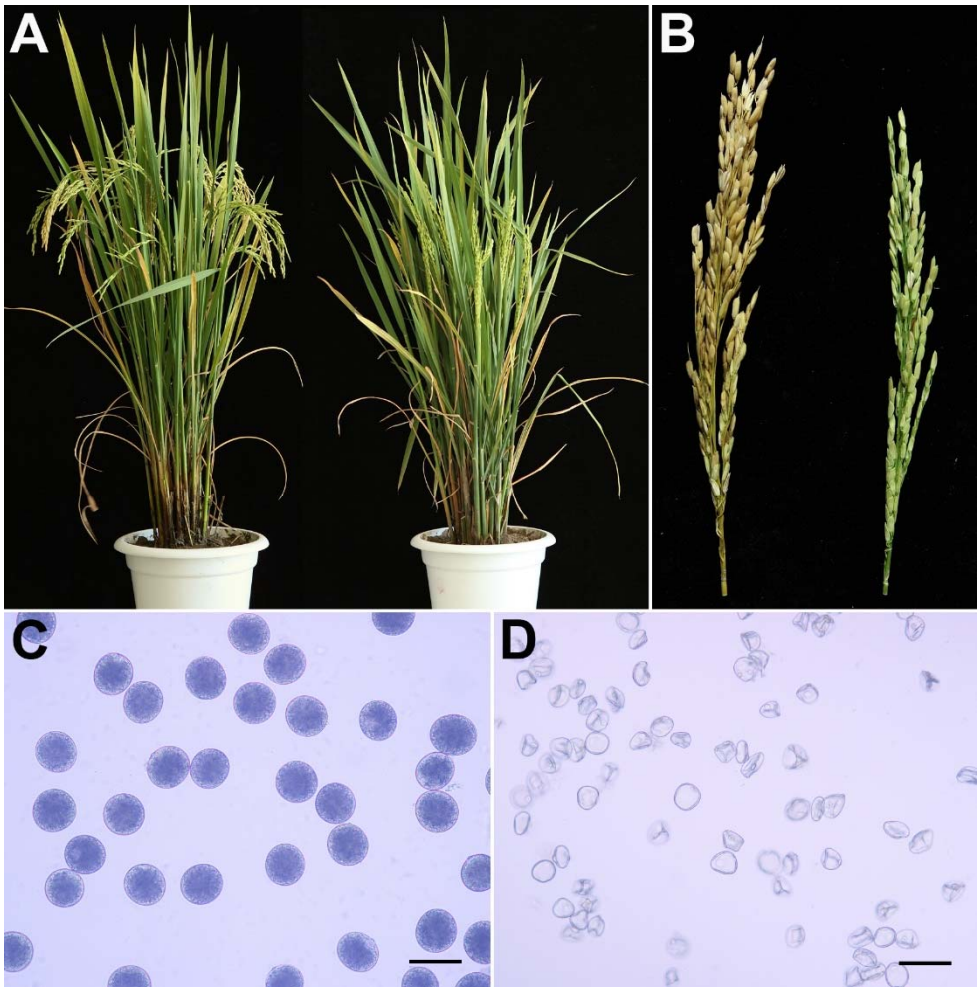

Figure S1 Phenotype characterization of the *Osmsh4-1* mutant.

A, Comparison of a wild type (WT) plant (left) and an *Osmsh4-1* plant (right).

B, Comparison of WT panicles (left) and *Osmsh4-1* panicles (right).

C, I_2-KI staining of wild type pollen grains.

D, I_2-KI staining of *Osmsh4-1* pollen grains. Scale bars, 50 μm.

