Supplementary Material

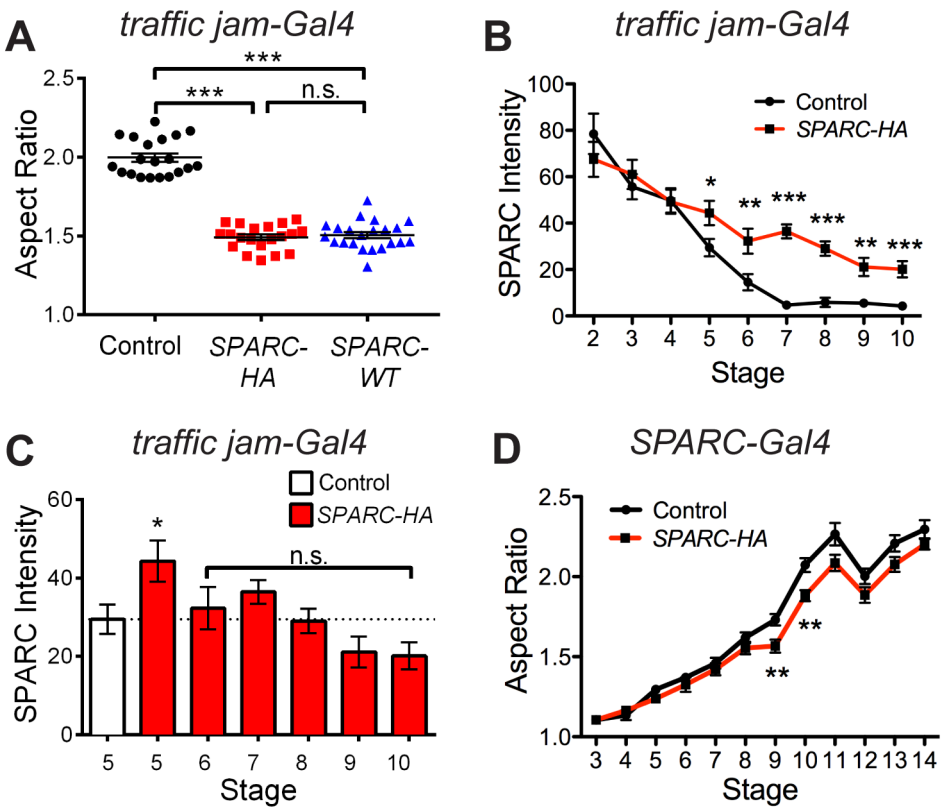

Figure S1. SPARC down-regulation is necessary for egg chamber elongation.

(A) Expression of a *SPARC-HA* or an untagged *SPARC-WT* transgene with *traffic jam-Gal4* similarly inhibit egg chamber elongation. Stage 14. (B-C) Mean SPARC immunofluorescence intensity in Control and *traffic jam-Gal4; UAS-SPARC-HA* egg chambers across stages. n=12-18 egg chambers per data point. (B) *SPARC-HA* expression with *traffic jam-Gal4* increases total SPARC levels after stage 4. (C) The level of persistent *SPARC-HA* expression is not significantly different from the endogenous expression level at stage 5. (D) *SPARC-Gal4*-driven *SPARC-HA* expression does not affect egg chamber elongation. n = 9-12 egg chambers per data point. (A-D) Data represent mean with s.e.m. Some error bars are too small to be seen. t-test * = P<0.05, ** = P<0.005, *** = P<0.0005.

