



Supplemental Figure 1: The live-imaging technique.

Live imaging of Arabidopsis meristems (a-h) and sepals (i-q).

meristem

a-b| First, plants are grown in conditions devised for imaging. For the Arabidopsis shoot meristem, 10-day seedlings germinated on MS-agar plates (a) are transferred to small plastic boxes containing MS-agar where the plant grows until bolting (b).

c-d| Second, the overlying flowers (c) are removed to expose the meristem (arrow d).

e-f| Third, the plants are placed on an upright confocal microscope stage for imaging. The meristem is stabilized with 1% agarose, the plastic box is filled with distilled water and placed on the microscope (e), and the meristem is imaged with a water-dipping lens (f).

g | Fourth, plants are imaged at fixed time intervals. An image section taken from the meristem with fluorescent markers: pCLV3::GFP-ER (green) and pWUS-dsRED-N7 (red). After imaging, the water is removed and plants are returned to the growth room until the next imaging time point.

h | Fifth, the confocal images are cropped, volume rendered, and aligned using Amira software (Visage Imaging). A volume rendered side-view of the 3D meristem from G after image registration and alignment using AMIRA software (h).

sepals

i-j | To image the sepals, plants are grown in mesh-covered pots (i) and the inflorescence is taped to a slide exposing the lateral side of the sepal (j).

k-l | Overlying flowers are removed to expose a sepal primordium on a young flower primordium close to the meristem.

m-n | The living plant in the pot is propped on the side of the microscope (m) while the slide attached to the inflorescence is mounted under the objective (n).

o | The same developing sepal is imaged every 6 hours. Sepal epidermal nuclei are shown in green and cell walls in red. The plant is staked upright and returned to the growth room between imaging time points.

p-q | Sepal nuclei at 12 hours are shown in yellow and 18 hours in green after cropping and volume rendering in Amira (p). After alignment using Amira affine registration (q) corresponding nuclei are observed (two lineages marked: red dots, blue asterisks).