Supplementary File 1. N values and details of statistical analyses performed.

Figure	Panel	n	Mean ± SD	p	Statistical test and notes
1	G, H	0 somites: 3 embryos (565, 474, 488 cells) 4-6 somites: 6 embryos (857, 761, 825, 718, 667, 889 cells) 7-9 somites: 5 embryos (1000, 1270, 1198, 1047, 1377 cells)	36.59 ± 2.20 μm^2 24.86 ± 2.82 μm^2 16.62 ± 2.16 μm^2	0 vs. 4-6: p = 0.0027 0 vs. 7-9: p = 0.0006 4-6 vs. 7-9: p = 0.0011	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons) Does not assume equal SDs
2	B, C	0-2 somites: 3 embryos (205, 158, 174 cells) 5 somites: 3 embryos (205, 231, 197 cells) 7-9 somites: 3 embryos (192, 164, 166 cells)	48.25 ± 4.99 μm^2 41.22 ± 2.22 μm^2 49.42 ± 3.32 μm^2	0-2 vs. 5: p = 0.2470 0-2 vs. 7-9: p = 0.9781 5 vs. 7-9: p = 0.0878	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons) Does not assume equal SDs
2 S1	B	0 somites: 3 embryos (393, 341, 331 cells) 4-6 somites: 6 embryos (447, 595, 632, 517, 566, 484 cells) 7-9 somites: 5 embryos (552, 711, 979, 799, 915 cells)	ML: 49.81 ± 2.97% AP: 50.19 ± 2.97% ML: 69.15 ± 9.18% AP: 30.85 ± 9.18% ML: 78.17 ± 8.52% AP: 21.83 ± 8.52%	0 vs. 4-6: p = 0.0085 0 vs. 7-9: p = 0.0003 4-6 vs. 7-9: p = 0.2228	Two-way ANOVA (Sidak's multiple comparisons)
	C	0 somites: 3 embryos (393, 341, 331 cells)	1.10 ± 0.03	0 vs. 4-6: p = 0.0233	Brown-Forsythe and Welch One-way ANOVA

		4-6 somites: 6 embryos (447, 595, 632, 517, 566, 484 cells) 7-9 somites: 5 embryos (552, 711, 979, 799, 915 cells)	1.34 ± 0.15 1.49 ± 0.19	0 vs. 7-9: p = 0.0322 4-6 vs. 7-9: p = 0.4490	(Dunnett's T3 multiple comparisons) Does not assume equal SDs
	E	0 somites: 3 embryos (134, 109, 96 cells) 4-6 somites: 3 embryos (132, 148, 131 cells) 7-9 somites: 3 embryos (121, 107, 102 cells)	ML: 66.12 ± 10.41% AP: 33.86 ± 10.41% ML: 62.89 ± 16.14% AP: 37.10 ± 16.14% ML: 67.62 ± 15.89 % AP: 32.37 ± 15.89%	0 vs. 4-6: p > 0.9999 0 vs. 7-9: p > 0.9999 4-6 vs. 7-9: p > 0.9999	Two-way ANOVA (Sidak's multiple comparisons)
	F	0 somites: 3 embryos (134, 109, 96 cells) 4-6 somites: 6 embryos (132, 148, 131 cells) 7-9 somites: 5 embryos (121, 107, 102 cells)	1.24 ± 0.16 1.28 ± 0.25 1.42 ± 0.31	0 vs. 5: p = 0.9939 0 vs. 7-9: p = 0.7590 5 vs. 7-9: p = 0.8903	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons) Does not assume equal SDs
3	B	0-1 somite: 3 embryos 6-7 somites: 4 embryos 8-9 somites: 4 embryos	1.34 ± 0.02 1.16 ± 0.02 0.95 ± 0.07	0-1 vs. 6-7: p = 0.0023 0-1 vs. 8-9: p < 0.0001 6-7 vs. 8-9: p = 0.0004	One-way ANOVA (Tukey's multiple comparisons)