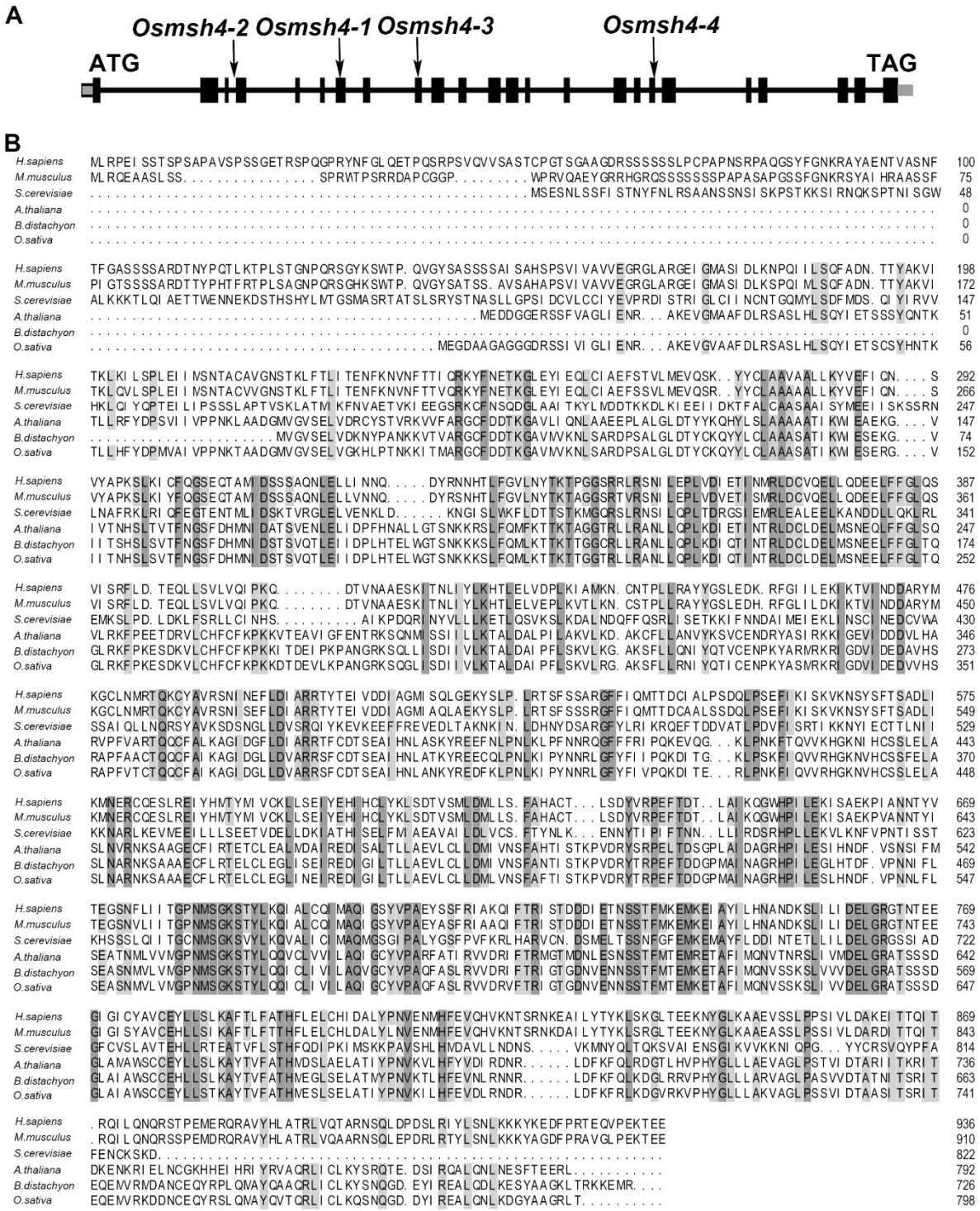

Figure S2 Organization of the *OsMSH4* gene and the protein alignment of MSH4 homologues.

A, Schematic representation of the *OsMSH4* gene and mutation sites in *Osmsh4* alleles. Translated regions are shown as black boxes and untranslated regions are shown as lines. The arrows indicate different mutation sites of *Osmsh4* mutants. B, Protein alignment of MSH4 homologs. Identical amino acids are shaded in gray, while similar amino acids are shaded in silver gray.

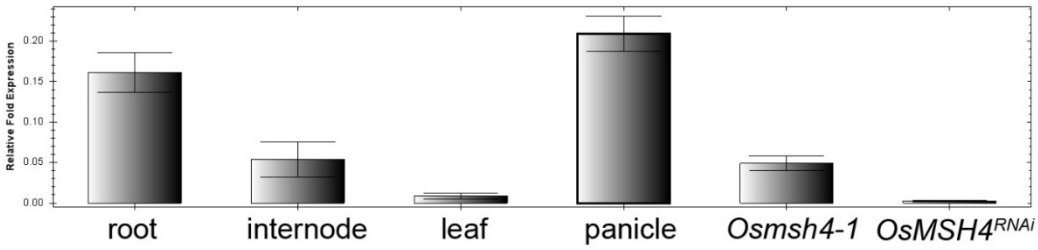

Figure S3 Expression analysis of *OsMSH4*. Transcription levels of *OsMSH4* in both wild type and *Osmsh4* (*Osmsh4-1*, *OsMSH4*^{RNAi}) displayed by Real-Time PCR, with *Ubiquitin* as the endogenous control. Error bars represent SD (n = 3).