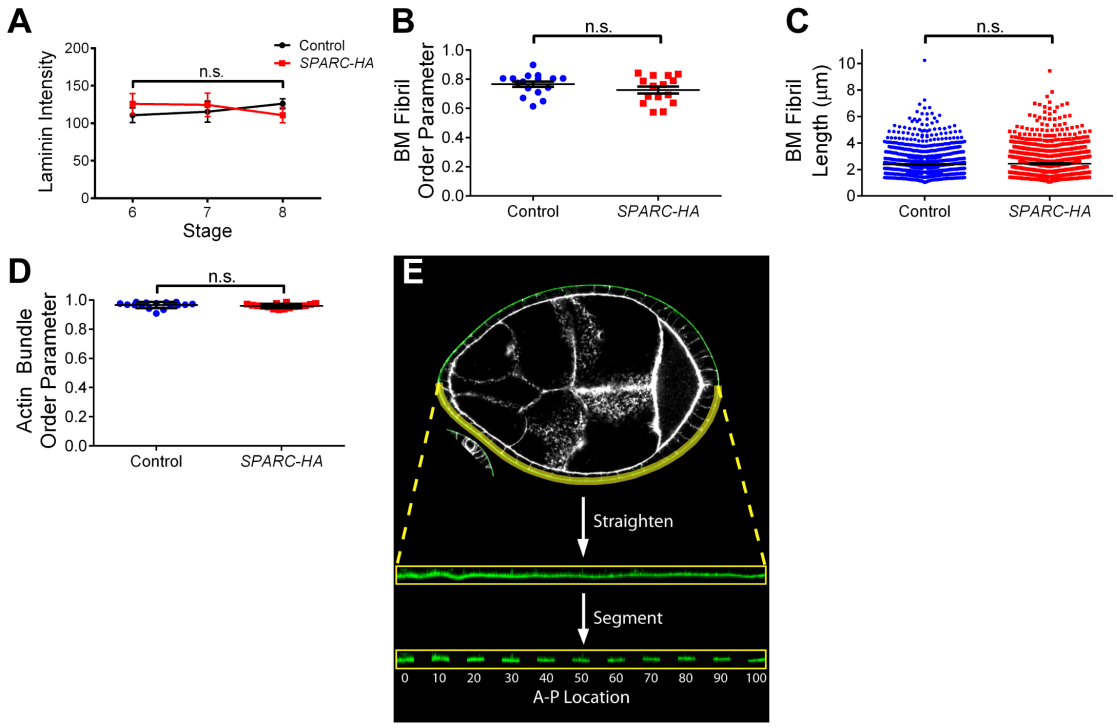

Figure S2. Persistent *SPARC* expression specifically lowers BM Col IV levels.

(A) Persistent *SPARC-HA* expression does not alter BM Laminin levels. n = 10-20 egg chambers per data point. (B-C) Persistent *SPARC* expression does not alter the global alignment (B) or mean length (C) of Col IV fibrils in the BM. (D) Persistent *SPARC* expression does not alter global alignment of actin bundles at the basal epithelial surface. (B, D) The order parameter describes the degree to which linear objects are aligned with one another; 1 = perfect alignment, 0 = random orientation. (E) Method for measuring Col IV-GFP intensity in the *mirror-Gal4* experiments shown in Figure 2I-L. BMs in transverse sections were outlined from anterior to posterior tip, straightened, segmented, and labeled according to location along the A-P axis. 0 represents anterior tip, 100 represents posterior tip of egg chamber. Mean GFP intensity of each region was then measured. (A-D) Data represent mean with s.e.m. t-test n.s. = P>0.05.

