

Supplementary Materials for

The histone modification reader ZCWPW1 is required for meiosis prophase I in male but not in female mice

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Published 14 August 2019, *Sci. Adv.* **5**, eaax1101 (2019)
DOI: 10.1126/sciadv.aax1101

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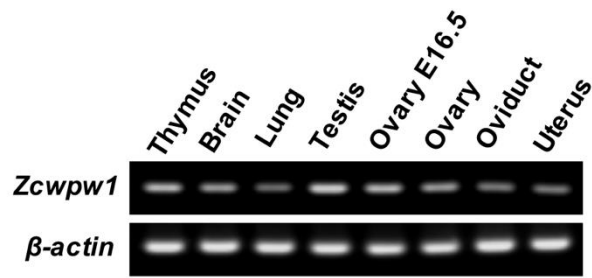


Fig. S1. *Zcwpw1* is generally expressed in different tissues. RT-PCR detection of *Zcwpw1* in different tissues indicated that *Zcwpw1* was generally expressed in various tissues, including adult testes and embryonic ovaries. β -actin was used as the control.

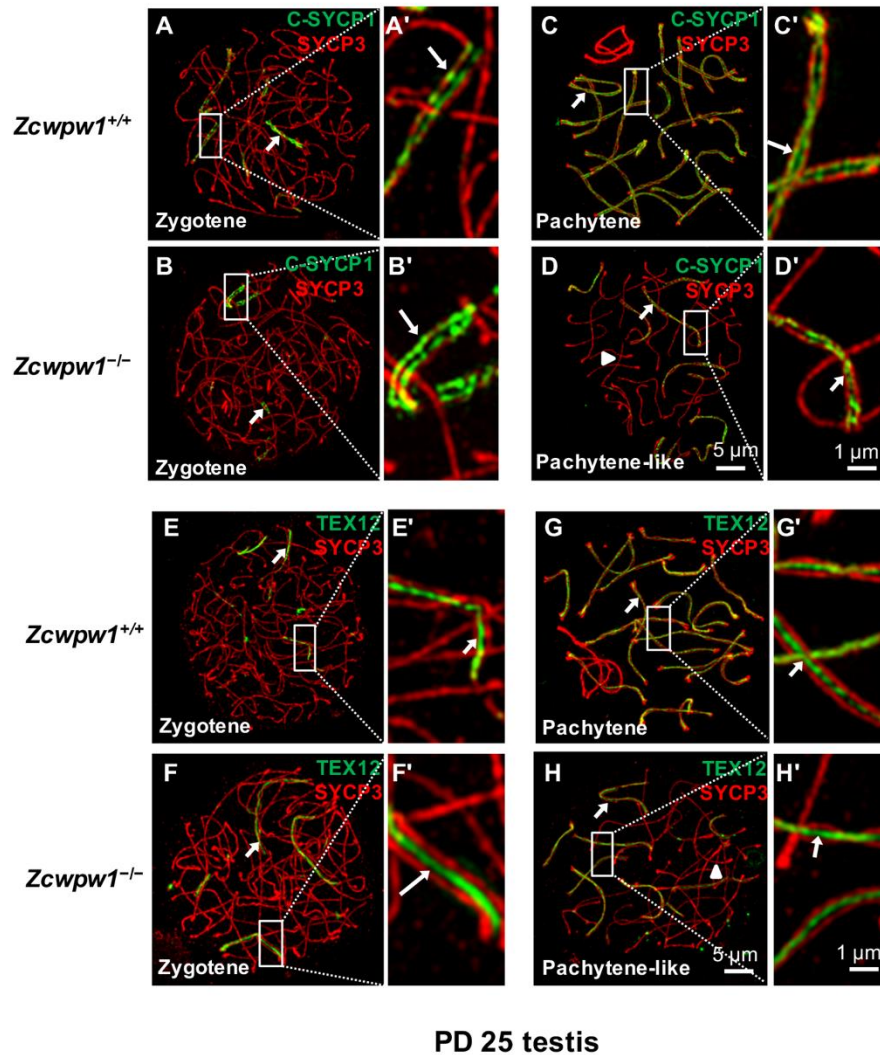


Fig. S2. The SC structure appeared normal in *Zcwpw1*^{-/-} spermatocytes. (A–D). SIM images of spermatocyte chromosome spreads immunostained for SYCP3 (red) and C-SYCP1 (green) from PD25 testes. Arrows indicated the synapsed region. (A'–D') Magnified views of the synapsed region show that C-SYCP1 (arrows, green signal) was co-localized with SYCP3 (arrowheads, red signal). (E–H). SIM images of spermatocyte