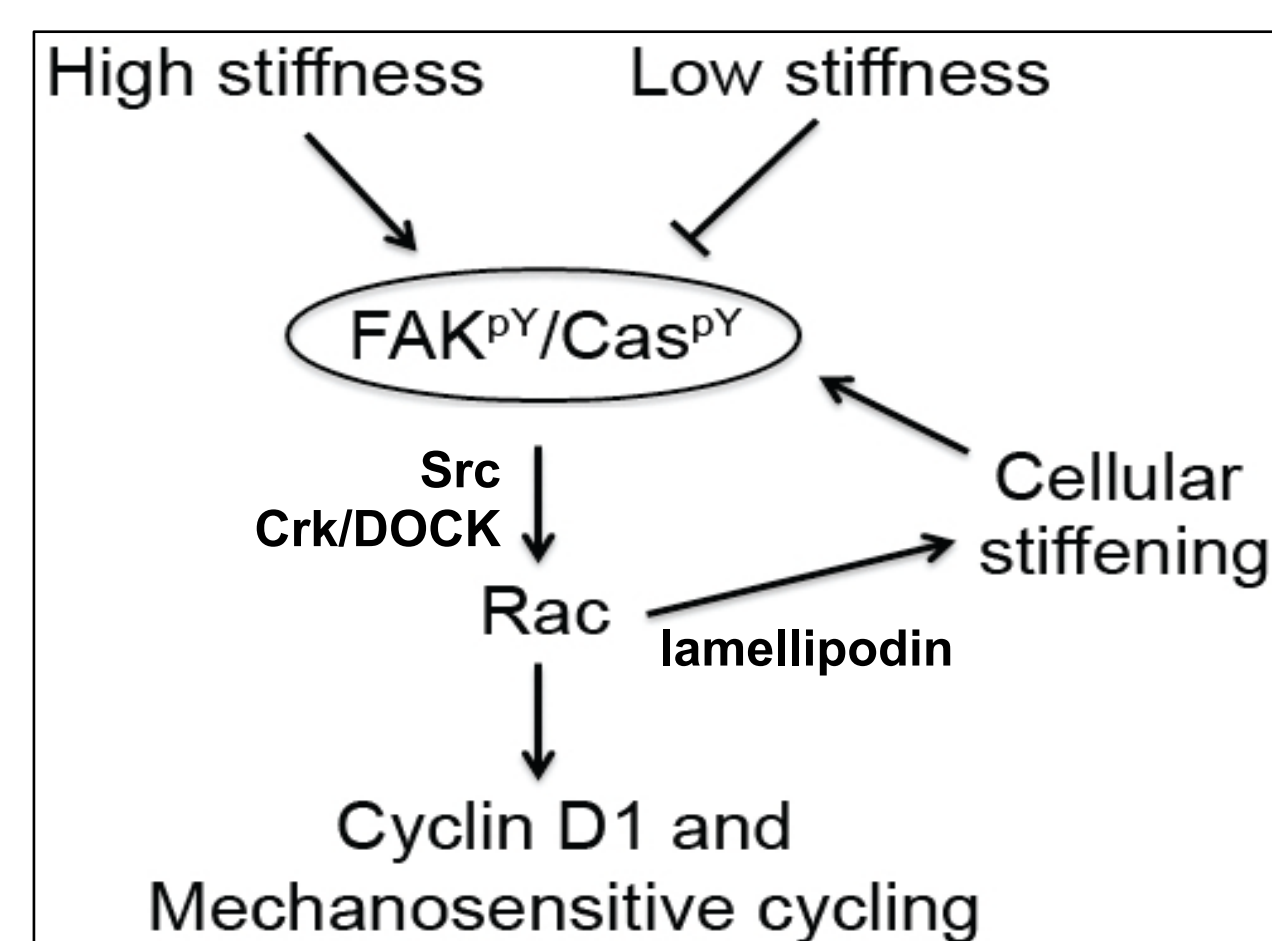


2. How do cells *adapt to* and *change* their mechanical environment?

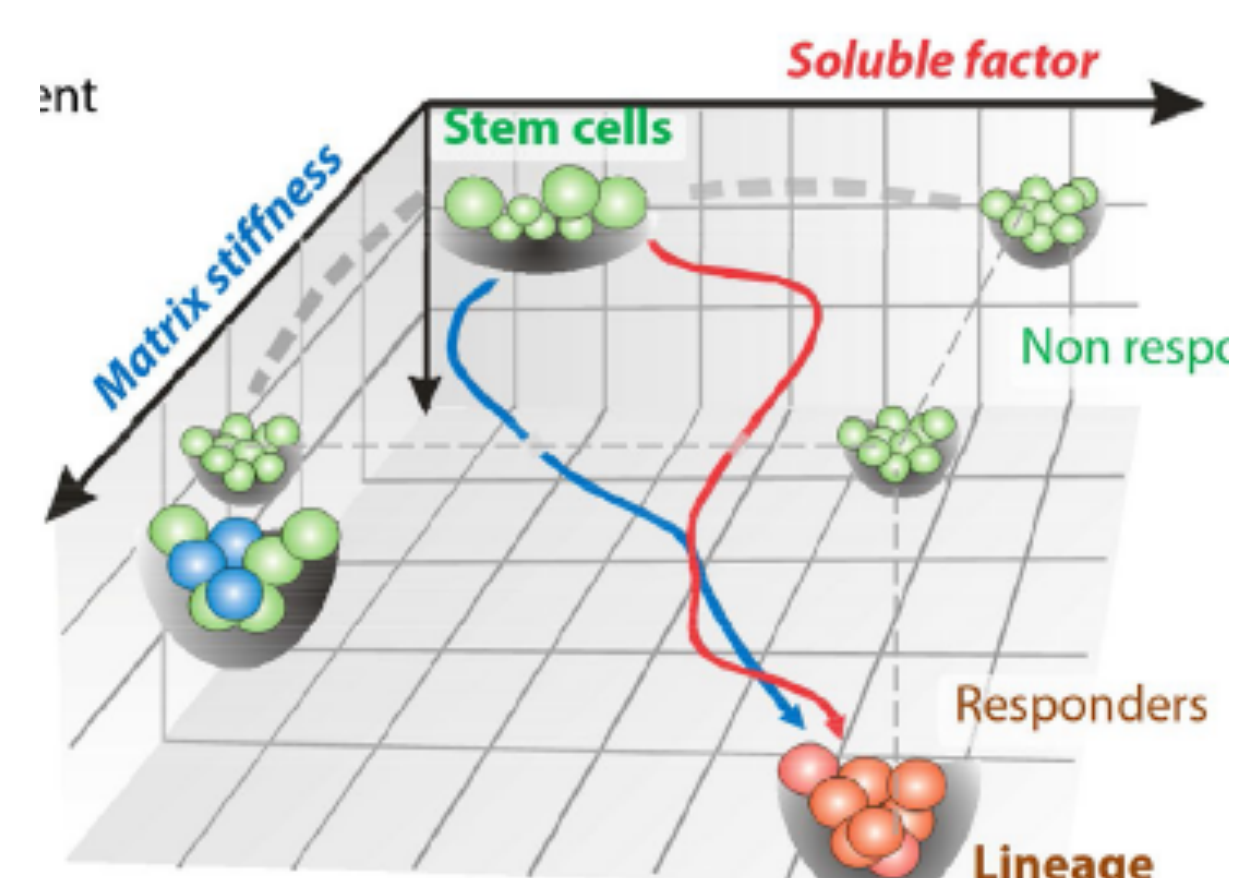
ECMs with tunable properties



Pathways governing mechanoreponse



Interaction between mechanics and soluble factors



CEMB Research Mission

Research Goal: To understand and control forces in living systems. Our **mission** is to define how molecules, cells, and tissues integrate mechanics within plant and animal biology to create new materials, biomedical therapies, and improved agricultural technologies. We seek to utilize multidisciplinary approaches to interrogate and guide the formation of biological structures on multiple scales. Research is guided by four thrusts.

