

Supplemental Data

Ganduri et al.

Supp. Table 1. *U. maydis* strains used in this study

Alias (Haploids)	Relevant Genotype	Reference
UCM350 ^a	wild type	Kojic et al., 2002
UEY12 ^{ab}	<i>trt1</i> Δ	Yu et al., 2018
UCM693 ^{ac}	<i>blm</i> Δ	Mao et al., 2009

^a The genotype of UCM350 is *nar1-6 pan1-1 alb1*. *nar*, *pan*, and *ab* indicate inability to reduce nitrate, auxotrophic requirement for pantothenate, and mating type loci, respectively.

^b *trt1* was disrupted by the insertion of *hph* cassette expressing the hygromycin resistance gene (Hyg^R).

^c *blm* was disrupted by the insertion of *hph* cassette expressing the hygromycin resistance gene (Hyg^R).

Supp. Table 2. Oligonucleotides used in this study

Oligo	Sequence 5' to 3'
(For STELA)	
UT4/5-F	TCGGGCAACGTTCCATGTCG
UT4-subtel-R2375	CCCTCGAAGGCAGTGCATAC
UT6-F	CTACTACACATCGGTTCAAGC
UT6-subtel-R2400	ATGCCAAAGTGGAAATCGTGAC
C Telorette 1	GCTCCGTGCATCTGGCAT <u>CCCCTAAC</u>
C Telorette 2	GCTCCGTGCATCTGGCAT <u>CTAACCCCT</u>
C Telorette 3	GCTCCGTGCATCTGGCAT <u>CCCTAACCC</u>
C Telorette 4	GCTCCGTGCATCTGGCAT <u>CCTAACCC</u>
C Telorette 5	GCTCCGTGCATCTGGCAT <u>CAACCCTA</u>
C Telorette 6	GCTCCGTGCATCTGGCAT <u>CACCCTAA</u>
Teltail	GCTCCGTGCATCTGGCATC
pMiniT 2.0 forward	ACCTGCCAACCAAAGCGAGAAC
pMiniT 2.0 reverse	TCAGGGTTATTGTCTCATGAGCG