	C	0-1 somite: 3 embryos 6-7 somites: 4 embryos 8-9 somites: 4 embryos	32.94 ± 3.59 µm 30.84 ± 2.18 µm 51.74 ± 3.21 µm	0-1 vs. 6-7: p = 0.6438 0-1 vs. 8-9: p < 0.0001 6-7 vs. 8-9: p < 0.0001	One-way ANOVA (Tukey's multiple comparisons)
	D	0-1 somite: 3 embryos 6-7 somites: 4 embryos 8-9 somites: 4 embryos	18.38 ± 3.34 µm 18.68 ± 2.22 µm 30.40 ± 1.90 µm	0-1 vs. 6-7: p = 0.9858 0-1 vs. 8-9: p = 0.0005 6-7 vs. 8-9: p = 0.0004	One-way ANOVA (Tukey's multiple comparisons)
	E	0-1 somite: 3 embryos 6-7 somites: 4 embryos 8-9 somites: 4 embryos	1.81 ± 0.13 1.67 ± 0.25 1.71 ± 0.20	0-1 vs. 6-7: p = 0.6798 0-1 vs. 8-9: p = 0.8234 6-7 vs. 8-9: p = 0.9587	One-way ANOVA (Tukey's multiple comparisons)
	G	408 cells, 3 embryos (111, 169, 128 cells)	N/A	N/A	N/A
	I	60 cells, 3 embryos (20, 20, 20 cells)	N/A	N/A	N/A
3 S1	A	0-1 somite: 3 embryos 6-7 somites: 4 embryos 8-9 somites: 4 embryos	652.5 ± 95.9 µm 494.9 ± 33.4 µm 406.5 ± 32.5 µm	0-1 vs. 6-7: p = 0.0149 0-1 vs. 8-9: p = 0.0011 6-7 vs. 8-9: p = 0.1236	One-way ANOVA (Tukey's multiple comparisons)
	B	0-1 somite: 3 embryos 6-7 somites: 4 embryos	486.5 ± 71.1 µm 425.6 ± 29.1 µm	0-1 vs. 6-7: p = 0.0976 0-1 vs. 8-9: p = 0.1320	One-way ANOVA (Tukey's multiple comparisons)

		8-9 somites: 4 embryos	427.5 ± 7.5 µm	6-7 vs. 8-9: p = 0.9998	
3 S2	B	3 embryos (50, 50, 50 cells)	E1: 0.17 ± 1.13 E2: 0.60 ± 1.61 E3: 0.03 ± 0.99	N/A	N/A
4	J	WT: 4 embryos (1415, 1367, 1186, 1240 cells) *Ift122*: 4 embryos (932, 906, 935, 757 cells)	13.63 ± 0.82 µm^2 21.06 ± 2.00 µm^2	p=0.0024	Welch's t-test Does not assume equal SDs
	K	WT: 5208 cells, 4 embryos *Ift122*: 3530 cells, 4 embryos	N/A (D = 0.2763)	p<0.0001	Kolmogorov-Smirnov
	L	WT: 4 embryos (1171, 1162, 1116, 1148 cells) *Ttc21b*: 3 embryos (580, 687, 613 cells)	15.60 ± 0.78 µm^2 30.05 ± 2.39 µm^2	p=0.0058	Welch's t-test Does not assume equal SDs
	M	WT: 4597 cells, 4 embryos *Ttc21b*: 1880 cells, 3 embryos	N/A (D = 0.4536)	p<0.0001	Kolmogorov-Smirnov
4 S4	A	WT: 4 embryos (835, 1138, 1052, 990 cells) *Ift122*: 4 embryos (715, 867, 626, 563 cells)	WT ML: 72.32 ± 2.74% WT AP: 27.68 ± 2.74% *Ift122* ML: 65.14 ± 1.89% *Ift122* AP: 34.86 ± 1.89%	WT vs. *Ift122* ML: p = 0.0020 WT vs. *Ift122* AP: p = 0.0020	Two-way ANOVA (Sidak's multiple comparisons)
	B	WT: 4 embryos (835, 1138, 1052, 990 cells)	1.33 ± 0.03 1.22 ± 0.04	p = 0.0058	Welch's t-test Does not

