SUPPLEMENTARY INFORMATION

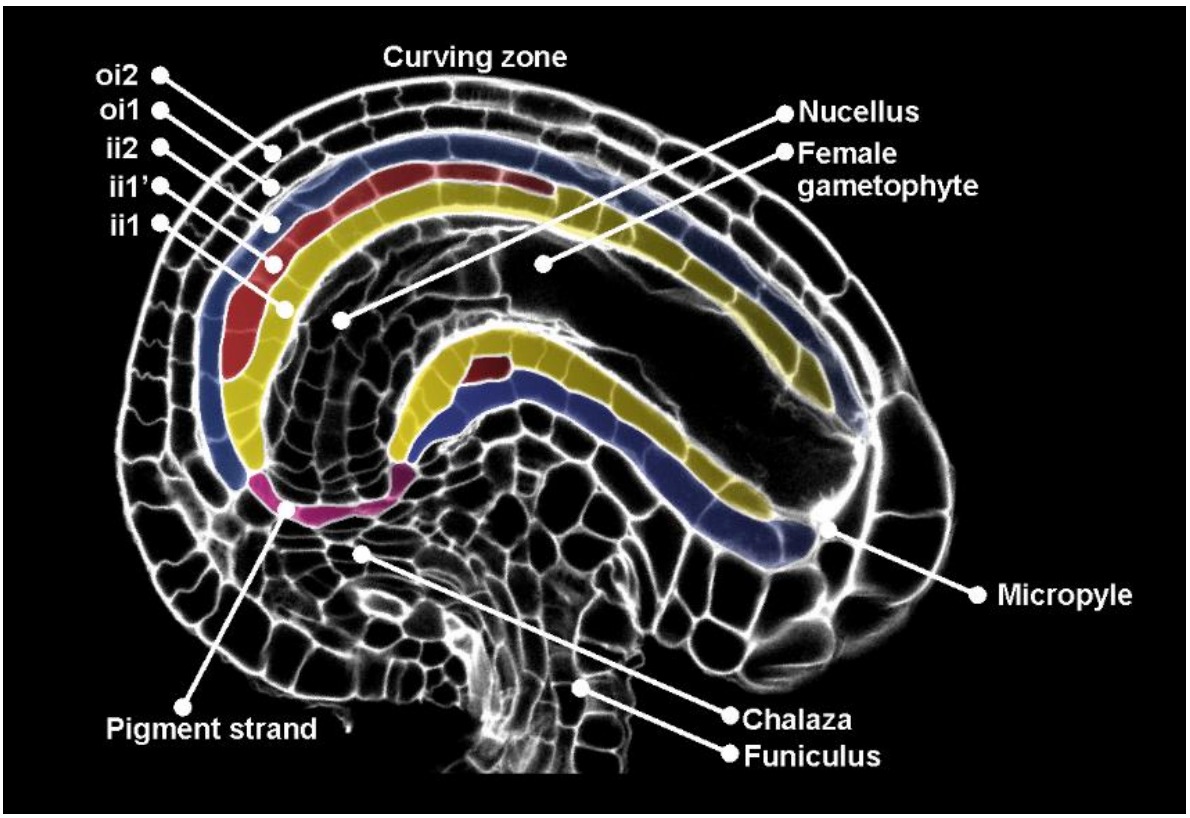

Figure S1. Ovule tissues and functional domains

Central longitudinal section of a wild type ovule at stage 3-VI imaged using the mPS-PI technique. Ecotype Col.

ii1, ii1', ii2, and pigment strand are highlighted in yellow, red, blue and purple, respectively.