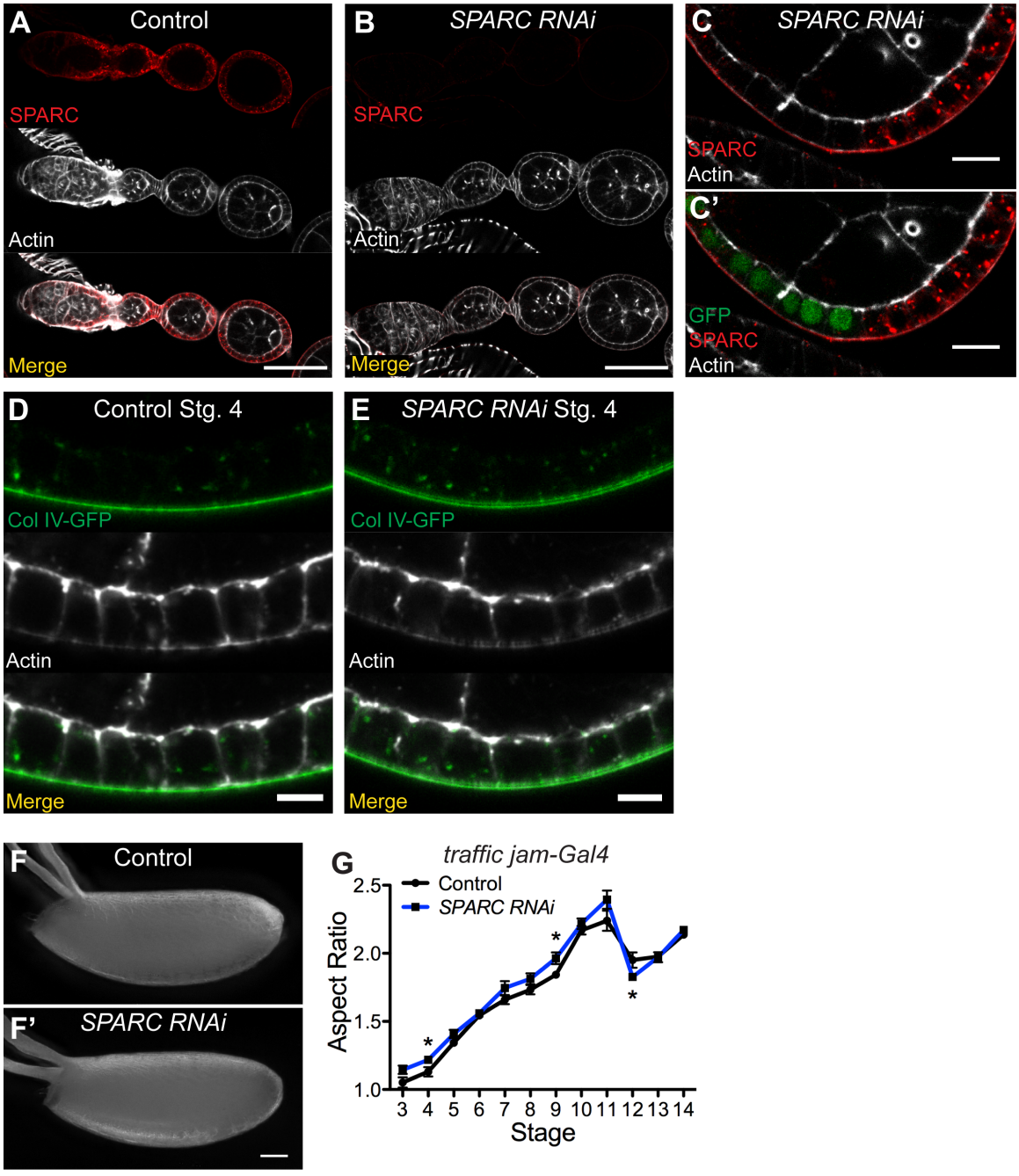
A
Control
SPARC
Actin
Merge
B
SPARC RNAi
SPARC
Actin
Merge
C
SPARC RNAi
SPARC
Actin
C'
GFP
SPARC
Actin
D
Control Stg. 4
Col IV-GFP
Actin
Merge
E
SPARC RNAi Stg. 4
Col IV-GFP
Actin
Merge
F
Control
F'
SPARC RNAi
G
traffic jam-Gal4
Control
SPARC RNAi
Aspect Ratio
2.5
2.0
1.5
1.0
3 4 5 6 7 8 9 10 11 12 13 14
Stage
*
*
*

Figure S3. SPARC knockdown does not affect egg chamber elongation.

(A-C) *SPARC RNAi* effectively depletes SPARC protein from follicle cells. (A-B) *SPARC RNAi* expression with *traffic jam-Gal4* removes SPARC immunofluorescence signal from the BM and follicle cells. (C-C') *SPARC RNAi* expression strongly reduces intracellular SPARC signal in a follicle cell clone. GFP marks *SPARC RNAi*-expressing cells. Persistent SPARC signal adjacent to the basal side of the *SPARC RNAi* clone is extracellular SPARC deposited non-autonomously into the BM by wild-type cells during egg chamber rotation. Stage 3. (D-E) *SPARC RNAi* does not alter the amount or distribution of intracellular or extracellular Col IV-GFP in the follicle cells. Stage 4. (F-G) *SPARC RNAi* expression with *traffic jam-Gal4* does not affect egg chamber elongation. (F-F') Representative Control and *SPARC RNAi* eggs. (G) Quantification of elongation in *SPARC RNAi*-expressing egg chambers. n=6-30 egg chambers per data point. Data represent mean with s.e.m. Some error bars are too small to be seen. t-test * = $P<0.05$, ** = $P<0.005$, *** = $P<0.0005$. Scale bars: 50 μm (A-B, F), 10 μm (C), 5 μm (D-E).

