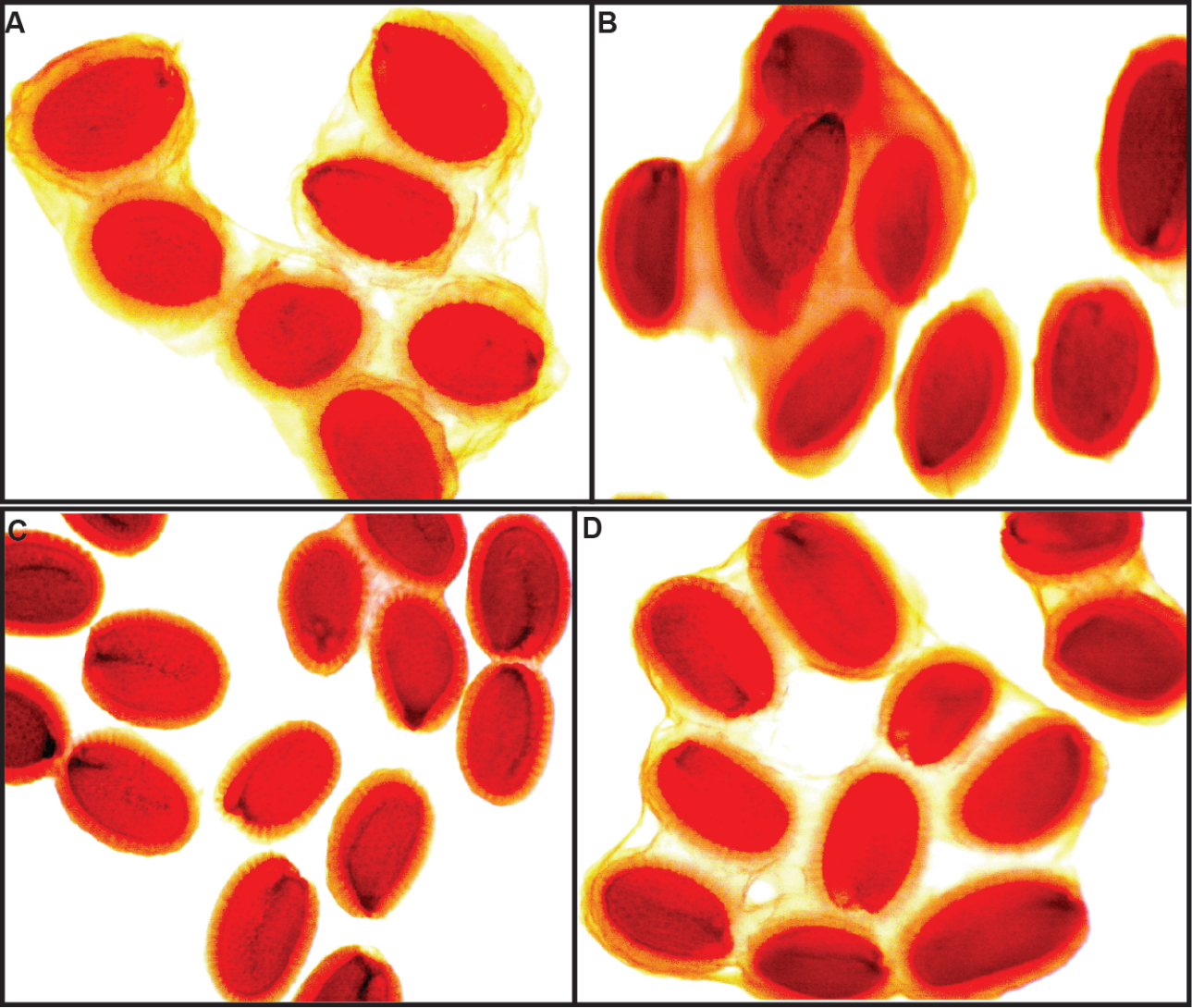
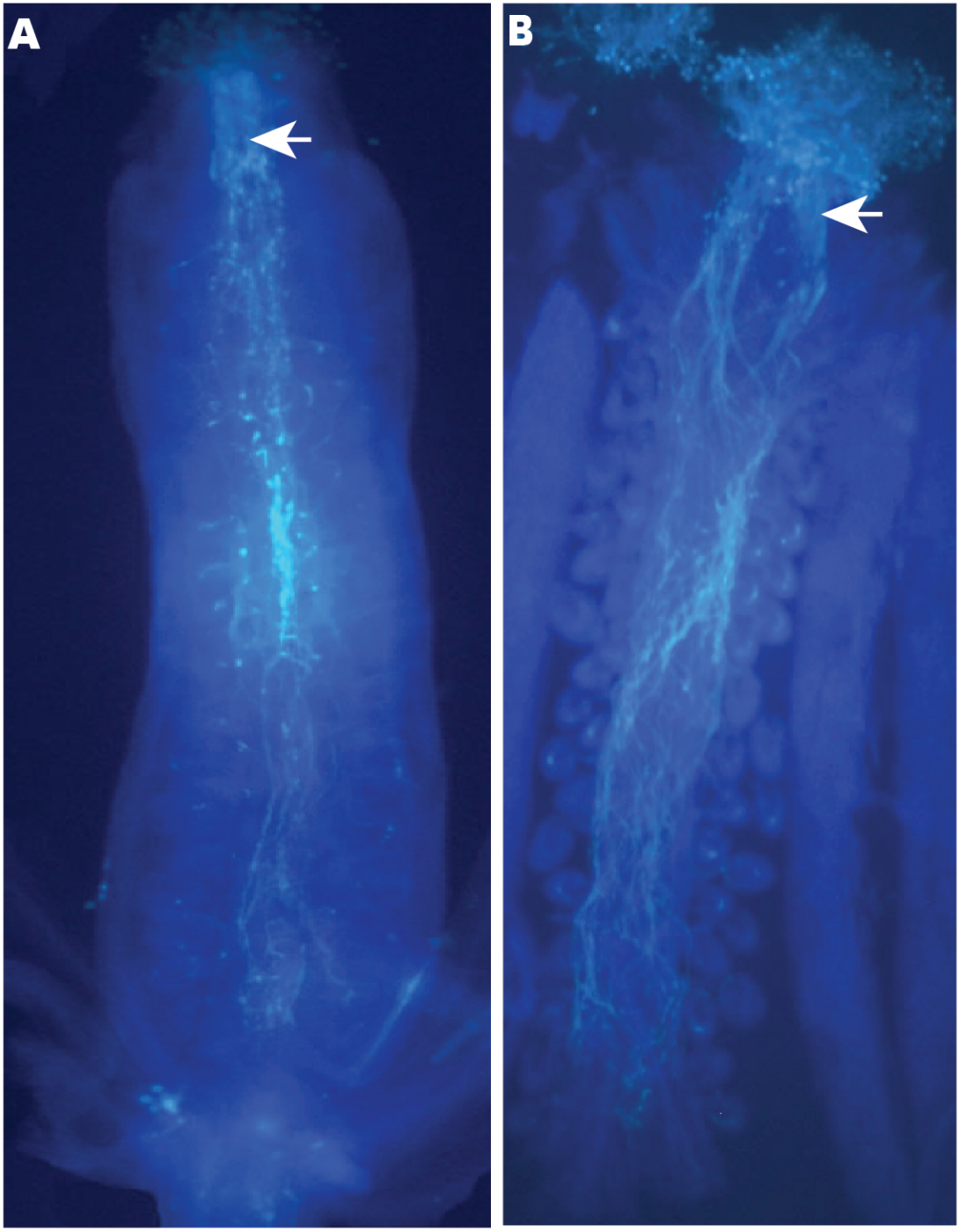
Supplementary figure legends.

