**Table S1. Strains used in this study**

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| Strain name | Genotype |
| SK1 haploid strains |
| S1904 | *MATa ura3∆(hindIII-SmaI) lys2 ho::LYS2 arg4∆(eco47III-hpaI)*  |
| Same genotype as S1904 except for: |
| S5284 | *MAT***a** *sgs1-6HA-hygMX* |
| S5405 | *MATa sgs1∆-hygMX* |
| S5407 | *MATa SGS1-WT-hygMX* |
| S5409 | *MATa sgs1-6KR-hygMX* |
| S5411 | *MATa sgs1-ASIM-hygMX* |
| S6008 | *MATa sgs1-K621R-hygMX* |
| S6010 | *MATa sgs1-ZSIM-hygMX* |
| S3501 | *MAT***a** *slx4∆::kanMX* |
| S3503 | *MATa slx4∆::kanMX* |
| S5287 | *MAT***a** *sgs1-6KR-6HA-hygMX* |
| S5288 | *MAT***a** *sgs1-ASIM-6HA-hygMX* |
| S5434 | *MAT***a** *SGS1-WT-hygMX* |
| S5448 | *MAT***a** *sgs1-6KR-hygMX* |
| S5461 | *MAT***a** *sgs1-ASIM-hygMX* |
| W303 haploid strains |
| H1472 | *MAT***a** *ade2-1 can1-100 ura3-1 his3-11,15 leu2-3,112 trp1-1* |
| Same genotype as H1472 except for: |
| T6151 | *MATa sgs1-ZSIM-3HA::kanMX* |
| T6171 | *MATa sgs1-K621R-3H::kanMX* |
| H1479 | *MATa SGS1-3HA::kanMX* |
| H1480 | *MAT***a** *slx4∆-hygMX* |
| T526-11 | *MAT***a** *slx4∆::kanMX* |
| T525-11 | *MATa slx4∆::kanMX* |
| X3246-13B1 | *MAT***a** *sgs1∆::HIS3* |
| H1482 | *MATa SGS1-WT-hygMX* |
| H1467 | *MATa sgs1-ZSIM-hygMX* |
| H1469 | *MATa sgs1-K621R-hygMX* |
| SK1 diploid strains |
| MJL2984 | *MATa ura3∆(hind3-sma1) lys2 ho::LYS2 cyh2-z arg4∆(eco47III-hpaI)**MAT***a** *ura3∆(hind3-sma1) lys2 ho::LYS2 cyh2-z arg4∆(eco47III-hpaI)**HIS4 leu2-R::URA3rev-tel-ARG4**his4::URA3rev-tel-arg4-pal+9 pac1(62528)-Sph1 leu2-R*  |
| Same genotype as MJL2984 except for: |
| MJL3166 | *natMX-pCLB2-3HA-SGS1**natMX-pCLB2-3HA-SGS1* |
| MJL3932 | *pSGS1-SGS1-6HA-tSGS1-hygMX* *pSGS1-SGS1-6HA-tSGS1-hygMX*  |
| MJL3960MJL3964 | *pSGS1-SGS1-WT-tSGS1-hygMX* *pSGS1-SGS1-WT-tSGS1-hygMX*  |
| MJL3961MJL3965 | *pSGS1-SGS1-6KR-tSGS1-hygMX* *pSGS1-SGS1-6KR-tSGS1-hygMX*  |
| MJL3962MJL3966 | *pSGS1-SGS1-ASIM-tSGS1-hygMX* *pSGS1-SGS1-ASIM-tSGS1-hygMX*  |
| MJL4127 | *pSGS1-SGS1-K621R-tSGS1-hygMX* *pSGS1-SGS1-K621R-tSGS1-hygMX*  |
| MJL4128 | *pSGS1-SGS1-ZSIM-tSGS1-hygMX* *pSGS1-SGS1-ZSIM-tSGS1-hygMX*  |
| MJL3171 | *natMX-pCLB2-3HA-SGS1 kanMX-pCLB2-3HA-MMS4**natMX-pCLB2-3HA-SGS1 kanMX-pCLB2-3HA-MMS4* |
| MJL3172 | *kanMX-pCLB2-3HA-MMS4**kanMX-pCLB2-3HA-MMS4* |
| MJL4134MJL4135 | *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-6HA-tSGS1-hygMX* *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-6HA-tSGS1-hygMX*  |
| MJL4136MJL4137 | *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-WT-tSGS1-hygMX* *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-WT-tSGS1-hygMX*  |
| MJL4138MJL4139 | *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-6KR-tSGS1-hygMX* *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-6KR-tSGS1-hygMX*  |
| MJL4140MJL4141 | *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-ASIM-tSGS1-hygMX* *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-ASIM-tSGS1-hygMX*  |
| MJL4142MJL4143 | *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-K621R-tSGS1-hygMX* *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-K621R-tSGS1-hygMX*  |
| MJL4144MJL4145 | *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-ZSIM-tSGS1-hygMX* *kanMX-pCLB2-3HA-MMS4 pSGS1-SGS1-ZSIM-tSGS1-hygMX*  |
| MJL3979 | *natMX-pCLB2-3HA-SGS1 msh4∆::kanMX**natMX-pCLB2-3HA-SGS1 msh4∆::kanMX* |
| MJL3980 | *pSGS1-Sgs1-WT-tSGS1-hygMX msh4∆::kanMX**pSGS1-Sgs1-WT-tSGS1-hygMX msh4∆::kanMX* |
| MJL3981 | *pSGS1-Sgs1-7KR-tSGS1-hygMX msh4∆::kanMX**pSGS1-Sgs1-7KR-tSGS1-hygMX msh4∆::kanMX* |
| MJL3982 | *pSGS1-Sgs1-ASIM-tSGS1-hygMX msh4∆::kanMX**pSGS1-Sgs1-ASIM-tSGS1-hygMX msh4∆::kanMX* |
| MJL4107 | *pSGS1-SGS1-6HA-tADH1-hygMX msh4∆::kanMX**pSGS1-SGS1-6HA-tADH1-hygMX msh4∆::kanMX* |
| MJL4114 | *pSGS1-sgs1-K621R-tSGS1-hygMX msh4∆::kanMX**pSGS1-sgs1-K621R-tSGS1-hygMX msh4∆::kanMX* |
| MJL4115 | *pSGS1-sgs1-ZSIM-tSGS1-hygMX msh4∆::kanMX**pSGS1-sgs1-ZSIM-tSGS1-hygMX msh4∆::kanMX* |

­­­­­Haploids and diploids were used for mitotic (Figures 2, S1 and S2) and meiotic experiments (Figure 3), respectively. *SGS1-WT-hygMX* denotes wild-type *SGS1* allelic replacement strains.

1 Strains from Bonner *et al.* (2016)