CEMB Research Areas

Plant and animal cell mechanics

Organ-on-a-chip technologies

Materials science and design

Matrix biology and cell mechanics

Mechanobiology of biomolecules

Mechanobiology of the nucleus



CEMB Graduate Student Perks

Financial Support

PI/co-PI advising

(mini) Student Sabbatical

“Introduction to Mechanobiology” course

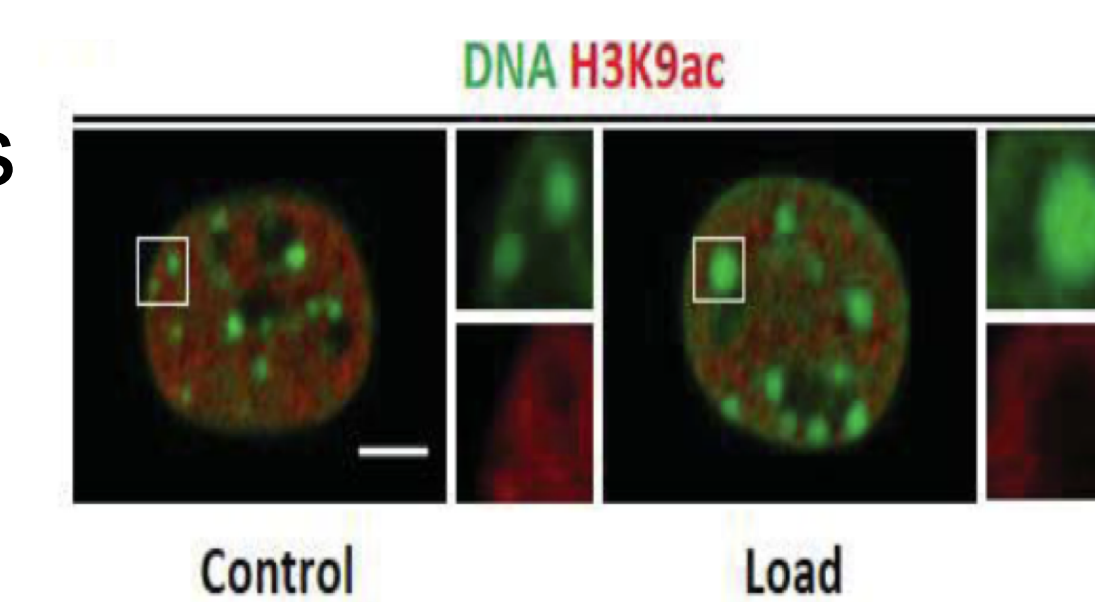
Innovation Slams

Mechanobiology Bootcamp and Retreat

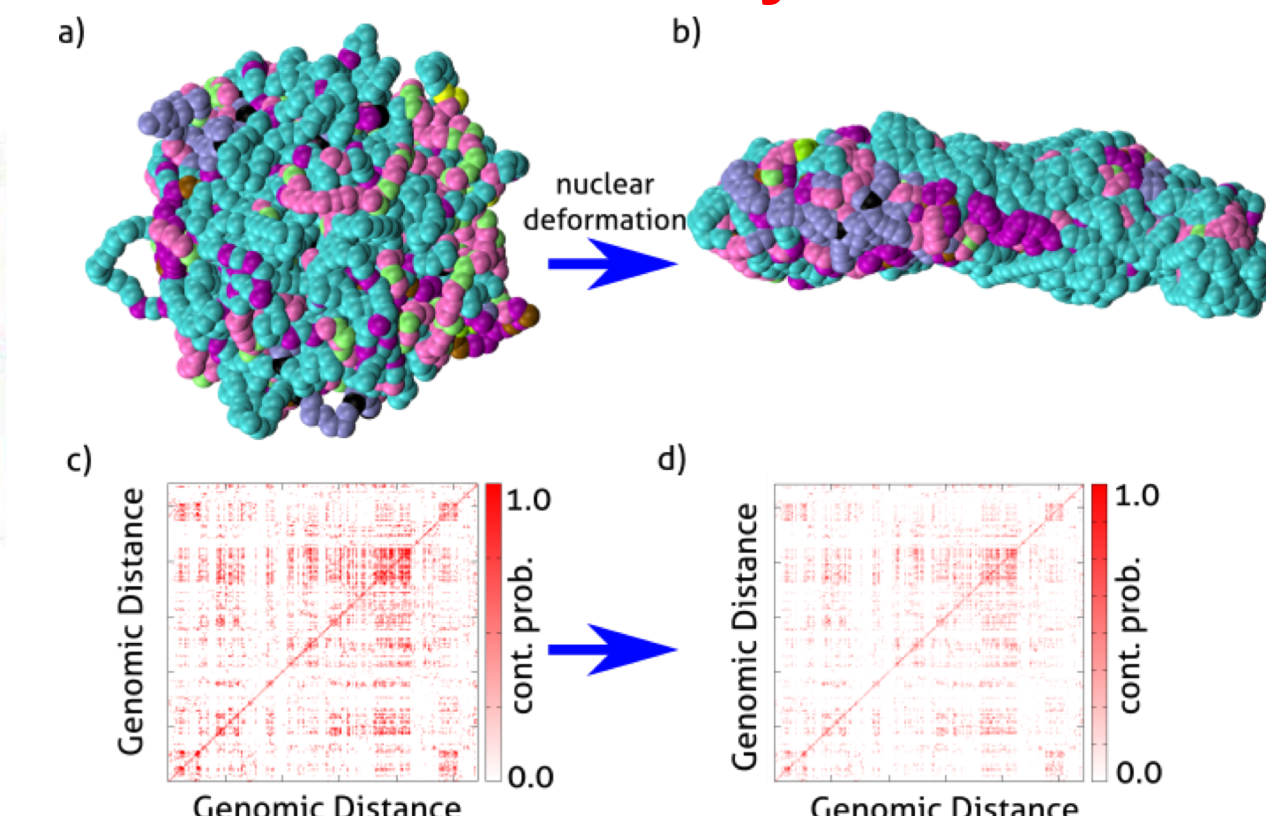
Mentor CEMB REU students and RET participants