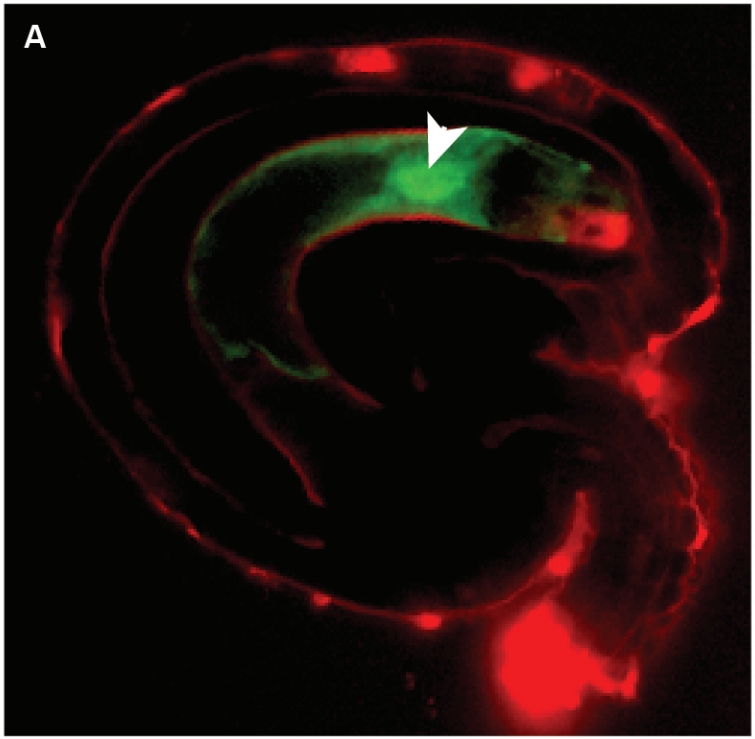
Supplemental Figure 1. Mucilage production is intact in *flp-7* and *flp-1; myb88* seeds. Micrographs of ruthenium red stained seeds. (A) L. *er*. (B) *flp-7*. (C) Col-0. (D) *flp-1; myb 88*.