chromosome spreads immunostained for SYCP3 (red) and TEX12 (green) from PD25 testes. Arrows indicate the synapsed region, arrowhead indicated the AEs. (E'–H') Magnified views of the synapsed region show that TEX12 localized in the intermediate region between AEs (arrows).

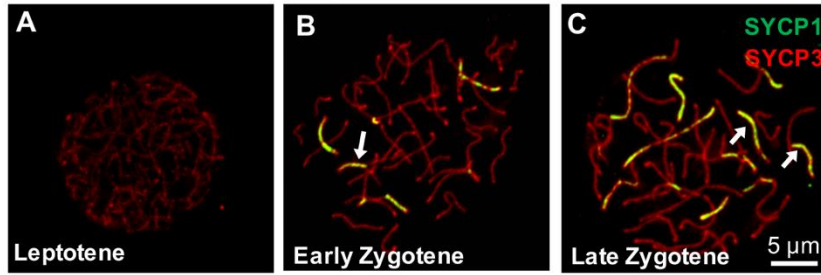
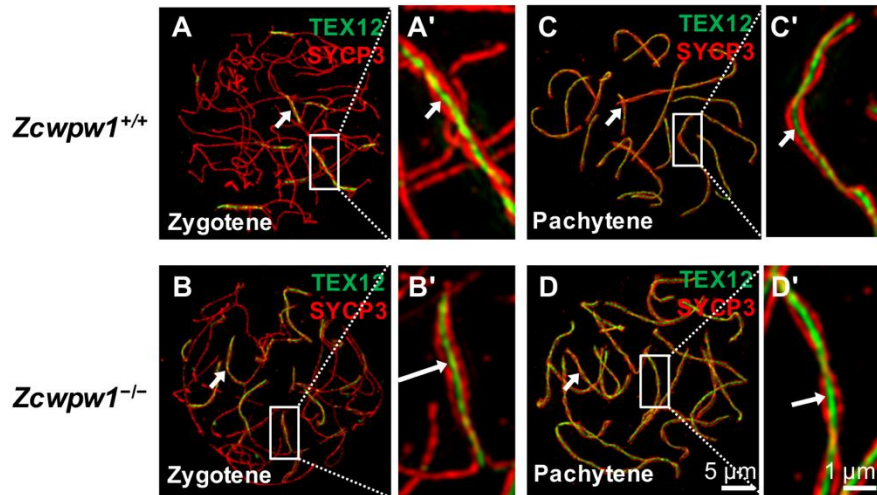


Fig. S3. Representative images of leptotene and zygotene stages in *Zcwpw1*^{-/-} spermatocytes. (A). Representative image of the leptotene stage in *Zcwpw1*^{-/-} spermatocytes. (B). Representative image of the early zygotene stage in *Zcwpw1*^{-/-} spermatocytes. (C). Representative image of the late zygotene stage in *Zcwpw1*^{-/-} spermatocytes.



E17.5 Ovary

Fig. S4. The SC structure appeared normal in *Zcwpw1*^{-/-} oocytes. (A–D). Chromosome spreads of E17.5 ovaries immunostained for SYCP3 (red) and TEX12 (green) using SIM at the indicated stages. Arrows indicate the synapsed region. (A'–D'). Magnified views of the synapsed region show that TEX12 localized in the central regions of SCs in a continuous pattern (arrows).

