**Supplemental Information**

**Specialization of CDK1 and Cyclin B paralog functions in a coenocystic mode of oogenic meiosis**

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**Fig. S1. The organizing centre (OC) disassembled before NEBD during the final stage of wild-type oocyte maturation.** (A) In immature oocytes, MPM2 staining was found on the OC, in the nucleoplasm of meiotic nuclei, and exhibited strong foci located on chromosomes. (B) As oocyte maturation progressed, the OC disassembled, and strong MPM2 foci were observed at the centromeres of bivalents, with uniform MPM2 staining in the nucleoplasm. (C) After NEBD, MPM2 staining disappeared from chromosomes, and MPM2 foci were found in the cytoplasm. Scale bars: 2 µm.



**Fig. S2.** **Impacts of *CDK1a* and *d* knockdowns on Cyclin B paralog mRNA and protein levels.** (A) RT-qPCR showed that *cyclin Ba* mRNA levels were very high, while *cyclin B3a* mRNA levels were very low in *CDK1a* RNAi ovaries. Values are presented relative to mRNA levels of EF1β and represent the mean from three biological repeats with standard errors indicated. (B) Cyclin Ba protein was low in *CDK1a* RNAi ovaries, but present as normal in *CDK1d* RNAi oocytes. Equal numbers of wild type oocytes were loaded as a positive control.



**Fig. S3. Knockdown of Cyclin B3a alone did not significantly affect oogenic meiosis or early embryogenesis, whereas double knockdown of Cyclins Ba and B3a resulted in infertility.** (A) Single knockdown efficiency of cyclin B3a mRNA levels and double knockdown efficiency of cyclin Ba and cyclin B3a mRNA levels. No significant off-target effects on other cyclin B paralogs or cyclin A were detected. (B) Compared to wild-type oocytes, more than 90% of *cycB3a* RNAi oocytes developed normally (no significant difference to WT), while none of *cycBa*; *cycB3a* double RNAi oocytes cleaved after fertilization using wild-type sperm (\*\*\*significantly different to WT; p<0.001, student t-test). UF, UnFertilized; AC, Abnormal Cleavage; D, Developed normally. The number of embryos assessed at the top of each histogram bar were derived from three independent experiments with standard errors indicated.



**Fig. S4. In wild-type oocyte chromatin, H3-pS28 staining shifts from chromosome arms to centromeres during prometaphase I, concurrently with enrichment of Aurora B kinase on centromeres.** (A) Before NEBD, Aurora B was evenly distributed in meiotic nuclei, and H3-pS28 labelled whole chromosomes. (B) After NEBD, Aurora B and H3-pS28 co-located on centromeres. C) At metaphase I, Aurora B and H3-pS28 co-localized on centromeres. Scale bars: 2 µm.