		Ift122: 4 embryos (715, 867, 626, 563 cells)			assume equal SDs
	C	WT: 3 embryos (146, 170, 195 cells) *Ift122*: 3 embryos (372, 599, 414 cells)	WT ML: 59.80 ± 15.49% WT AP: 40.20 ± 15.49% *Ift122* ML: 65.18 ± 11.60% *Ift122* AP: 34.82 ± 11.60%	WT vs. *Ift122* ML: p = 0.8725 WT vs. *Ift122* AP: p = 0.8725	Two-way ANOVA (Sidak's multiple comparisons)
	D	WT: 3 embryos (146, 170, 195 cells) *Ift122*: 3 embryos (372, 599, 414 cells)	1.20 ± 0.16 1.26 ± 0.12	p = 0.6810	Welch's t-test Does not assume equal SDs
	E	WT: 4 embryos (913, 898, 870, 912 cells) *Ttc21b*: 3 embryos (415, 489, 411 cells)	WT ML: 72.36 ± 3.00% WT AP: 27.64 ± 3.00% *Ttc21b* ML: 59.99 ± 6.91% *Ttc21b* AP: 40.01 ± 6.91%	WT vs. *Ttc21b* ML: p = 0.0167 WT vs. *Ttc21b* AP: p = 0.0167	Two-way ANOVA (Sidak's multiple comparisons)
	F	WT: 4 embryos (913, 898, 870, 912 cells) *Ttc21b*: 3 embryos (415, 489, 411 cells)	1.34 ± 0.09 1.22 ± 0.07	p = 0.0863	Welch's t-test Does not assume equal SDs
4 S5	E	WT: 3 embryos	WT 0-100: 2.34 ± 0.76 % WT 100-200: 3.48 ± 0.50 % WT 200-300: 4.12 ± 0.59 % WT 300-400: 3.60 ± 0.72 %	WT vs. *Ift122* 0-100: p > 0.9999 100-200: p = 0.9950 200-300: p > 0.9999	Two-way ANOVA (Sidak's multiple comparisons)

		Ift122: 3 embryos	*Ift122* 0-100: 2.37 ± 0.83 % *Ift122* 100-200: 3.67 ± 0.59 % *Ift122* 200-300: 4.05 ± 0.15 % *Ift122* 300-400: 3.62 ± 0.75 %	300-400: p > 0.9999	
	F	WT: 3 embryos *Ttc21b*: 3 embryos	WT 0-100: 3.25 ± 0.36 % WT 100-200: 4.31 ± 0.48 % WT 200-300: 4.22 ± 0.31 % WT 300-400: 4.40 ± 0.38 % *Ttc21b* 0-100: 2.78 ± 0.29 % *Ttc21b* 100-200: 4.52 ± 0.16 % *Ttc21b* 200-300: 4.25 ± 0.26 % *Ttc21b* 300-400: 4.18 ± 0.90 %	WT vs. *Ttc21b* 0-100: p = 0.6082 100-200: p = 0.9633 200-300: p > 0.9999 300-400: p > 0.9618	Two-way ANOVA (Sidak's multiple comparisons)
4 S6	B	WT: 3 embryos *Ttc21b*: 3 embryos	77.00 ± 5.57 cells 75.33 ± 5.13 cells	p = 0.7225	Welch's t-test Does not assume equal SDs
5	C, D	WT lateral: 4 embryos (data from Figure 4K) WT midline: 3	N/A	N/A	N/A

