BIOLOGICAL SCIENCES SEMINAR SERIES

"*IN VIVO* FORCE MEASUREMENT WITH TWO, ONE, HALF AND ZERO GFP"

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Abstract: The measurement of mechanical forces at the molecular level in vivo has been the bottleneck of mechanobiology, and existing force sensors cannot satisfy the growing need to detect, quantify and screen mechanical forces. Here we developed a series of genetically encoded force sensors based on calibrated coiled-coils. Coiled-coils respond to tensile mechanical forces in a binary manner (folded or unfolded) in the picoNewton (pN) range. We demonstrate the modular design of the coiled-coil force sensors and the incorporation of different readouts including fluorescence and luminescence. We used the coiled-coil force sensors to measure the forces on Cdc12p (cytokinetic formin) during cytokinesis and on Ent1p (homologous to epsins in mammalian cells) during clathrin-mediated endocytosis in fission yeast, on CAR (chimeric antigen receptor) in cultured mammalian cells, and on spectrin in the axon of Caenorhabditis elegans. We propose that the calibrated coiled-coils can be used as a modular unit to transform mechanical forces into *any* chemical signal. We envision a future where in vivo force measurement and manipulation are conducted on a routine basis.

HOSTED BY:
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