

Supplementary Figure Legends

Supplementary Fig. 1. qRT-PCR experiments to confirm that *UAS-RNAi* stocks used in this study can deplete the relevant mRNAs efficiently.

(A-E) qRT-PCR to quantitate mRNA encoding Nup62(A), Nup58(B), Nup54(C), Emb(D) and Rae1(E). Total RNAs were extracted from adult testes of control males (*bam>dcr2*), *bam>dcr2 Nup62RNAi^{GLV21060}* males, *bam>dcr2 Nup62RNAi^{KK10831}* males, *bam>dcr2 Nup58RNAi^{HMC5104}* males, *bam>dcr2 Nup58RNAi^{KK101515}* males, *bam>dcr2 Nup54RNAi^{HMC04733}* males, *bam>dcr2 Nup54RNAi^{GD42153}* males, *bam>dcr2 embRNAi^{HMS00991}* males, *bam>dcr2 embRNAi^{JF01311}* males, and *bam>dcr2 rae1RNAi^{HMC00670}* males. qRT-PCR analysis to quantitate amount of mRNA of each gene was repeated three times. Relative mRNA levels of the genes were calculated and normalized to the control level, which was set to 1.0. *** $p < 0.001$, Student's *t*-test. Error bars represent s.d.

Supplementary Fig. 2. Immunostaining of premeiotic spermatocytes to confirm that Nup54, another component of Nup62 complex is not localized on nuclear envelope in the Nup62-depleted spermatocytes.

(A, B) Simultaneous immunostaining of the spermatocytes expressing Nup54-HA before meiosis I with anti-LaminDm0 and anti-HA antibodies. (A) Normal spermatocytes at later growth stage. (B) The spermatocytes depleted of Nup62 at the equivalent stage. DAPI staining (blue in A and B, white in A' and B'), anti-LaminDm0

immunostaining (green in A and B, white in A'' and B''), anti-HA immunostaining for detecting Nup54-HA (red in A and B, white in A''' and B''').

Supplementary Fig. 3. Intact cysts consisted of early spermatocytes generated from mitoses of spermatogonia and those of post-meiotic cells derived from spermatocytes depleted of Nup62

(A-D) Phase contrast micrographs of intact cysts consisted of pre-and post-meiotic cells. (A, C) A whole cyst of spermatocytes at S2b stage. The cells at this developmental stage show a characteristic organelle organization that a nucleus is localized to be shifted from the center and mitochondria are assembled beside the nucleus. Therefore, it is easier to find the cysts out in a large number of testis cells. (B, D) Whole cysts of post-meiotic cells at onion stage just after completion of meiosis II. Intact cysts prepared from control testes (*nos>dcr2*) (B) and from testes depleted of *Nup62* (*nos>dcr2 Nup62RNAi^{GLV21060}*) (D). (A'-D') DAPI staining. DNA is colored in red (A-D) or in white (A'-D'). Margin of a cell is encircled by a dotted line (A-A''). (A''-D'') Phase-contrast micrographs of the cysts. Bar: 10 μ m.