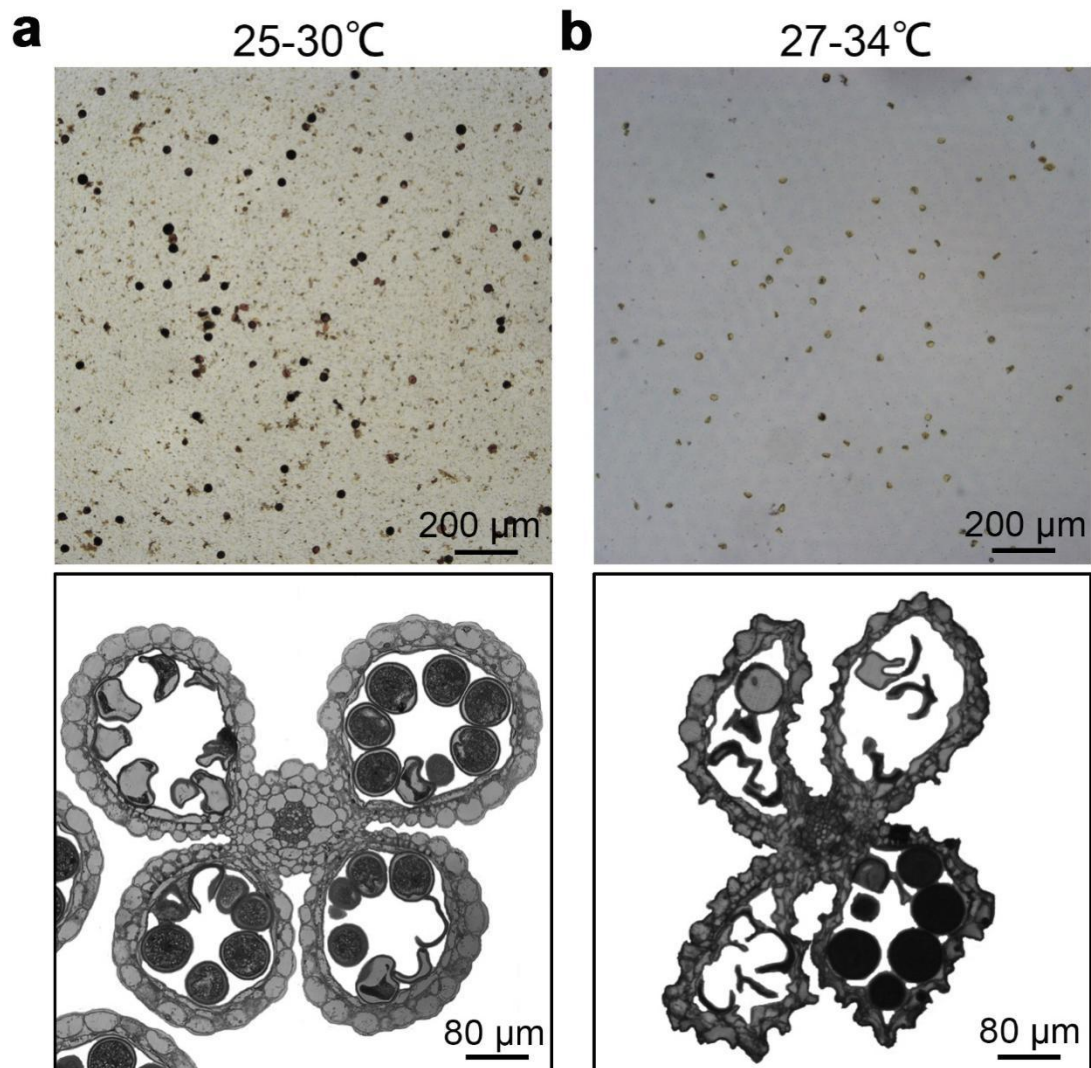


In the format provided by the authors and unedited.