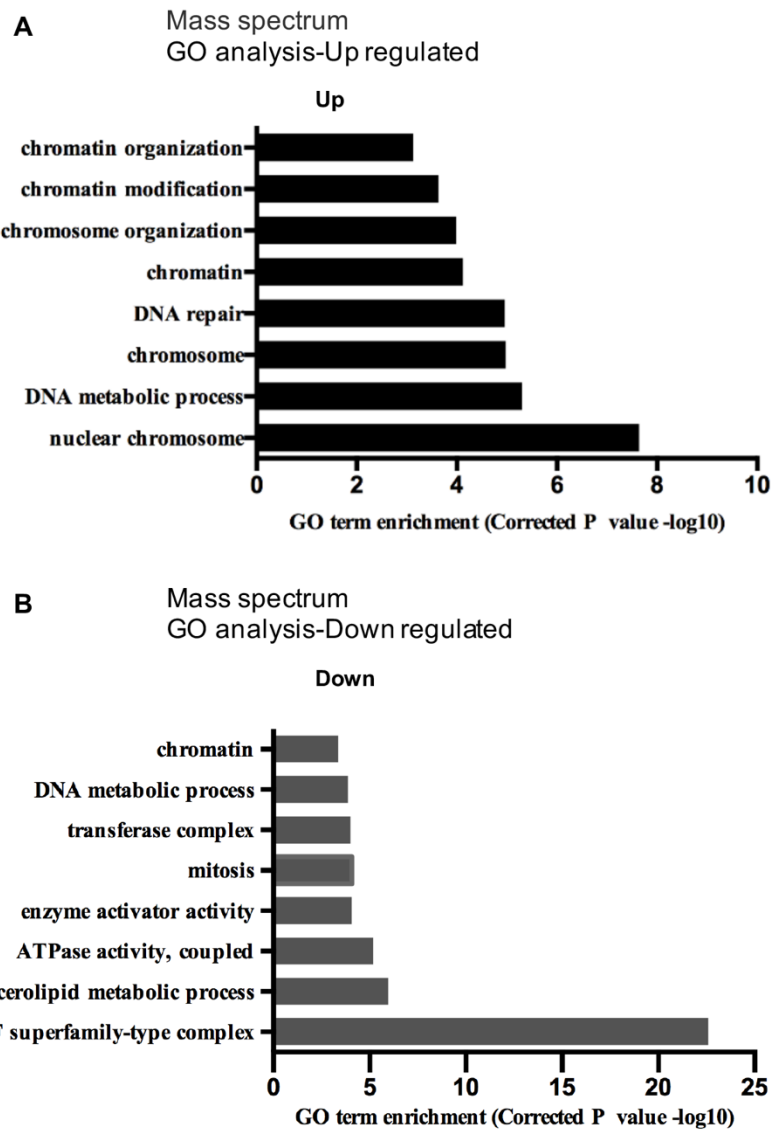


Fig. S5. Protein profiling analysis of PD14 wild-type and *Zcwpw1*^{-/-} testes. (A). GO term enrichment of up-regulated proteins in *Zcwpw1*^{-/-} testes. **(B).** GO term enrichment in down-regulated proteins in *Zcwpw1*^{-/-} testes.

Table S1. List of 94 differentially expressed proteins in PD14 *Zcwpw1*^{+/+} and *Zcwpw1*^{-/-} testes by HPLC-MS. List of 94 differentially expressed proteins in PD14 *Zcwpw1*^{+/+} and *Zcwpw1*^{-/-} testes by HPLC-MS.

