

Supplementary movie Legends:

Movie S1. Time-lapse confocal scanning microscopy of the *Arabidopsis* root hair stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1). The movie is presented at a rate of 10 frames per second.

Movie S2. Time-lapse confocal scanning microscopy of the *Arabidopsis* main root hair stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1). The movie is presented at a rate of 10 frames per second.

Movie S3. Time-lapse confocal scanning microscopy of the *Arabidopsis* main root hair stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1) treated with 10 μ M Oryzalin. The movie is presented at a rate of 10 frames per second.

Movie S4. Time-lapse confocal scanning microscopy of the *Arabidopsis* main root hair stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1) treated with 40 μ M CytoD. The movie is presented at a rate of 10 frames per second.

Movie S5. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1). The movie is presented at a rate of 50 frames per second.

Movie S6. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1) treated with 40 μ M CytoD. The movie is presented at a rate of 50 frames per second.

Movie S7. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1) treated with 10 μ M Oryzalin. The movie is presented at a rate of 50 frames per second.

Movie S8. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #1) treated with 50 μ M BFA. The movie is presented at a rate of 50 frames per second.

Movie S9. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in *Columbia-0* plants (OLE6-eGFP #2). The movie is presented at a rate of 50 frames per second.

Movie S10. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in myosin 3KO plants (3KO #1). The movie is presented at a rate of 50 frames per second.

Movie S11. Time-lapse confocal scanning microscopy of the *Arabidopsis* leaf epidermis stably expressing PtOLE6-eGFP in myosin 3KO plants (3KO #2). The movie is presented at a rate of 50 frames per second.