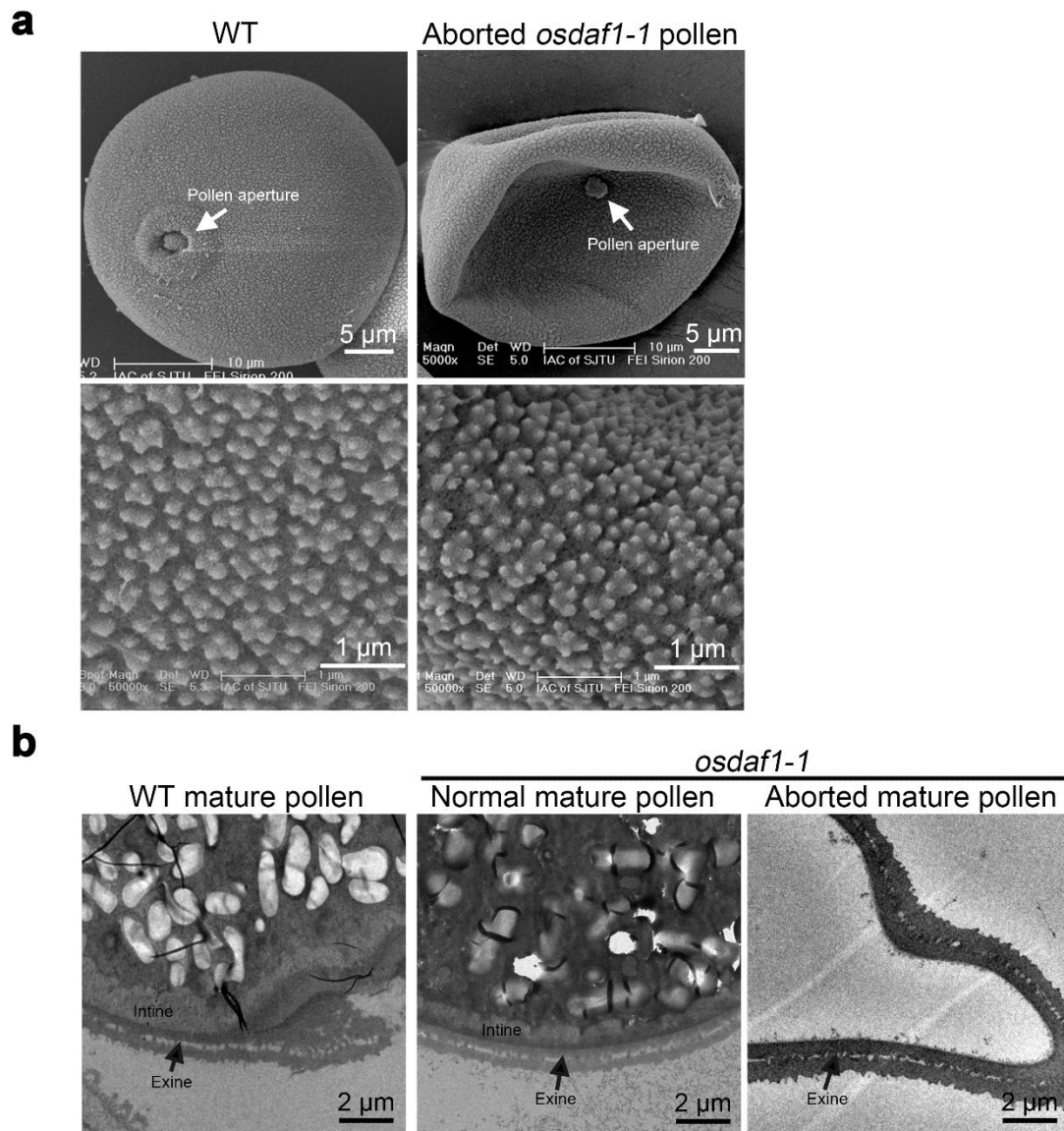
Rice pollen aperture formation is regulated by the interplay between OsINP1 and OsDAF1

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Supplementary Figure 1. Temperature affects pollen viability in *osdaf1* mutant. Pollen grains stained by I₂-IK (upper panel) and transverse section of mature anthers (lower panel) from *osdaf1-1* mutant grown under 25–30°C (August, 2014) (a) and 27–34°C (August, 2016) (b) average environmental temperature in paddy field. These observations were consistent for 5 consecutive years (2014–2018). Scale bars are indicated.



Supplementary Figure 2. Exine and intine of *osdaf1* mature pollen. **a**, SEM observation for wild-type (WT) pollen grain and aborted *osdaf1-1* pollen grain. Pollen aperture is indicated. **b**, TEM observation for WT, *osdaf1-1* normal or aborted mature pollen. Exine and intine are indicated. Arrows indicate pollen apertures. The phenotypes in **a** and **b** were observed at least three times independently with similar results. Scale bars are indicated.