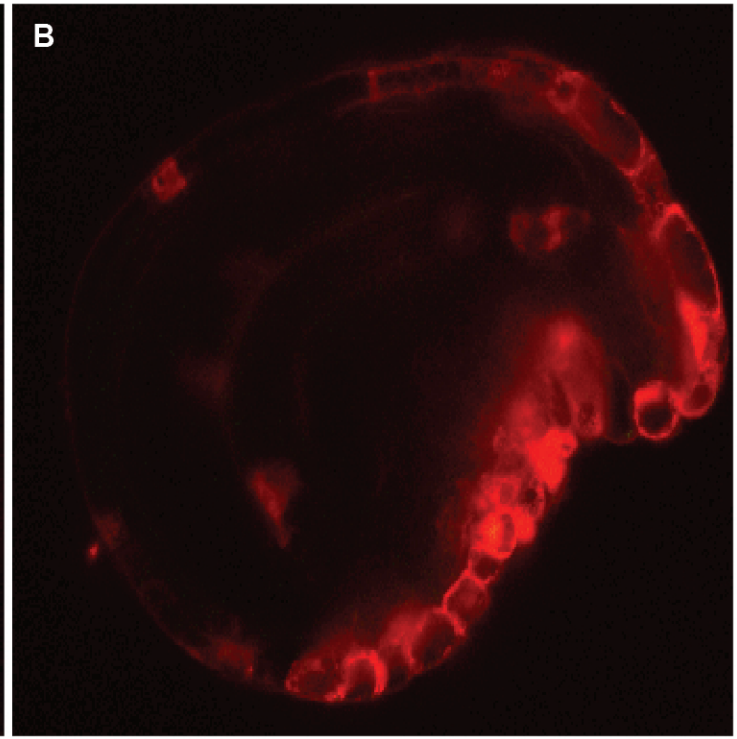
Supplemental Figure 2. Pollen tube growth is normal in *flp-7* pistils. Micrographs of pollen tubes stained with aniline blue 24 hours after pollination. (A) L. *er*. (B) *flp-7*.

Supplemental Figure 3. Abnormal *flp-7* ovules do not differentiate central cells. (A, B) Micrographs of FG7 ovules. (A) *AGL61::GFP* in L. *er* background. (B) *AGL61::GFP* in *flp-7* background. (C) Quantification of expression. 85% of ovules (n=329) in the L. *er* background showed *AGL61::GFP* expression while only 55% of ovules (n=257) in the *flp-7* background did.