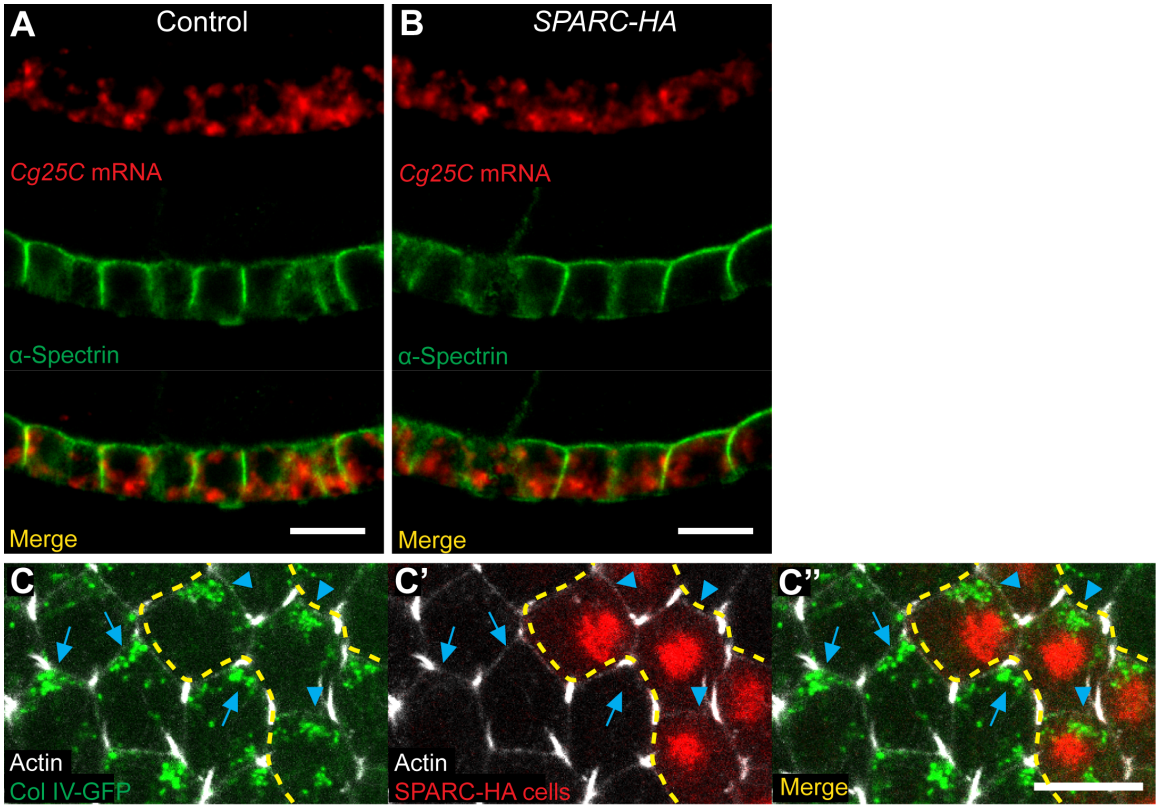

Figure S4. Persistent *SPARC* expression does not affect Col IV production or exocytosis.

(A-B) *In situ* hybridization against the mRNA encoding the Col IV α1 chain Collagen gene at 25C (Cg25C). *SPARC-HA* expression does not alter the amount or distribution of *Cg25C* mRNA. (C) Intracellular Col IV-GFP in a *SPARC-HA* mosaic epithelium. The amount and distribution of intracellular Col IV-GFP is indistinguishable between wild-type cells (arrow) and *SPARC-HA* cells (arrowheads), indicating no effect of SPARC-HA on Col IV protein production or exocytosis. RFP indicates *SPARC-HA* expressing cells. Yellow line outlines *SPARC-HA* clone. (A-C) Stage 8. Scale bars: 10 μm.