Supplementary Table 1. List of primers used in this study.

Primers	Sequence
Primers for map-based cloning	
<i>ZQF1-F</i>	TGTGGATGGACTCAATGTTT
<i>ZQF1-R</i>	GCCTACGTGTAATCCGAGTC
<i>Y3'-F</i>	GTCAACTCGCTGAAAGATTAGG
<i>Y3'-R</i>	GACCACCACCAATCTTGTTTAT
<i>ZQF2'-F</i>	TATTGATCAGGTGGCAAGTT
<i>ZQF2'-R</i>	CCATCCCCATCCATATACTC
<i>CH201-F</i>	TCAGATCCCTAAAGCAATATGAT
<i>CH201-R</i>	CGTTTTGATTTACGATTCCAC
<i>ZQF3'-F</i>	GCACAATCAACAACCTTCAGA
<i>ZQF3'-R</i>	ACGAGTGCTTAGACACGGTA
<i>CH202-F</i>	ATGGAAAGGTTAAGGTAACAATG
<i>CH202-R</i>	CGAATAAATCGAAGGGCAT
<i>YH42-5-F</i>	CATTTTACCTCTCCCTTTTA
<i>YH42-5-R</i>	GTGCATACACATCATCGTCC
<i>ZQF7-F</i>	TGAAATTGAACGGTGGAATG
<i>ZQF7-R</i>	TTTCTCATCCCAAACAAGCA
Primers for <i>OsDAF1</i> complementation	
<i>gOsDAF1-F</i>	CTCGGTACCCGGGGATCCCTCAACATCTGGCTTCAG
<i>gOsDAF1-R</i>	AAATTCGAGCTGGTCACCAGAGAGCAGGTAATATCT
Primers for subcellular localizations	
<i>OsDAF1cds-F</i>	GGACTCTTGACCATGGGCCCCGAGGCCTCCTCCTCCT
<i>OsDAF1cds-R</i>	TGCTCACCATACTAGTACTACCGGGAGAGGCGCG
<i>OsINP1cds-F</i>	GGACTCTTGACCATGGGCCCCCTCCACGCTGTAGGC
<i>OsINP1cds-R</i>	TGCTCACCATACTAGTGCGACAACCTGAAGAATGC
Primers for <i>OsDAF1</i> localization in rice	
<i>3'CDS-SpeI-F</i>	GCCACTGGACGAAGGCCTGCTGAGAGGGGAATCTCTGTT
<i>3'CDS-SpeI-R</i>	GACTGACACCAGATCTACTAGTGCGACAACCTGAAGAATGCA GTA
<i>SpeI-eYFP-F</i>	CAGTTGTCGCACTAGTATGGTGAGCAAGGGCGAGGA
<i>SpeI-eYFP-R</i>	CACCAGATCTACTAGTTCATTGTACAGCTCGTCCA
<i>3'UTR-F</i>	GTGAACTAGTAGATCTGCATACAAGTTATAGGTTA
<i>3'UTR-R</i>	GACTGACACCAGATCTGAGCAGTAAAAAGTATGACA
Primers for <i>OsINP1</i> localization in rice	
<i>gOsINP1-F</i>	TCGAGCTCGGTACCCGGGATTGATACGACGACGCCG
<i>gOsINP1-R</i>	AAGCTTGCATGCCTGCAGACTACCGGGAGAGGCGCG