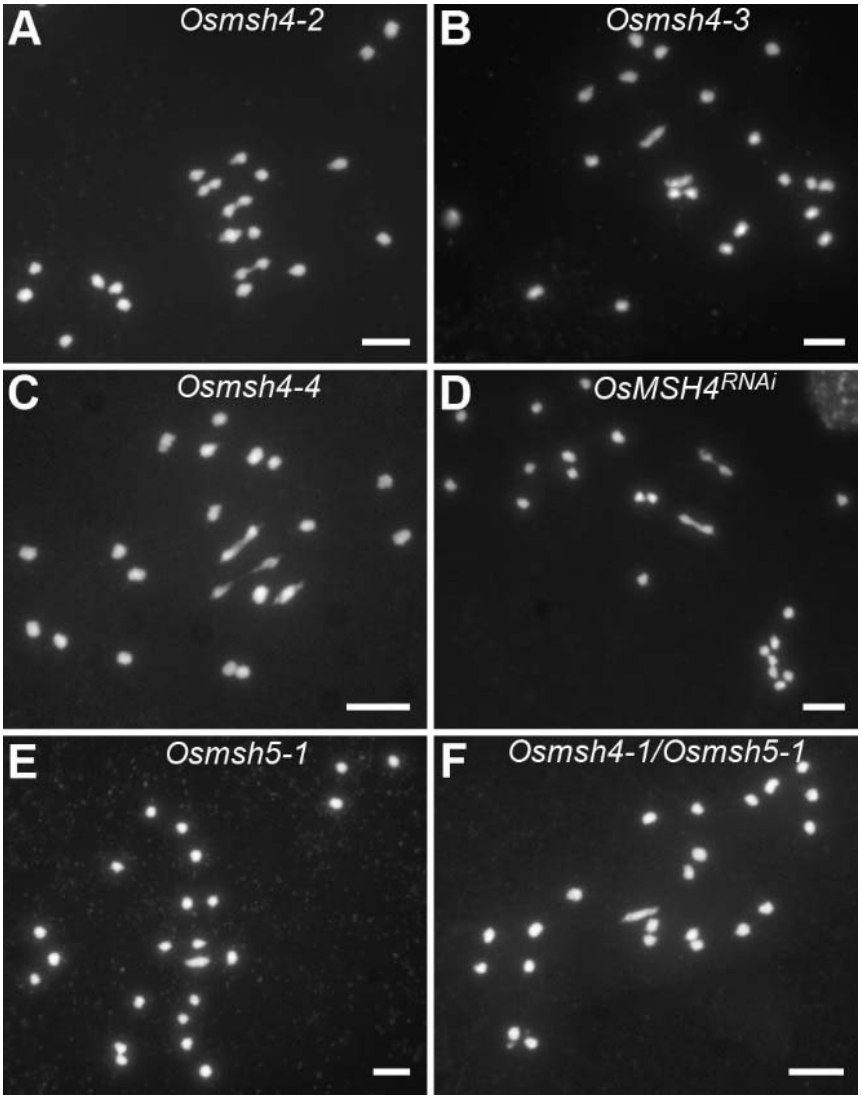

Figure S4 Defects in different mutants.

A, *Osmsh4-2*.

B, *Osmsh4-3*.

C, *Osmsh4-4*.

D, *OsMSH4*^{RNAi}.

E, *Osmsh5-1.*

F, *Osmsh4-1 Osmsh5-1*.

Chromosomes were stained with DAPI. Scale bars, 5 μm.

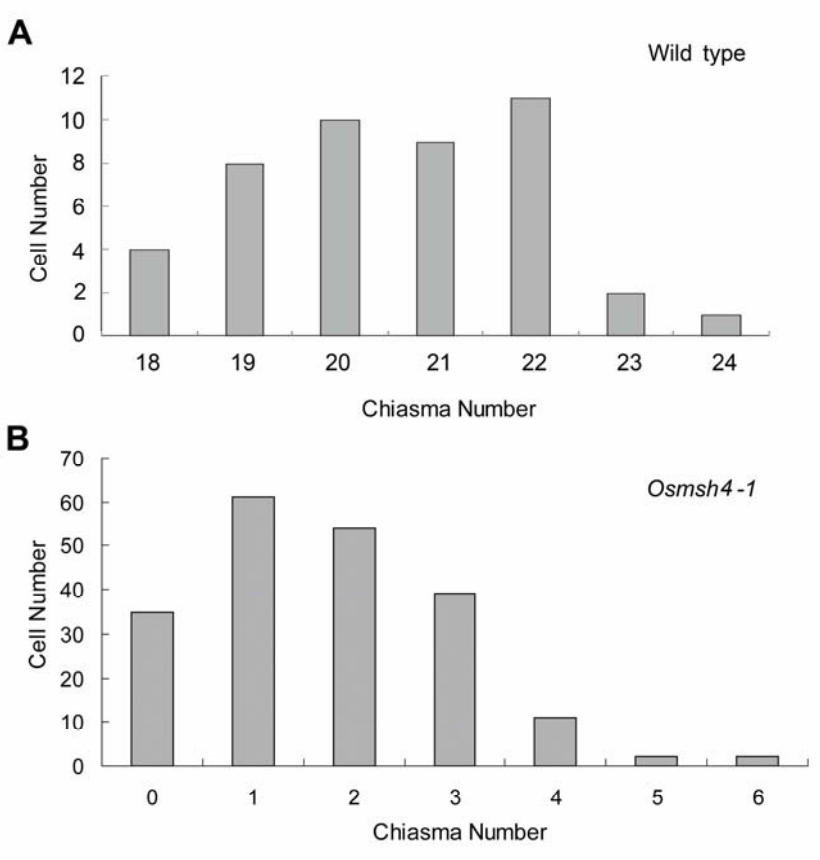

Figure S5 Chiasma distribution in wild type and *Osmsh4-1*.

