Supporting Information

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Table S1. Statistical analysis of mitotic orientation during chick gonad development

Orientation	Left gonad ($n = 33$)	Right gonad ($n = 33$)	Right gonad + Pitx2c ($n = 47$)
Perpendicular A/P (type A)	32.43% (o: 48, e: 52)	44.44%* (o:64, e:51)	30.75% (o: 63, e: 72)
Perpendicular to cortex (type B)	24.32% (o: 36, e: 42)	33.33% (o: 48, e: 41)	27.32% (o: 56, e: 58)
Parallel to cortex (type C)	43.24%* (o: 64, e: 54)	22.22%*** (o: 32, e: 53)	41.92% (o: 86, e: 75)

Statistical analysis was performed for embryos at stage 27 HH. This stage precedes the onset of the structural changes that are responsible for the differences in shape between left and right gonads. The analysis was performed with gonad sections obtaining a P value for the whole data of <0.001. The statistical significance was calculated by using a χ^2 test. In the table, o refers to observed value and e to the expected value for each type of mitosis. Note that the percentage of type C mitosis is approximately half in the right versus the left gonad, whereas type A is more frequent in the right than in the left gonad [$P < 0.001$ when the whole set of data between left and right data is compared; *, $P < 0.01$; ***, $P < 0.001$ (when observed and expected values are compared)]. Overexpression of *pitx2c* in the right gonad shifts the percentage of mitosis distribution toward a distribution similar to that observed in wild-type left gonads ($P < 0.0001$).