

Photoactivatable Actin Inhibitor Cytochalasin D

Roshna Vakkeel, Shifang Zhao, Emmanuel Terriac, Franziska Lautenschäger, Aránzazu del Campo
INM – Leibniz Institut für Neue Materialien, Saarbrücken

In cellular shape change, motility and cellular division actin dynamics plays a very crucial role.^[1] The assembly of monomeric G-actin into filamentous F-actin into branches leads to cellular shape change via formation of a lamellipodium triggering cell movement. Using actin inhibitors, investigation and regulation of these cellular processes with spatiotemporal regulation of F-actin dynamics can be achieved. Fungal metabolites cytochalasins^[2] are effective modulators of actin network organization with good cell permeability and high binding affinity towards the fast growing plus end of the actin microfilaments.^[3] Using cytochalasin D, we can spatiotemporally and reversibly disturb the F-actin cytoskeleton and release free actin monomers within the cell. This will allow us to study cytoskeletal dynamics, or how it affects related cellular structures and processes.

Herein, we present phototriggerable Cytochalasin D (a potent actin inhibitor) for controlled release to locally disturb F-actin superstructures, like stress fibers, cortical actin networks and finally direct cell motility. The phototriggerable derivative^[4] will also serve as a good method with dosage control of the drug at the required sites of action combined with high bioavailability and subcellular resolution in time scale of minutes.

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