Supplemental Materials

Molecular Biology of the Cell

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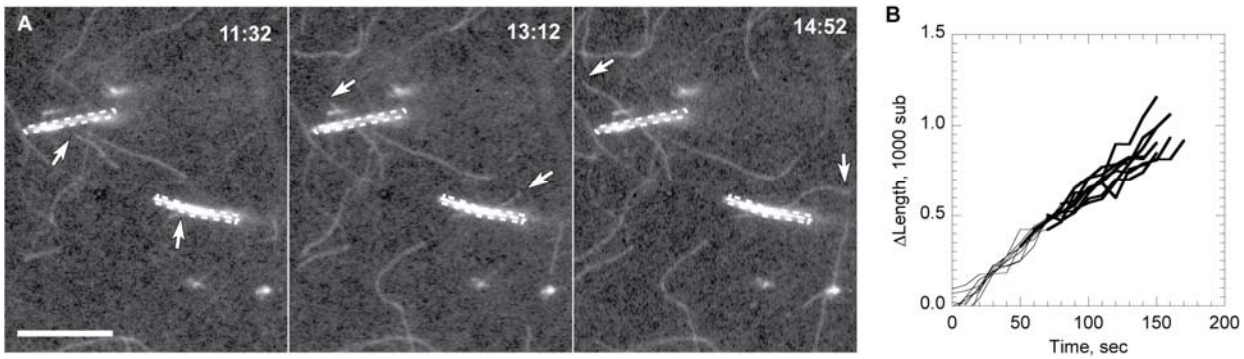
SUPPLEMENTARY FIGURES AND LEGENDS



Supplementary Figure 1. Actin filaments do not interact with control, BSA blocked nanofibers. Conditions as in Figure 1 except control nanofibers were blocked only with 1 mg/ml (0.1% FITC labeled) BSA. (A) Time-lapse TIRF microscopy image of barbed end of actin filaments (*white arrow*) growing past BSA coated nanofibers. (B) Barbed end elongation rate of filaments that grew past nanofibers. Growth rates remained the same before (*thin line*) and after (*thick line*) encountering the nanofiber (see Supplementary Movie 6). Scale bar, 10 µm.

SUPPLEMENTARY MOVIE LEGENDS

Supplementary Movie 1. Single filament capture is non-processive. Conditions as in Figure 1. Time-lapse TIRF microcopy movie of elongating barbed ends (*arrowhead*) attached to a GST-PP-WWCA coated nanofiber. Barbed ends polymerized either parallel to the nanofiber long axis at the diffusion-limited rate *(white arrowhead*) or perpendicular to the nanofiber at a substantially reduced rate (*black arrowhead).*

Supplementary Movie 2. Rapid processive elongation in standard magnesium. Conditions as in Figure 2. Time-lapse TIRF microscopy movie of sustained processive elongation of actin filaments on GST-PP-WWCA coated glass nanofibers (*black arrowhead*) in 1 mM Mg^{2+} with barbed ends attached to nanofibers (*white arrowhead*).

Supplementary Movie 3. Rapid processive elongation in high magnesium. Conditions as in Figure 2. Time-lapse TIRF microscopy movie of sustained rapid elongation of actin filaments (*black arrowhead*) with barbed ends attached to GST-PP-WWCA nanofibers in 10 mM Mg^{2+}.

Supplementary Movie 4. Rapid processive elongation in standard magnesium. Conditions as in Figure 2 except with 10 mM total Mg^{2+}. Time-lapse TIRF microscopy movie of two elongating actin filaments (black arrowheads). Filament barbed ends are bundled (open arrowhead) and lead to a nearby GST-PP-WWCA nanofibers. The lower filament undergoes sustained, rapid elongation, while the upper filament elongates at the normal rate.

Supplementary Movie 5. Profilin slows rate of bundle mediated processive elongation. Conditions as in Figure 3. Time-lapse TIRF microcopy movie of sustained processive association of profilin-actin with actin filaments barbed ends attached to GST-PP-WWCA coated nanofibers resulting in filament buckling (*black arrowhead).*

Supplementary Movie 6. Filaments do not interact with BSA blocked nanofibers. Conditions as in Supplementary Figure 1. Time-lapse TIRF microcopy movie of barbed end of actin filaments (*black arrowhead*) growing past FITC-BSA coated nanofibers.