3. How do cells *remember* their mechanical environment?

Impact of strain on chromatin organization and epigenetics

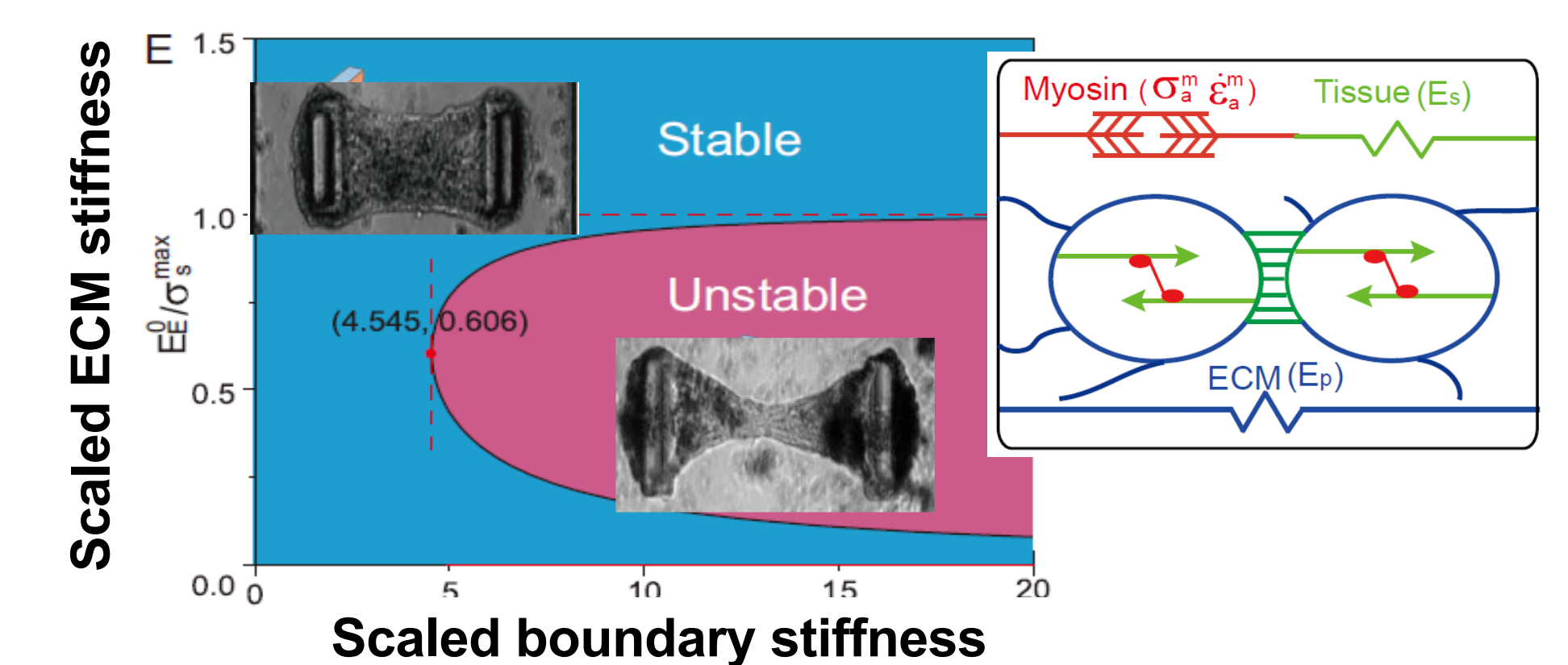


Multiscale models for chromatin dynamics