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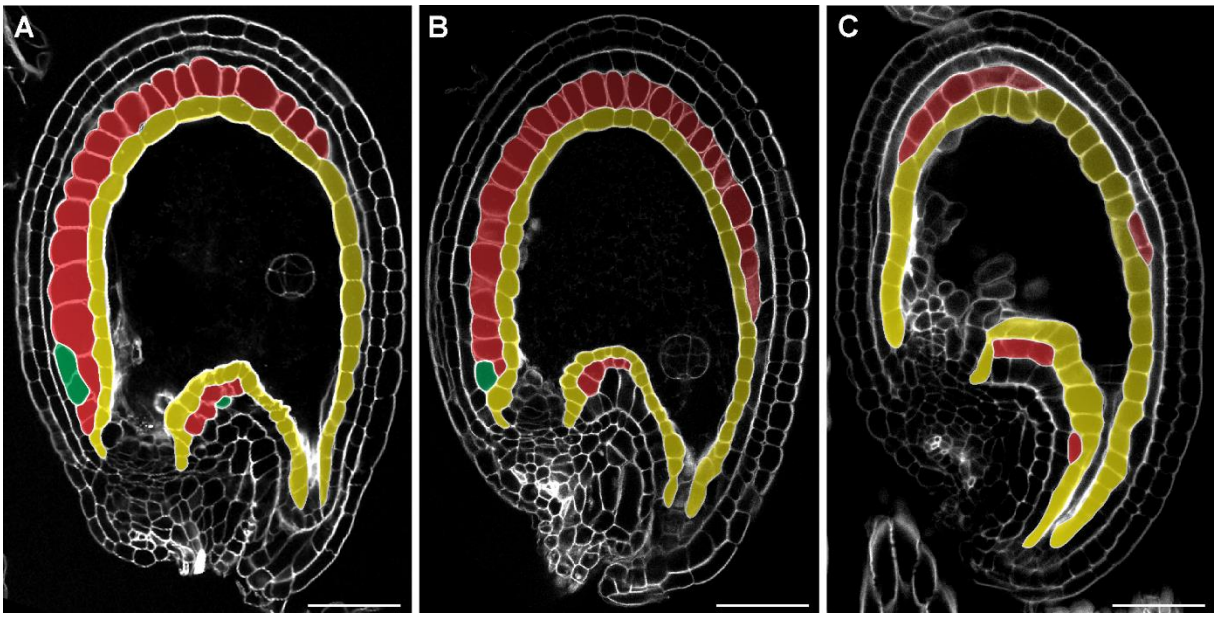

Figure S2. ii1'cellular patterning in *tt16;stk* seeds

(A-C) Central longitudinal sections of wild type (A), *stk* (B), and *tt16;stk* (C) seeds at 4 DAF imaged using the mPS-PI technique. Ecotype Col. Endothelium, ii1' and ii1'' are highlighted in yellow, red, and green, respectively. Scale bar, 50 µm.

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Figure S3. *tt16*/+ embryo compressed by *tt16*/- maternal tissues

Central longitudinal section of the micropylar region of a seed at 6 DAF (imaged using the mPS-PI technique) developed from a *tt16* ovule fertilized with wild type pollen. Ecotype Ws. Scale bar, 50 µm. Endothelium, ii1', ii1'', and embryo are highlighted in yellow, red, green, and pink respectively.

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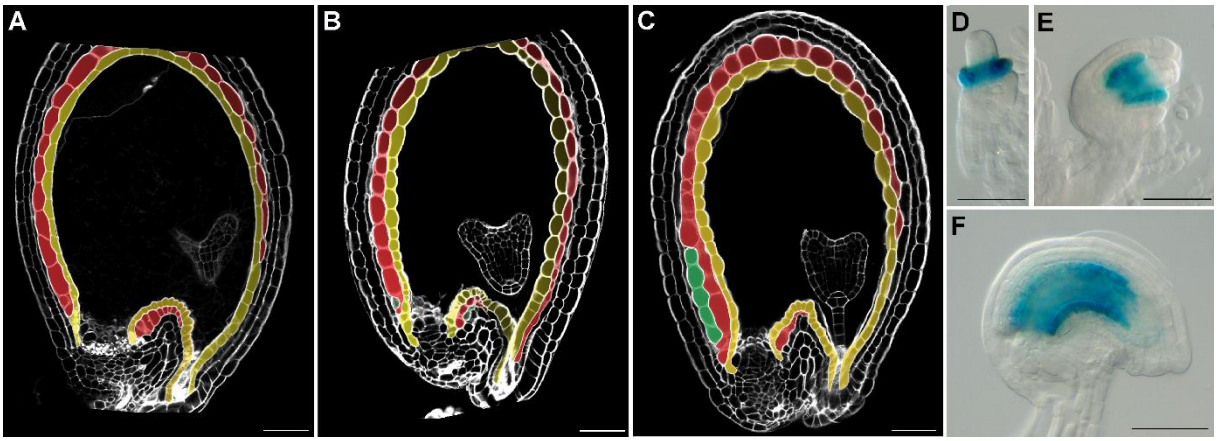

Figure S4. *tt16* complementation lines

(A-C) Central longitudinal sections of wild type (A), *1.6ProTT16:gTT16;tt16* (B), and *ProTT1:gTT16;tt16* (C) seeds at 6 DAF imaged using the mPS-PI technique. Ecotype Ws. Endothelium, ii1' and ii1'' are highlighted in yellow, red, and green, respectively.