		embryos (276, 316, 285 cells) *Ift122* lateral: 4 embryos (data from Figure 4K) *Ift122* midline: 3 embryos (516, 441, 539 cells)			
	E	WT lateral: 4 embryos (data from Figure 4J) WT midline: 3 embryos (276, 316, 285 cells) *Ift122* lateral: 4 embryos (data from Figure 4J) *Ift122* midline: 3 embryos (516, 441, 539 cells)	WT: lateral: 13.63 ± 0.82 μm^2 midline: 32.45 ± 2.18 μm^2 *Ift122*: lateral: 21.06 ± 2.00 μm^2 midline: 19.23 ± 2.37 μm^2	WT lat vs. WT mid: p = 0.0149 *Ift122* lat vs. *Ift122* mid: p = 0.8383 WT lat vs. *Ift122* lat: p = 0.0100 WT lat vs. *Ift122* mid: p = 0.1723 WT mid vs. *Ift122* lat: p = 0.0091 WT mid vs. *Ift122* mid: p = 0.0090	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons) Does not assume equal SDs
	G	WT: 3 embryos *Ift122*: 3 embryos	N/A	N/A	N/A
	H	WT: 3 embryos *Ttc21b*: 3 embryos	N/A	N/A	N/A
	I	WT (lateral and midline): 3 embryos	WT: lateral: 59.80 ± 1.90 µm midline: 26.63 ± 2.97 µm	WT lat vs. WT mid: p = 0.0019 *Ift122* lat vs. *Ift122* mid: p = 0.4142	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons)

		Ift122 (lateral and midline): 3 embryos	*Ift122*: lateral: 51.13 ± 1.10 µm midline: 45.81 ± 3.96 µm	WT lat vs. *Ift122* lat: p = 0.0239 WT lat vs. *Ift122* mid: p = 0.0433 WT mid vs. *Ift122* lat: p = 0.0034 WT mid vs. *Ift122* mid: p = 0.0111	Does not assume equal SDs
5 S1	B	WT: 3 embryos *Ttc21b*: 3 embryos	WT lateral: 44.77 ± 2.66 µm WT midline: 21.40 ± 3.06 µm *Ttc21b* lateral: 48.44 ± 3.32 µm *Ttc21b* midline: 44.91 ± 6.12 µm	WT lat vs. WT mid: p = 0.0025 WT lat vs *Ttc21b* lat: p = 0.6285 WT lat vs. *Ttc21b* mid: p > 0.9999 WT mid vs. *Ttc21b* lat: p = 0.0021 WT mid vs. *Ttc21b* mid: p = 0.0352 *Ttc21b* lat vs. *Ttc21b* mid: p = 0.9140	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons) Does not assume equal SDs
	C	WT: 3 embryos *Ttc21b*: 3 embryos	420.0 ± 24.2 µm 601.3 ± 44.1 µm	p = 0.0075	Welch's t-test Does not assume equal SDs
	D	WT: 3 embryos	1.00 ± 0.04	p = 0.0076	Welch's t-test

		Ttc21b: 3 embryos	1.16 ± 0.04		Does not assume equal SDs
	E	WT: 3 embryos *Ift122*: 3 embryos	313.3 ± 14.2 µm 387.0 ± 47.9 µm	p = 0.1065	Welch's t-test Does not assume equal SDs
	F	WT: 3 embryos *Ift122:* 3 embryos	0.66 ± 0.07 0.92 ± 0.11	p = 0. 0314	Welch's t-test Does not assume equal SDs
6	B (*Ift122*)	WT: 86 cables, 3 embryos *Ift122*: 36 cables, 3 embryos	WT circular mean: 24.2° *Ift122* circular mean: 41.5°	P < 0.05	Watson nonparametric two-sample test for homogeneity
	B (*Ttc21b*)	WT: 84 cables, 3 embryos *Ttc21b:* 29 cables, 3 embryos	WT circular mean: 26.4° *Ttc21b* circular mean: 44.3°	0.05 < P < 0.10	Watson nonparametric two-sample test for homogeneity
	C (*Ift122)*	WT: 3 embryos *Ift122*: 3 embryos	28.67 ± 6.11 cables 12.33 ± 3.06 cables	p = 0.0266	Welch's t-test Does not assume equal SDs
	C (*Ttc21b*)	WT: 3 embryos *Ttc21b*: 3 embryos	28.0 ± 1.7 cables 9.7 ± 5.0 cables	p = 0.0160	Welch's t-test Does not assume equal SDs
	D (*Ift122*)	WT: 3 embryos *Ift122*: 3 embryos	50.7 ± 9.3 cables 33.3 ± 4.0 cables	p = 0.06668	Welch's t-test Does not assume equal SDs

