Electronic Supplementary Material (ESI) for Soft Matter

Crosslinking proteins modulate the self-organization of driven systems

SUPPLEMENTAL MATERIAL

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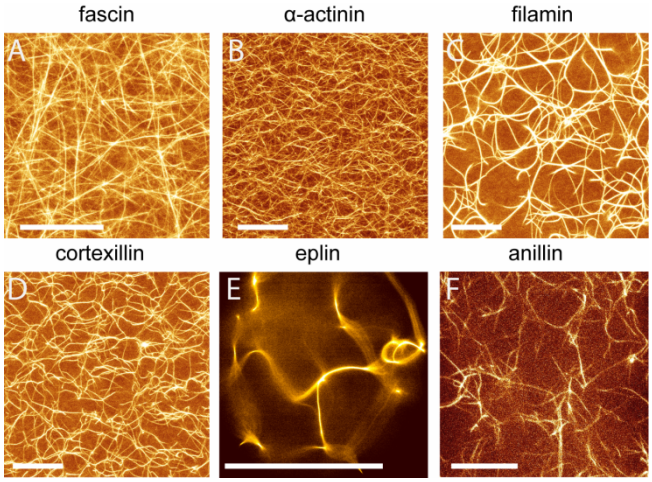
1. Supplemental Figure



Supplemental Figure S1.**Typical network structures for the different crosslinking proteins**.
A: Fascin forms forms networks consisting of bundles of crosslinked actin filaments.
B: α-actinin forms homogenous actin-networks formed by tight bundles in kinetically trapped networks.
C: Filamin forms networks that are characterized by a coexistence of kinetically trapped bundles and clusters at high crosslinker concentrations.
D: Cortexillin forms anti-parallel bundle networks
E: Eplin bundles actin filaments to form extended bundle networks.
F: Anillin, like α-actinin and filamin, forms bundled *in vitro* networks.

All scalebars are 50µm.

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2. Video Captions

Movie 1: Fascin leads to the self-organized formation of polar structures. For the ring formation the actin density was set to 3μM and the crosslinker density was 0.2μM. For the fibre formation the actin density was set to 10μM and the fascin concentration was adjusted to 0.5μM.

Movie 2: α-actinin networks that are set under stress by motor proteins are unstable and phase separate into dilute regions and contractile patches. The actin concentration was set to 7.6μM and the crosslinker concentration was 0.2μM.

Movie 3: **α-EPLIN networks undergo a similar phase-separation like α-actinin networks – however, with a smaller structure size.** The actin concentration was adjusted to 7.6μM and the α-EPLIN was 0.046μM.

Movie 4: **The addition of Anillin leads to the formation of apolar bundles that are barely transported by the underlying motor proteins.** The actin concentration was adjusted to 7.6μM and the anillin concentration was 0.2 μM.