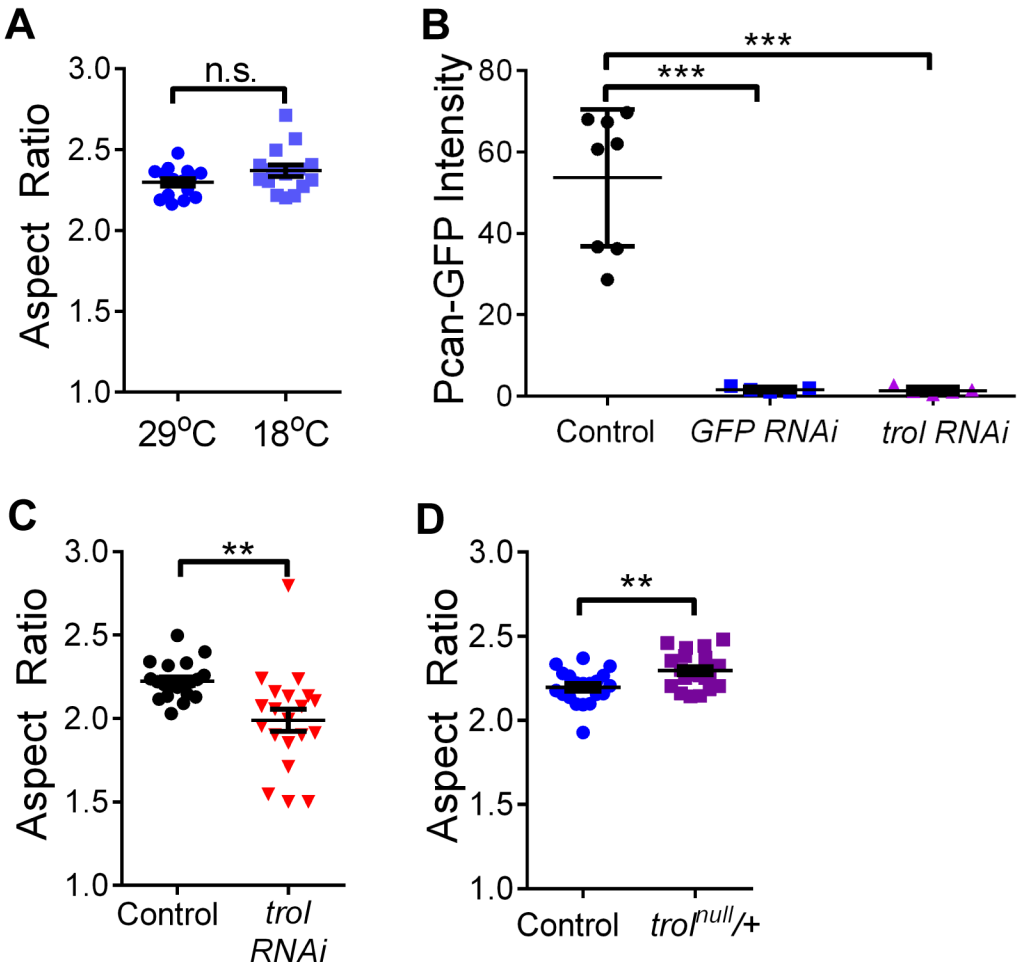

Figure S5. Basement membrane protein levels regulate egg chamber elongation.

(A) Aspect ratio does not differ between wild-type flies aged at 29°C vs. 18°C. (B) Quantification of BM Pcan-GFP intensity. *GFP RNAi* and *trol RNAi* effectively remove Pcan-GFP signal. Stage 8. n = 5-8 egg chambers per condition. (C) Depletion of Perlecan via expression of *trol RNAi* inhibits egg chamber elongation. (D) Egg chambers heterozygous for a *trol* null mutation exhibit slight hyper-elongation. (A, C-D) Stage 14. (A-D) Data represent mean with s.e.m. Some error bars are too small to be seen. t-test ** = P<0.005, *** = P<0.0005.