A
B
C
D


A
B


A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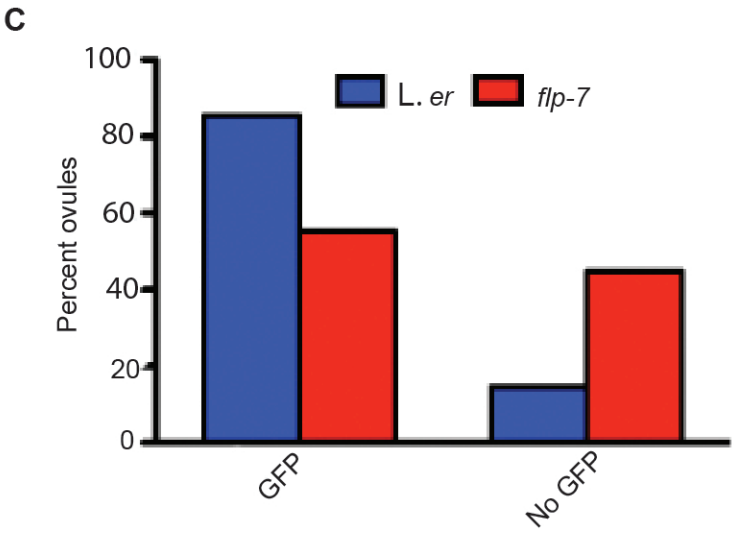
C
100
80
60
40
20
0
Percent ovules
L. er
flp-7
GFP
No GFP

Supplemental Table 1. Primer combinations used for genotyping.

Allele or construct	To amplify wild type allele (or construct)	Length of product (bp)	To amplify mutant allele	Length of product (bp)	Restriction enzyme used (if dCAPs)
flp-1	FLP-1DCAPSF FLP-1DCAPSR	162	FLP-1DCAPSF FLP-1DCAPSR	162	PvuII[a]
flp-7	FLP-7DCAPSF FLP-7DCAPSR	125	FLP-7DCAPSF FLP-7DCAPSR	125	DdeI[a]
myb88	MYB88-3F MYB88-10R	1200	LBa1 MYB88-10R	600	NA[b]
er (L. *er* allele)	erdCAPSF erdCAPSR	105	erdCAPSF erdCAPSR	105	EcoRV[a]

[a]Cuts wild type allele; [b]NA, not applicable.

Supplemental Table 2. Primers used in this study.

Primer name	Use	Sequence (5' to 3')	Reference
FLP-1DCAPSF	*flp-1* dCAPs	CAAAGACAAAAGCACAAGACAATGC	(Xie *et al.*, 2010)
FLP-1DCAPSR	*flp-1* dCAPs	GAAATCAGAGTTTAAGTATGTATACCAG	(Xie *et al.*, 2010)
erdCAPSF	L. *er* dCAPs	AATGGTAGCCTCTGGGATCTTCTTCA	This study
erdCAPSR	L. *er* dCAPs	ATAAGCTAAACCTTGTGCTGCACCATATGAT	This study
MYB88-3F	*myb88* allele confirmation	GAGGATAAAAGTAACCAAGAGGTGTTTC	(Lai *et al.*, 2005)
MYB88-10R	*myb88* allele confirmation	GATATGGCTGCAAACCTATGGAG	(Lai *et al.*, 2005)
LBa1	*myb88* allele confirmation	TGGTTCACGTAGTGGGCCATCG	http://signal.salk.edu/tdnaprimers.2.html
FLP-7DCAPSF	*flp-7* dCAPs	ACTTACACAGACTTCCATTACATGG	Kind gift of Dr. Eunkyoung Lee (University of British Columbia)
FLP-7DCAPSR	*flp-7* dCAPs	CCATCTATTACCAAATACTCTTTGAGC	Kind gift of Dr. Eunkyoung Lee (University of British Columbia)
ERGENF	Confirmation of *pER::ER* transgene	GGGACAAGTTTGTACAAAAAAGCAGGCTCTTTTGAGAAAAGATAATATTATGTG	This study
ERGENR	Confirmation of *pER::ER* transgene	GGGGACCACTTTGTACAAGAAAGCTGGGTTTAGAAAAACTTAGATAGGCAG	This study
LERPF	Confirmation of *pER::ER* transgene	ACTCTTGATTGGGACACACGGCTTAATT	This study
LERPR	Confirmation of *pER::ER* transgene	ATTCCATAACTGTAGACATCGG	This study

Xie Z, Lee E, Lucas JR, Morohashi K, Li D, Murray JA, Sack FD, Grotewold E. 2010. Regulation of cell proliferation in the stomatal lineage by the Arabidopsis MYB FOUR LIPS via direct targeting of core cell cycle genes. *Plant Cell* **22**, 2306-2321.