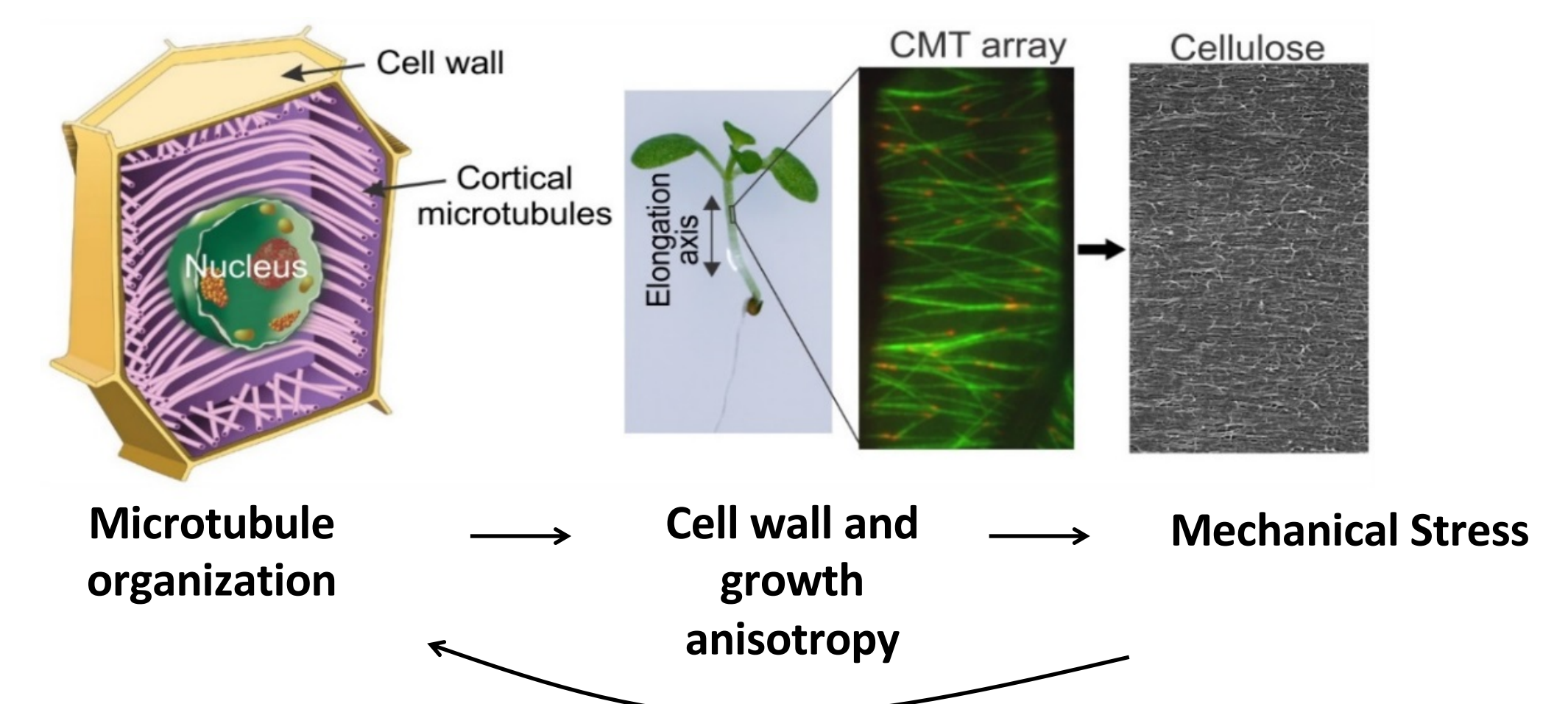


4. Development of Crosscutting and Emerging Technologies

Active Models for Tissue Remodeling



Leaf on a chip



Single molecule force sensors