A, Statistical analysis of the chiasma distribution in wild type meiocytes.

B, Statistical analysis of the chiasma distribution in *Osmsh4-1* meiocytes.

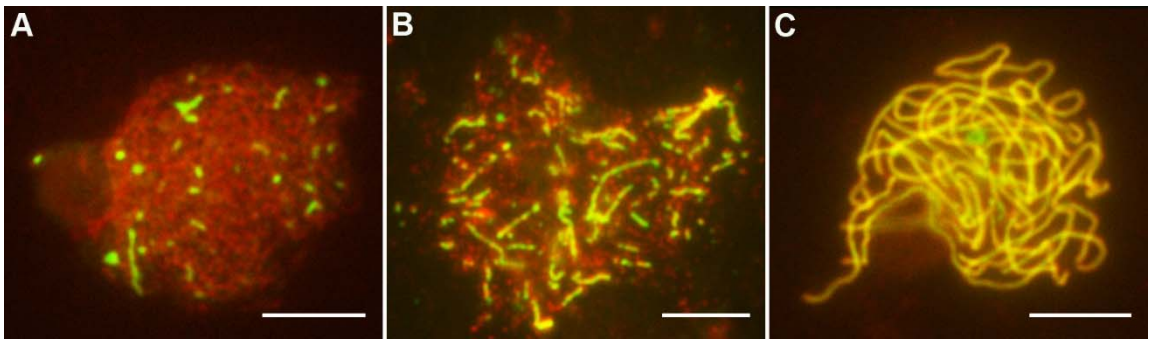

Figure S6 Immunolocalization of OsREC8 (red) and ZEP1 (green) in wild type meiocytes.

A, The localization of ZEP1 at leptotene.

B, The localization of ZEP1 at zygotene.

C, The localization of ZEP1 at pachytene.

OsREC8 signals (red) were used to indicate chromosomes. Scale bars, 5 μm.

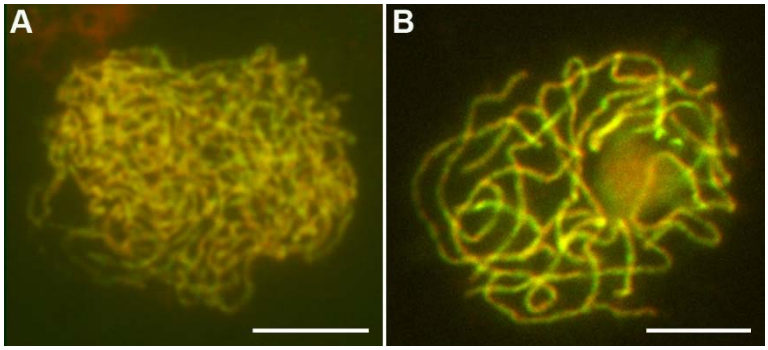

Figure S7 Immunolocalization of OsREC8, PAIR2 and PAIR3 in wild type meiocytes.

A, The localization of PAIR2 (green) at zygotene.

B, The localization of PAIR3 (green) at pachytene.

OsREC8 (red) signals were used to indicate chromosomes. Scale bars, 5 μm.

Table S1 STS primers used in this study

Primer	Forward	Reverse
P1	5′-TGCCCTACACTGGAGAAT-3′	5′-CAGCCACAGTACATAACA-3′
P2	5′-GGCTCGATCTCATTCTATAT-3′	5′-ACGTACCAAATGTAAAGTGT-3′
P3	5′-AGCAGTACTAAAGTTCAGC-3′	5′-GACTTACCAAAGTGGCTCA-3′
P4	5′-AGGTACTGATTCTCATGCTCG-3′	5′-CAACATTGGCACAATCAAGG-3′
P5	5′-CTCCCTCTCGACGACTTGA-3′	5′-TACCAGCAGATTCAGGATT-3′
P6	5′-CCAGCACTACCATAAAACA-3′	5′-CTGGTGCTAGGTAATGATG-3′
P7	5′-AAATATCTGATCCCAGTG-3′	5′-AAATATCTGATCCCAGTG-3′