Lai LB, Nadeau JA, Lucas J, Lee EK, Nakagawa T, Zhao L, Geisler M, Sack FD. 2005. The Arabidopsis R2R3 MYB proteins FOUR LIPS and MYB88 restrict divisions late in the stomatal cell lineage. *Plant Cell* **17**, 2754-2767.

Supplementary Table S3. Female gametophyte markers used in this study.

Marker line	Expression pattern	Reference	Source
ET884	Synergids	(Groß-Hardt et al., 2007)	Dr. Ueli Grossniklaus (University of Zurich)
ET1119	Egg cell	(Groß-Hardt et al., 2007)	NASC (stock # N26012)
pMEA::GUS	Central cell	(Groß-Hardt et al., 2007)	Dr. Ueli Grossniklaus (University of Zurich)
pAGL61::GFP	Central cell	(Steffen et al., 2008)	Dr. Gary Drews (University of Utah)

Groß-Hardt R, Kagi C, Baumann N, Moore JM, Baskar R, Gagliano WB, Jurgens G, Grossniklaus U. 2007. LACHESIS restricts gametic cell fate in the female gametophyte of Arabidopsis. *PLoS Biol* **5**, e47.

Steffen JG, Kang IH, Portereiko MF, Lloyd A, Drews GN. 2008. AGL61 interacts with AGL80 and is required for central cell development in Arabidopsis. *Plant Physiol* **148**, 259-268.

Table S4. Stages of floral, ovule and gametophyte development.

Floral stage[a]	Landmarks at beginning of stage	Ovule stage[b]	Ovule landmarks at beginning of stage	Gametophyte/embryo/ endosperm landmarks at beginning of stage
8	Locules appear in medial stamens	**1-I**	Ovule buttresses arise	
9	Petal primordial become stalked	**1-II**	Buttresses enlarge	
10	Petal height level with lateral stamens	**2-I**		MMC enlarges
		2-II	Inner integument initiates	
		2-III	Outer integument initiates, chalazal nucellus divides	
11	Stigmatic papillae appear	**2-IV**	Chalazal nucellus enlarges	Meiosis
		2-V	Integuments extend toward the apex of nucellus	Tetrad formation
12	Petal height level with medial stamens	**3-I**	Outer integument envelops nucellus and inner integument, funiculus and nucellus curve	Degenerating tetrad with mono-nuclear embryo sac
		3-II	Outer integument surrounds nucellus, micropylar end points more than 90 degrees away from funiculus, further differential growth of integuments	2 nuclei in embryo sac
		3-III	Micropylar end points away from funiculus about 90 degrees	Vacuole appears in embryo sac
		3-IV	Inner integument surrounds nucellus, endothelium differentiates	4 nuclei in embryo sac
		3-V		8 nuclei in embryo sac, cellularization
		3-VI	Additional cell layer initiated in inner integument	Central cell nuclei fuse, antipodal cells degenerate
13	Petals visible above sepals, bud opens, anthesis	**4-I**	Micropyle next to funiculus	Fertilization, vacuole in egg cell breaks down
		4-II	Additional cell layer in	1st nuclear division in

			inner integument continues to grow	endosperm
14	Medial anthers extend above stigma	**4-III**		Migration of one endosperm nucleus to chalazal end
		4-IV		2nd nuclear division in endosperm
		4-V	Micropylar end turned back 90 degrees from funiculus	3rd nuclear division in endosperm, 2 chalazal nuclei reside within cytoplasmic pocket, zygote elongates
15	Stigma extends above medial anthers	**4-VI**		Further nuclear division in endosperm, one-cell embryo proper
16	Petals and sepals withering			
17	Organ abscission from siliques			
18	Siliques turn yellow			
19	Valves of silique separate			
20	Seed dispersal			

[a]Based on (Smyth *et al.*, 1990); [b]Based on (Schneitz *et al.*, 1995).

Smyth DR, Bowman JL, Meyerowitz EM. 1990. Early flower development in *Arabidopsis*. *Plant Cell* **2**, 755-767.

Schneitz K, Hulskamp M, Pruitt RE. 1995. Wild type ovule development in Arabidopsis thailana: a light microscope study of cleared whole mount tissue. *Plant J.* **7**, 731-749.