

Supplemental Movie S1. GST Protein Does not Sever Actin Filaments.

Dynamic imaging of actin filaments in the presence of 100 nM GST protein plus 10 μM Ca^{2+} was recorded at 5-s intervals for 500 s using a TIRFM assay. Bar = 10 μm .

Supplemental Movie S2. MDP25 Severs Actin Filaments.

Dynamic imaging of actin filaments in the presence of 100 nM GST-MDP25 was recorded at 5-s intervals for 500 s using a TIRFM assay. Bar = 10 μm .

Supplemental Movie S3. Ca^{2+} Dramatically Enhances the Actin Filament Severing Activity of MDP25.

Dynamic imaging of actin filaments in the presence of 100 nM GST-MDP25 plus 10 μM Ca^{2+} was recorded at 5-s intervals for 500 s using a TIRFM assay. Bar = 10 μm .

Supplemental Movie S4. The Actin Filament-severing Activity of VLN2.

Dynamic imaging of actin filaments in the presence of 1 nM VLN2 plus 10 μM free Ca^{2+} as a positive control. Time-lapse images were collected at 5-s intervals for 500 s. Bar = 10 μm .

Supplemental Movie S5. Actin Filaments in a Wild-type Pollen Tube.

Dynamic imaging of actin filaments in a wild-type pollen tube was recorded at 5-s intervals for 5 min using a spinning disk microscopy assay. Bar = 10 μm .

Supplemental Movie S6. Actin Filaments in a *mdp25-1* pollen tube.

Dynamic imaging of actin filaments in a *mdp25-1* pollen tube was recorded at 5-s intervals for 5 min using a spinning disk microscopic assay. Bar = 10 μm .

Supplemental Movie S7. Medial Section showing Actin Filament Dynamics in the Subapical Region of a Wild-type Pollen Tube.

Dynamic imaging of actin filaments at the medial section of a wild-type pollen tube subapical region was recorded at 2-s intervals for 40 s using a spinning disk

microscopic assay. Bar = 10 μ m.

Supplemental Movie S8. Actin Filament Dynamics at the Medial Section of an *mdp25*
-1 Mutant Pollen Tube.

Dynamic imaging of actin filaments at the medial section of an *mdp25-1* pollen tube
subapical region was recorded at 2-s intervals for 40 s using a spinning disk
microscopic assay. Bar = 10 μ m.