(D-F) GUS activity in cleared whole mounts of *ProTT1:gTT16-GUS* ovules at stage 2-III (D), stage 2-V (E), and stage 3-VI (F). Ecotype Col.

Scale bar, 50 µm.

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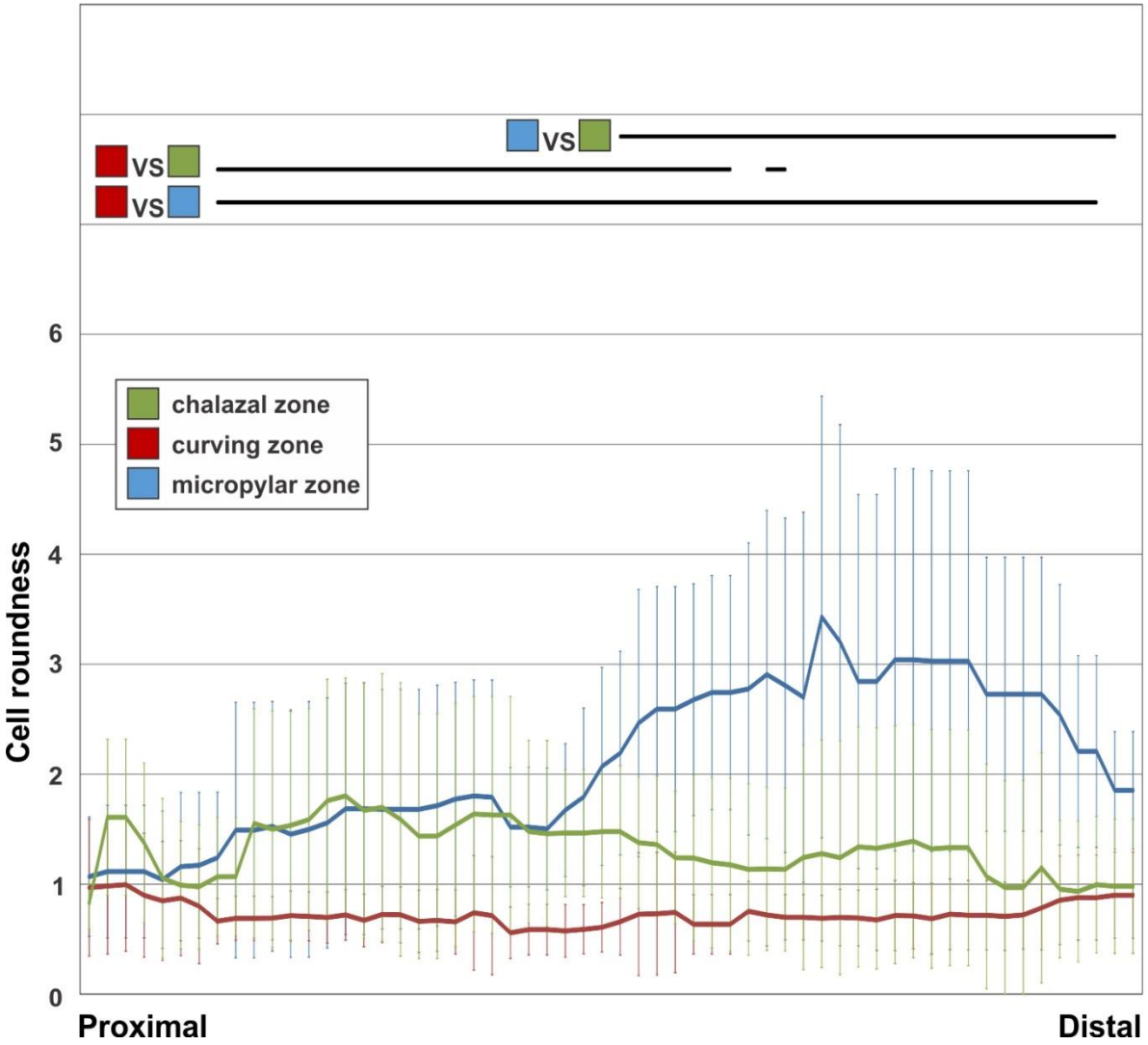

Figure S5. ii1' cell roundness along the proximal-distal axis

Average ii1' cell roundness (see Materials and methods) in the chalazal zone (green), curving zone (red) and micropylar zone (light blue) as observed in central longitudinal sections of wild type seeds at 4 DAF. Lines on top of the graph indicate regions of statistically significant difference between zones (Two tailed student's *t* test , $P < 0.05$). n=12. Error bars: standard deviations. Ecotype Ws.