Gene name	Description	Fold change	Change trend	P value
Cnbp	Cellular nucleic acid-binding protein	1.58	UP	0.04
Tex101	Testis-expressed protein 101	1.79	UP	0.00
Ythdf2	YTH domain-containing family protein 2	1.35	UP	0.02
Pi4kb	Isoform 2 of Phosphatidylinositol 4-kinase beta	1.34	UP	0.01
Gm45808	Uncharacterized protein (Fragment)	2.02	UP	0.05
Sycp3	Synaptonemal complex protein 3	1.55	UP	0.01
Gm364	Transmembrane 9 superfamily member	1.40	UP	0.03
Baz1a	Bromodomain adjacent to zinc finger domain protein 1A	1.37	UP	0.04
Nfix	Isoform NFIX2 of Nuclear factor 1 X-type	1.45	UP	0.05
Hormad1	Isoform 2 of HORMA domain-containing protein 1	1.70	UP	0.03
Exosc4	Exosome complex component RRP41	1.67	UP	0.05
Igkv12-41	Protein Igkv12-41 (Fragment)	1.52	UP	0.01
Hist1h2ba	Histone H2B type 1-A	1.37	UP	0.00
Itm2b	Integral membrane protein 2B	1.32	UP	0.01
Syce2	Synaptonemal complex central element protein 2	1.37	UP	0.02
Ttc23l	Tetratricopeptide repeat protein 23-like (Fragment)	1.63	UP	0.01
Cyp2d22	Cytochrome P450 CYP2D22	1.33	UP	0.02
Chp1	Calcineurin B homologous protein 1	1.31	UP	0.00
Wfdc1	Putative uncharacterized protein	1.84	UP	0.02
Cbwd1	COBW domain-containing protein 1	1.36	UP	0.00
Ggcx	Vitamin K-dependent gamma-carboxylase	1.68	UP	0.00
Pam	Peptidyl-glycine alpha-amidating monooxygenase	1.52	UP	0.01
Pomgnt1	Isoform 2 of Protein O-linked-mannose beta-1,2-N-acetylglucosaminyltransferase 1	1.42	UP	0.01
Zdhhc12	Probable palmitoyltransferase ZDHHC12	1.59	UP	0.04

Kcnab1	Voltage-gated potassium channel subunit beta-1	1.95	UP	0.02
Atp8a1	Phospholipid-transporting ATPase	1.46	UP	0.01
Ighg1	Ig gamma-1 chain C region secreted form (Fragment)	1.49	UP	0.03
Prss50	Probable threonine protease PRSS50	1.56	UP	0.05
Rad23a	Putative uncharacterized protein (Fragment)	1.35	UP	0.04
Rlf	Rearranged L-myc fusion sequence	1.39	UP	0.03
Stard9	StAR-related lipid transfer protein 9	1.57	UP	0.00
Bckdk	[3-methyl-2-oxobutanoate dehydrogenase [lipoamide]] kinase, mitochondrial	1.48	UP	0.04
Pdzd11	PDZ domain-containing protein 11	1.61	UP	0.03
Rab32	Ras-related protein Rab-32	1.53	UP	0.04
Rbms1	RNA-binding motif, single-stranded-interacting protein 1	1.41	UP	0.01
Brms11	Breast cancer metastasis-suppressor 1-like protein	1.30	UP	0.04
Figl1	Fidgetin-like protein 1	1.42	UP	0.03
Rab6a	Ras-related protein Rab-6A	1.45	UP	0.00
Uchl5	Isoform 2 of Ubiquitin carboxyl-terminal hydrolase isozyme L5	1.74	UP	0.04
Gmeb2	Glucocorticoid modulatory element-binding protein 2	1.38	UP	0.03
Tmed3	Transmembrane emp24 domain-containing protein 3	1.34	UP	0.02
Gene name	Description	Fold change	Change trend	P value
Tyw1	S-adenosyl-L-methionine-dependent tRNA 4-demethylwyosine synthase	-1.35	DOWN	0.04
Tmem168	Transmembrane protein 168	-1.34	DOWN	0.04
Itga7	Integrin alpha 7	-1.56	DOWN	0.01
Elov12	Elongation of very long chain fatty acids protein 2	-1.39	DOWN	0.03
Ube2d4	Ubiquitin-conjugating enzyme E2D 4	-1.72	DOWN	0.01
Eif2s2	Eukaryotic translation initiation factor 2 subunit 2 (Fragment)	-1.34	DOWN	0.05
Ncapg2	Condensin-2 complex subunit G2	-1.60	DOWN	0.04
Apoc3	Apolipoprotein C-III	-1.43	DOWN	0.03
Timm29	Mitochondrial import inner membrane translocase subunit Tim29	-1.36	DOWN	0.03
Thns11	Threonine synthase-like 1	-1.38	DOWN	0.01
Ocr1	Isoform 2 of Inositol polyphosphate 5-phosphatase OCRL-1	-1.59	DOWN	0.00
Chd5	Chromodomain-helicase-DNA-binding protein 5	-1.32	DOWN	0.00
Bet11	BET1-like protein	-2.02	DOWN	0.02