Supplementary Movie 1. Prolonged *SPARC* expression does not alter egg chamber rotation dynamics.

20 minute time-lapse movie of stage 8 follicle cell migration in control (left) and *tj-Gal4;SPARC-HA* (right) egg chambers. Cell membranes are marked with Neuroglian-GFP and Indy-GFP. Scale: 5 μm.

Supplementary Table S1
Detailed Experimental Genotypes.

Figure	Panel	Genotype
1	B	*w; tj-Gal4, vkg-GFP/+*
	C D	*w; vkg-GFP/vkg-GFP*
	E	w^{1118}
	F G	*w; tj-Gal4/+* *w; tj-Gal4/+; UAS-SPARC-HA/+*
2	A	*w; tj-Gal4, vkg-GFP/vkg-GFP* *w; tj-Gal4, vkg-GFP/vkg-GFP; UAS-SPARC-HA/+*
	B D	*w; tj-Gal4, vkg-GFP/vkg-GFP*
	C E	*w; tj-Gal4, vkg-GFP/vkg-GFP; UAS-SPARC-HA/+*
	F	*w, Nrg-GFP/+; tj-Gal4/+; Indy-GFP/+* *w, Nrg-GFP/+; tj-Gal4/+; Indy-GFP/UAS-SPARC-HA*
	G	*w, Nrg-GFP/+; tj-Gal4/+; Indy-GFP/+*
	H	*w, Nrg-GFP/+; tj-Gal4/+; Indy-GFP/UAS-SPARC-HA*
	I K	*w; UAS-eGFP/+; mirror-Gal4/+*
	J	*w; vkg-GFP/+; mirror-Gal4/UAS-SPARC-HA*
	L	*w; vkg-GFP/+; mirror-Gal4/+* *w; vkg-GFP/+; mirror-Gal4/UAS-SPARC-HA*
3	A	*w; ubi-nls-mRFP, vkg-GFP, FRT40A/FRT40A; T155-Gal4, UAS-FLP/UAS-SPARC-HA*
	B E	*w; tj-Gal4, vkg-GFP/+*
	C	*w; tj-Gal4, vkg-GFP/+; UAS-Crag RNAi*$^{TRiP.HMS00241}$*/+*
	D F	*w; tj-Gal4, vkg-GFP/+; UAS-PH4αEFB RNAi*$^{TRiP.HMS00835}$*/+*
	G	*w; tj-Gal4, vkg-GFP/vkg-GFP* *w; tj-Gal4/+*
4	A	*w; tj-Gal4, vkg-GFP/+*
	B	*w; tj-Gal4, vkg-GFP/+; UAS-SPARC-HA/+*
	C	*w; tj-Gal4, vkg-GFP/UAS-vkg RNAi*^{V16986}
	D	*w; tj-Gal4, vkg-GFP/+* *w; tj-Gal4, vkg-GFP/+; UAS-SPARC-HA/+* *w; tj-Gal4, vkg-GFP/UAS-vkg RNAi*^{V16986}
	E	*w; tj-Gal4/+* *w; tj-Gal4/+; UAS-SPARC-HA/+* *w; tj-Gal4/UAS-vkg RNAi*^{V16986}
	F	*trol-GFP/+; tj-Gal4/+*
	G	*trol-GFP/+; tj-Gal4/+; UAS-SPARC-HA/+*
	H	*trol-GFP/+; tj-Gal4/UAS-vkg RNAi*^{V16986}
	I	*trol-GFP/+; tj-Gal4/+* *trol-GFP/+; tj-Gal4/+; UAS-SPARC-HA/+* *trol-GFP/+; tj-Gal4/UAS-vkg RNAi*^{V16986}
	J K L M	*trol-GFP/trol-GFP*
	N	*w; tj-Gal4/+*

