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AFM Imaging of F-actin Network Formation on a photopolymer surface TAIJI IKAWA, OSAMU WATANABE, Toyota Central R&D Labs, YOULI LI, CYRUS R. SAFINYA, University of California Santa Barbara — We investigated the network formation of cytoskeltal filamentous (F-) actin in the presence of divalent cations by atomic force microscopy using a novel protein immobilization technique. The F-actin network was immobilized on the surface of a unique non-ionic photopolymer containing azo-dyes (azopolymer), which upon photo-irradiation deforms along the contour of the proteins thus physically immobilizes them. Two-dimensional F-actin networks were formed and immobilized by spotting F-actin solutions on the azopolymer surface, which was then irradiated using an array of blue light emitting diodes. The structure of the F-actin network, which consists of multiple X-, Y-, T-shaped junctions, was influenced by the concentration of the divalent cations in the spotting solution. We observed that the angle between two crossing F-actins at a junction decreases with increasing concentration of divalent cations. Above a certain ionic concentration, the cross-linked networks of F-actin transform into close-packed parallel rafts and bundles. The results show promise in the fabrication of two-dimensional aligned F-actin sheets.

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