Cdc27	Cell division cycle protein 27 homolog	-1.34	DOWN	0.02
Tusc3	Tumor suppressor candidate 3 (Fragment)	-1.36	DOWN	0.03
Rb1cc1	RB1-inducible coiled-coil protein 1 (Fragment)	-2.13	DOWN	0.01
Ube2c	Ubiquitin-conjugating enzyme E2 C	-1.37	DOWN	0.05
Thap11	THAP domain-containing protein 11	-1.57	DOWN	0.01
Slc7a5	Large neutral amino acids transporter small subunit 1	-1.30	DOWN	0.03
Rfc5	Replication factor C subunit 5	-1.31	DOWN	0.03
Ndrp1	Protein NDRG1	-1.36	DOWN	0.00
Serinc3	Serine incorporator 3	-1.65	DOWN	0.02
Gtf2h3	General transcription factor IIH subunit 3	-2.01	DOWN	0.00
Znf609	Zinc finger protein 609	-1.48	DOWN	0.04
Tra2a	Transformer-2 protein homolog alpha	-1.47	DOWN	0.03
Clcn5	Chloride channel protein	-1.32	DOWN	0.02
Aard	Alanine and arginine-rich domain-containing protein	-1.35	DOWN	0.01
Washc5	WASH complex subunit 5	-1.58	DOWN	0.01
Sipa111	Isoform 2 of Signal-induced proliferation-associated 1-like protein 1	-1.51	DOWN	0.05
Scai	Protein SCAI	-1.32	DOWN	0.04
Fam76a	Protein FAM76A	-1.58	DOWN	0.00
Kctd2	BTB/POZ domain-containing protein KCTD2	-1.51	DOWN	0.01
Gtf2h2	General transcription factor II H, polypeptide 2, isoform CRA_b	-1.36	DOWN	0.04
Bola1	BolA-like protein 1	-1.44	DOWN	0.01
Epdr1	Mammalian ependymin-related protein 1	-1.31	DOWN	0.02
Tubb2a	Tubulin beta-2A chain	-1.31	DOWN	0.03
Afp	Alpha-fetoprotein	-1.51	DOWN	0.03
Actr5	Actin-related protein 5	-1.52	DOWN	0.03
Egflam	Isoform 2 of Pikachurin	-1.99	DOWN	0.00
Actr8	Actin-related protein 8	-1.55	DOWN	0.01
Tbc1d10a	TBC1 domain family member 10A	-1.41	DOWN	0.00
Plekhg5	Pleckstrin homology domain-containing family G member 5	-1.36	DOWN	0.01
Apoc2	Apolipoprotein C-II	-1.54	DOWN	0.04
Serpinc1	Antithrombin-III	-1.59	DOWN	0.01
Lgals7	Galectin	-1.59	DOWN	0.01
Enpp4	Isoform 2 of Bis(5'-adenosyl)-triphosphatase enpp4	-1.51	DOWN	0.00
Hexa	Beta-hexosaminidase subunit alpha	-1.60	DOWN	0.04
Nelfcd	Negative elongation factor D	-1.34	DOWN	0.02
Nrde2	Protein NRDE2 homolog	-2.00	DOWN	0.03
Exosc3	Exosome complex component RRP40	-1.43	DOWN	0.03
Dtd1	D-tyrosyl-tRNA(Tyr) deacylase 1	-1.42	DOWN	0.00
Bap18	Isoform 2 of Chromatin complexes subunit BAP18	-1.43	DOWN	0.03
Zcwpw1	Zinc finger CW-type PWWP domain protein 1	-1.68	DOWN	0.00