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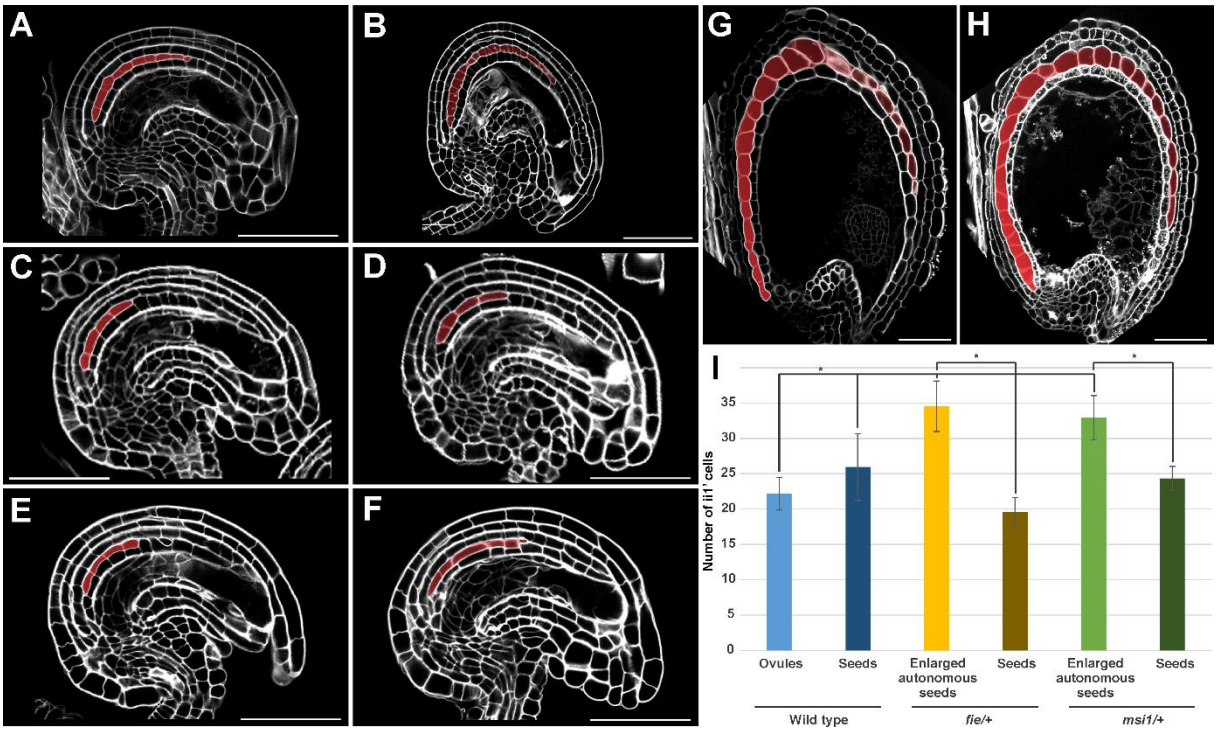

Figure S6. Ovule development in *kpl1* and *fis* mutants

(A) Central longitudinal section of a *kpl1* ovule at stage 3-VI imaged using the mPS-PI technique. Ecotype Ws.

(B) Central longitudinal section of a wild type unfertilized ovule 6DAF imaged using the mPS-PI technique. Ecotype Ws.

(C-E) Central longitudinal sections of *fie*/+ (C), *msi1*/+ (D), *tt16;fie*/+ (E), and *tt16;msi1*/+ (F) ovules at stage 3-VI imaged using the mPS-PI technique. Ecotype Col.

(G-H) Central longitudinal sections of *fie*/+ (G) and *msi1*/+ (H) seeds at 6 DAF imaged using the mPS-PI technique. Ecotype Col.

(I) Average number of ii1' cells as observed in central longitudinal sections of wild type (blue), *fie*/+ (yellow) and *msi1*/+ (green) ovules (from emasculated flowers) and seeds at 6 DAF. Asterisks indicate statistical difference (Two-tailed student's *t* test, $P < 0.05$). Error bars: standard deviations. $n > 9$. Ecotype Col.

Scale bars, 50 µm. The ii1' is highlighted in red.

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