Primers for truncated OsDAF1 localization in rice	
<i>eYFP-3'UTR-F</i>	GCAGGCATGCAAGCTTATGGTGAGCAAGGGCGAG
<i>eYFP-3'UTR-R</i>	ATTCGAGCTGGTCACCAGAGAGCAGGTAATATCT
<i>pro-ΔKC-F</i>	CCATGATTACGAATTCTCATCAACTCCTCAACAT
<i>pro-ΔKC-R</i>	CGACTCTAGAGGATCCGCCCTTTGTTGCTGCCCCG
<i>pro-sp-F</i>	CCATGATTACGAATTCTCATCAACTCCTCAACAT
<i>pro-sp-R</i>	GATCCCCGGGTACCGAGCTCGGCGGGGGCCGCAGCGAT
<i>ΔL-F</i>	CCCCCGCCGAGCTCGGTACCACCAAGTACATAGGCCCA
<i>ΔL-R</i>	CGACTCTAGAGGATCCGCGACAACCTGAAGAATGC
<i>pro-F</i>	CCATGATTACGAATTCTCATCAACTCCTCAACAT
<i>pro-R</i>	GATCCCCGGGTACCGAGCTCGGCGATGGCGCTGCTAGG
<i>ΔSL-F</i>	CCATCGCCGAGCTCGGTACCATGACCAAGTACATAGGC
<i>ΔSL-R</i>	CGACTCTAGAGGATCCGCGACAACCTGAAGAATGC
Primers for qRT-PCR assay	
<i>qRT-OsDAF1-F</i>	GGTTCAGGGCTGTATATGGTGT
<i>qRT-OsDAF1-R</i>	CCTGCTGGCTGTGTTGTAAGT
Primers for Y2H assay	
<i>AD-OsINP1-F</i>	ATGGAGGCCAGTGAATTCATGCCGAGGCCTCCTCCT
<i>AD-OsINP1-R</i>	CTCGAGCTCGATGGATCCCTAACTACCGGGAGAGGC
<i>BK-DAF1-N-F</i>	GCCATGGAGGCCGAATTCGCCGCCGCGTCGAGCATC
<i>BK-DAF1-N-R</i>	CGCCGCCATCTGTTCTGAGGATCCGTCGACCTGCAG
<i>BK-DAF1-C-F</i>	CATGGAGGCCGAATTCCGGTCAGTGCGCCGCAA
<i>BK-DAF1-C-R</i>	GCAGGTCGACGGATCCTCAGCGACAACCTGAAG
<i>BK-DAF1-Δ5-F</i>	CATGGAGGCCGAATTCCGGTCAGTGCGCCGCAA
<i>BK-DAF1-Δ5-R</i>	GCAGGTCGACGGATCCTCAGCGACAACCTGAAG
Primers for BiFC assay	
<i>DAF1-C-cYFP-F</i>	ACAGGTACCCGGGGATCCATGCGGTCAGTGCGCCGC
<i>DAF1-C-cYFP-R</i>	ACCGCCGTCGACTCTAGAGCGACAACCTGAAGAATGC
<i>nYFP-OsINP1-F</i>	GAGGACGCCGGCGGATCCATGCCGAGGCCTCCTCCT
<i>nYFP-OsINP1-R</i>	CTGCAGGTCGACTCTAGACTAACTACCGGGAGAGGC
Primers for Split-LUC assay	
<i>DAF1-C-nLUC-F</i>	CGGTACCCGGGATCCATGGGCCGGTCAGTGCGCCGC
<i>DAF1-C-nLUC-R</i>	GTACGAGATCTGGTCGACGCGACAACCTGAAGAATGC
<i>cLUC-DAF1-C-F</i>	GCGTCCCGGGGCGGTACCGGCCGGTCAGTGCGCCGC
<i>cLUC-DAF1-C-R</i>	CCATTGTTGGATCCTCAGCGACAACCTGAAGAATGC
<i>OsINP1-nLUC-F</i>	GCTCGGTACCCGGGATCCATGCCGAGGCCTCCTCCT
<i>OsINP1-nLUC-R</i>	GTACGAGATCTGGTCGACACTACCGGGAGAGGCGCG
<i>cLUC-OsINP1-F</i>	GCGTCCCGGGGCGGTACCCCGAGGCCTCCTCCTCCT

<i>cLUC-OsINP1-R</i>	CCATTTGTTGGATCCCTAACTACCGGGAGAGGCGCG
Primers for Co-IP assay	
<i>35S:DAF1-C-6HA-F</i>	GCTACGCGTCTCGAGATGGGCCGGTCAGTGCGCCGC
<i>35S:DAF1-C-6HA-R</i>	CCCGGGCTGCAGGAATTCGCGACAACTGAAGAATGC
<i>35S:OsINP1-eGFP-F</i>	TCTCTCAAGCTTGGATCCATGCCGAGGCCTCCTCCT
<i>35S:OsINP1-eGFP-R</i>	CATACTAGTTCTGGATCCACTACCGGGAGAGGCGCG