	D (*Ttc21b*)	WT: 3 embryos *Ttc21b*: 3 embryos	43.4 ± 3.8 cables 33.7 ± 4.2 cables	p = 0.0414	Welch's t-test Does not assume equal SDs
	F (*Ift122*)	WT: 151 cables, 3 embryos *Ift122*: 100 cables, 3 embryos	WT circular mean: 34.7° *Ift122* circular mean: 45.9°	P < 0.01	Watson nonparametric two-sample test for homogeneity
	F (*Ttc21b*)	WT: 130 cables, 3 embryos *Ttc21b:* 101 cables, 3 embryos	WT circular mean: 28.8° *Ttc21b* circular mean: 40.8°	P < 0.001	Watson nonparametric two-sample test for homogeneity
	G (*Ift122*)	WT: 3 embryos (50, 50, 50 cells) *Ift122*: 3 embryos (50, 50, 50 cells)	N/A	N/A	N/A
	H (*Ttc21b*)	WT: 3 embryos (50, 50, 50 cells) *Ttc21b*: 3 embryos (50, 50, 50 cells)	N/A	N/A	N/A
7	B	WT: 3 embryos *Ift122*: 3 embryos	N/A	N/A	N/A
	C	WT: 3 embryos *Ttc21b*: 3 embryos	N/A	N/A	N/A
8	B, C	WT: 5 embryos (1129, 1011, 1047, 1269, 1105 cells) *Gli2*: 5 embryos (1075, 967, 1067, 1017, 1097 cells)	17.39 ± 0.78 μm^2 16.96 ± 1.57 μm^2	p = 0.6069	Welch's t-test Does not assume equal SDs

	E, F	WT: 5 embryos (233, 220, 161, 342, 310 cells) *Gli2*: 5 embryos (228, 257, 277, 171, 174 cells)	47.66 ± 7.20 µm^2 32.24 ± 5.98 µm^2	p = 0.0066	Welch's t-test Does not assume equal SDs
	H	WT: 5 embryos *Gli2*: 5 embryos	WT lateral: 59.54 ± 2.14 µm WT midline: 29.90 ± 1.80 µm *Gli2* lateral: 57.37 ± 5.95 µm *Gli2* midline: 50.01 ± 3.04 µm	WT lat vs. WT mid: p < 0.0001 WT lat vs. *Gli2* lat: p = 0.9555 WT lat vs. *Gli2* mid: p = 0.0038 WT mid vs. *Gli2* lat: p = 0.0009 WT mid vs. *Gli2* mid: p < 0.0001 *Gli2* lat vs. *Gli2* mid: p = 0.2100	Brown-Forsythe and Welch One-way ANOVA (Dunnett's T3 multiple comparisons) Does not assume equal SDs
8S2	A	WT: 5 embryos (903, 796, 823, 792, 860 cells) *Gli2*: 5 embryos (1023, 867, 831, 738, 836 cells)	WT ML: 74.76 ± 5.95% WT AP: 25.24 ± 5.95% *Gli2* ML: 71.73 ± 7.47% *Gli2* AP: 28.63 ± 7.47%	WT vs. *Gli2* ML: p = 0.6853 WT vs. *Gli2* AP: p = 0.6853	Two-way ANOVA (Sidak's multiple comparisons)
	B	WT: 5 embryos (903, 796, 823, 792, 860 cells) *Gli2*: 5 embryos (1023, 867, 831, 738, 836 cells)	1.31 ± 0.10 1.27 ± 0.13	p = 0.6079	Welch's t-test Does not assume equal SDs
	C	WT: 5 embryos (260, 173, 88, 105, 100 cells)	WT ML: 66.59 ± 12.01%	WT vs. *Gli2* ML: p = 0.9991	Two-way ANOVA (Sidak's