		w; tj-Gal4/+; UAS-trol-RG/+
	O	*trol-GFP/+; tj-Gal4/+* *trol-GFP/+; tj-Gal4/UAS-GFP.dsRNA*^{BL9330}
	P	*trol-GFP/+; tj-Gal4/+* *trol-GFP/+; tj-Gal4/UAS-GFP.dsRNA*^{BL9330} *trol-GFP/+; tj-Gal4/+; UAS-SPARC-HA/UAS-mcd8-RFP*^{BL32218} *trol-GFP/+; tj-Gal4/UAS-GFP.dsRNA*^{BL9330}*; UAS-SPARC-HA/+*
S1	A	*w; tj-Gal4, vkg-GFP/vkg-GFP* *w; tj-Gal4, vkg-GFP/vkg-GFP; UAS-SPARC-HA/+* *w; tj-Gal4, vkg-GFP/vkg-GFP; UAS-SPARC-2/+*
	B C	*w; tj-Gal4, vkg-GFP/+* *w; tj-Gal4, vkg-GFP/+; UAS-SPARC-HA/+*
	D	*w; ; SPARC-Gal4/+* *w; ; SPARC-Gal4/UAS-SPARC-HA*
S2	A	*w; tj-Gal4/+* *w; tj-Gal4/+; UAS-SPARC-HA/+*
	B C D	*w; tj-Gal4, vkg-GFP/+* *w; tj-Gal4, vkg-GFP/+; UAS-SPARC-HA/+*
S3	A	*w; tj-Gal4/+*
	B	*w; tj-Gal4/+; UAS-SPARC RNAi*^{V16678}*/+*
	C	*w; hs-FLP/+; ; act5c>>Gal4, UAS-GFP/UAS-SPARC RNAi*^{V16678}
	D	*w; tj-Gal4, vkg-GFP/+*
	E	*w; tj-Gal4, vkg-GFP/+; UAS-SPARC RNAi*^{V16678}*/+*
	F G	*w; tj-Gal4/+* *w; tj-Gal4/+; UAS-SPARC RNAi*^{V16678}*/+*
S4	A	*w; tj-Gal4/+*
	B	*w; tj-Gal4/+; UAS-SPARC-HA/+*
	C	*w; hs-FLP/+;vkg-GFP/vkg-GFP; act5c>>Gal4, UAS-GFP/UAS-SPARC-HA*
S5	A	*w;tj-Gal4/+*
	B	*trol-GFP/+; tj-Gal4/+* *trol-GFP/+; tj-Gal4/UAS-GFP.dsRNA*^{BL9330} *trol-GFP/+; tj-Gal4/+; UAS-trol RNAi*$^{TRiP.JF03376}$*/+*
	C	*trol-GFP/+; tj-Gal4/+* *trol-GFP/+; tj-Gal4/+; UAS-trol RNAi*$^{TRiP.JF03376}$*/+*
	D	*w*^{1118} *trol*^{null}*/w*^{1118}

Supplementary Table S2
Most crosses were raised at 25°C and females aged on yeast for 3 days at 29°C. Experiments using different conditions are detailed below.

Figure	Panels	Temp at which cross was raised	Females on yeast	
			Temp	No. days
1	C	25	RT	4
	D	25	25	2
	E (Red)	25	25	4
	E (Blue)	25	25	3
2	I	25	25	3
	J	25	25	2
3	C	25	29	2
	D E F G	25	25	3
4	A B F G	18	29	3
	C H	18	18	3
	D E I (Control, *SPARC-HA*)	18	29	3
	D E I (*vkg RNAi*)	18	18	3
	O	22	25	3
S2	A	25	29	4
S3	C	25	HS	3
S4	C	25	HS	3
S5	A (29°C)	18	29	3
	A (18°C)	18	18	3
	B C	22	25	3
	D	25	25	3

Supplementary Table S3
Gal4 drivers used and expression patterns.

Gal4 driver	**Expression pattern**
traffic jam-Gal4 (tj-Gal4)	All follicle cells, all stages
mirror-Gal4	Central follicle cells, stage 7 and later
SPARC-Gal4	Early stage follicle cells (endogenous SPARC expression pattern)
hs-FLP; act5c>>Gal4, UAS-GFP	Clonal FLP-out expression