		Gli2: 5 embryos (244, 325, 180, 177, 146 cells)	WT AP: 33.41 ± 12.01% *Gli2* ML: 66.99 ± 20.28% *Gli2* AP: 33.01 ± 20.28%	WT vs. *Gli2* AP: p = 0.9991	multiple comparisons)
	D	WT: 5 embryos (260, 173, 88, 105, 100 cells) *Gli2*: 5 embryos (244, 325, 180, 177, 146 cells)	1.31 ± 0.20 1.38 ± 0.37	p = 0.7324	Welch's t-test Does not assume equal SDs
9	H	control: 3 embryos (1140, 1104, 1395 cells) Wnt1-Cre2 > SmoM2: 3 embryos (763, 867, 723 cells)	15.15 ± 1.61 μm^2 22.69 ± 2.07 μm^2	p = 0.0089	Welch's t-test Does not assume equal SDs
	I	control: 3639 cells, 3 embryos Wnt1-Cre2 > SmoM2: 2353 cells, 3 embryos	N/A (D = 0.3002)	p < 0.0001	Kolmogorov-Smirnov
	J	control: 3 embryos (225, 183, 189 cells) Wnt1-Cre2 > SmoM2: 3 embryos (188, 176, 224 cells)	43.76 ± 4.85 μm^2 43.56 ± 3.81 μm^2	p = 0.9556	Welch's t-test Does not assume equal SDs
	K	control: 597 cells, 3 embryos Wnt1-Cre2 > SmoM2: 588 cells, 3 embryos	N/A (D = 0.0320)	p = 0.9215	Kolmogorov-Smirnov
9 S1	B	control: 4 embryos Wnt1-Cre2 > SmoM2: 4 embryos	3.73 ± 0.38 % 3.64 ± 0.44 %	p = 0.7798	Welch's t-test Does not assume equal SDs

9S2	A	control: 3 embryos (887, 912, 1132 cells) SmoM2: 3 embryos (567, 655, 753 cells)	control ML: 69.99 ± 3.13% control AP: 30.01 ± 3.13% SmoM2 ML: 69.19 ± 3.72% SmoM2 AP: 30.81 ± 3.72%	control vs. SmoM2 ML: p = 0.9519 control vs. SmoM2 AP: p = 0.9519	Two-way ANOVA (Sidak's multiple comparisons)
	B	control: 3 embryos (887, 912, 1132 cells) SmoM2: 3 embryos (567, 655, 753 cells)	1.29 ± 0.05 1.29 ± 0.60	p = 0.9359	Welch's t-test Does not assume equal SDs
	C	control: 3 embryos (85, 143, 125 cells) SmoM2: 3 embryos (146, 78, 144 cells)	control ML: 66.77 ± 14.70% control AP: 33.23 ± 14.70% SmoM2 ML: 66.01 ± 19.55% SmoM2 AP: 33.99 ± 19.55%	control vs SmoM2 ML: p = 0.9983 control vs SmoM2 AP: p = 0.9983	Two-way ANOVA (Sidak's multiple comparisons)
	D	control: 3 embryos (85, 143, 125 cells) SmoM2: 3 embryos (146, 78, 144 cells)	1.31 ± 0.20 1.38 ± 0.37	p = 0.7324	Welch's t-test Does not assume equal SDs