UT4/5-F

```

UT4-a  1  TCGGGCAACGTTCCATGTCGAGTTCTCGGATGTGAACGAGTATATGCTCT
UT4-b  1  TCGGGCAACGTTCCATGTCGAGTTCTCGGATGTGAACGAGTATATGCTCT
UT4-c  1  TCGGGCAACGTTCCATGTCGAGTTCTCAGATGTGAACGAGTATATGCTCT
UT4-d  1  TCGGGCAACGTTCCATGTCGAGTTNCTCGGATGTGAACGAGTATATGCTCT
UT4-e  1  TCGGGCAACGTTCCATGTCGAGTTCTCGGATGTGAACGAGTATATGCTCT
consensus 1  *****.***.*****

UT4-a  51  GGGTGGGGACACCAGCAATGCTGGCAGGCAAGGAGTGCCTGATGGCCAAC
UT4-b  51  GGC TGGGGACACCAGCAATGCTGGCAGGCAAGGAGTGCCTGATGGCCAAC
UT4-c  51  GGGTGGGGACACCAGCAATGCTGGCAGGCAAGGAGTGCCTGATGGCCAGC
UT4-d  51  GGGTGGGGACACCAGCAATGCTGGCAGGCAAGGAGTGCCTGATGGCCAAC
UT4-e  51  GGGTGGGGACACCAGCAATGCTGGCAGGCAAGGAGTGCCTGATGGCCAAC
consensus 51  **.******

UT4-a  101  TGC GTTGCTGCAGCGCAACTGCAAGTGTGGGATCGACGGGATGATGACGA
UT4-b  101  TGC GTTGCTGCAGCGCAACTGCAAGTGTGGGATCGACGGGATGATGACGA
UT4-c  101  TGC GTTGCTGCAGCGCAACTGCAAGTGTGGGATCGACGGGATGATGACGA
UT4-d  101  TGC GTTGCTGCAGCGCAACTGCAAGTGTGGGATCGACGGGATGATGACGA
UT4-e  101  TGC GTTGCTGCAGCGCAACTGCAAGTGTGGGATCGACGGGATGATGACGA
consensus 101 *****

UT4-a  151  AGAGCGGTGACAGGATCGCGAGCGGTGGTTGGTAAACACGGGGTTGGAG
UT4-b  151  AGAGCGGTGACAGGAACCGGAGCGGTGGTTGGTAAACACGGGGTTGGAG
UT4-c  151  AGAGCGGTGACAGGATCGCGAGCGGTGGTTGGTAAACACGGGGTTGGAG
UT4-d  151  AGAGCGGTGACAGGATCGCGAGCGGTGGTTGGTAAACACGGGGTTGGAG
UT4-e  151  AGAGCGGTGACAGGAACCGGAGCGGTGGTTGGTAAACACGGGGTTGGAG
consensus 151 *****

UT4-a  201  CGGATCTGGATTTATGCTGGACGCGGAGATTCGCTGCTCGTATGCCGGTG
UT4-b  201  CGGATCTGGACGGGTGCTGGACGCGAGAGATCGGCTGTCGTATGCCGGTG
UT4-c  201  CGGATCTGGATTTATGCTGGACGCGGAGATTCGCTGCTCGTATGCCGGTG
UT4-d  201  CGGATCTGGATTTATGCTGGACGCGGAGATTCGCTGCTCGTATGCCGGTG
UT4-e  201  CGGATCTGGATTTAATGCTGGACGCGGAGATTCGCTGCTCGTATGCCGGTG
consensus 201 *****

UT4-a  251  CCTTCGAGGGTGGATGCTGAGGGGTGGATGTATATTGTAGTGGGTATGG
UT4-b  251  CCTTCGAGGGTGGATGCTGAGGGGTGGATGTATATTGTAGTGGGTATGG
UT4-c  251  CCTTCGAGGGTGGATGCTGAGGGGTGGATGTATATTGTAGTGGGTATGG
UT4-d  251  CCTTCGAGGGTGGATGCTGAGGGGTGGATATATATTGTAGTGGGTATGG
UT4-e  251  CCTTCGAGGGTGGATGCTGAGGGGTGGATGTATATTGTAGTGGGTATGG
consensus 251 *****

UT4-a  301  GGTGAAG-----TGGGGCAGATATATATTGTGAGTAAAACCATTA
UT4-b  301  GGTGAAG-----TGGGGCAGATATATATTGTGAGTAAAACCATTA
UT4-c  301  GGTGAAG-----TGGGGCAGATATATATTGTGAGTAAAGTACATTA
UT4-d  301  GGTGAAG-----TGGGGCAGATATATATTGTGAGTAAAACCATTA
UT4-e  301  GGTGAAGATGGAGTAAGTGGGGCAGATATATATTGTGAGTAAAATATTA
consensus 301 *****

UT4-a  341  TTTTATTTGATTTTAAATTTTTT-TT-TAATGTTGGTATTTAATTTGGAG
UT4-b  341  TTTTATTTGATTTTAAATTTTTTTT-TAATGTTGGTATTTAATTTGGAG
UT4-c  341  TTTTATTTGACTTTAATTTTTTTT-TAATGTTGGTATTTAATTTGGAG
UT4-d  341  TTTTATTTGACTTTAATTTTTTTT-TAATGTTGGTATTTAATTTGGAG
UT4-e  351  TTTTATTTGATTTTAAATTTTTTTT-TAATGTTGGTATTTAATTTGGAG
consensus 351 *****

```

```

UT4-a  389  ATTATTAATTTTGTTTTGGTGGCAACATTGGGTGAGCGGTGAAGCGAGTC
UT4-b  390  ATTATTAATTTTGTATTTTGGTGGCAACATTGGGTGAGCAAGGAGGAGTC
UT4-c  390  ATTATTAATTTTGTTTTGGTGGCAACATTGGGTGAGCGCTGAAGCGAGTC
UT4-d  390  ATTATTAATTTTGTTTTGGTGGCAACATTGGGTGAGCGCTGAAGCGAGTC
UT4-e  401  ATTAATAATTTTCTTTTGGTGGCAACATTGGGTGAGCAAGGAGGAGTC
consensus 401  ****.*.**..*****

UT4-a  439  TGAGTGTGGCTGGGTATAGTGTGGGGGTGAGTATGGTGGGTTGTGTGTG
UT4-b  440  TGAGTGTGGTGGGTATAGTGTGGGGGTGAGTATGGTGGGTTGTGTGTG
UT4-c  440  TGAGTGTGGCTGGGTATGTTGTGGGGGTGAGTATGGTGGGTTGTGTGTG
UT4-d  440  TGAGTGTGGCTGGGTATGTTGTGGGGGTGAGTATGGTGGGTTGTGTGTG
UT4-e  451  TGAGT-----ATGGTGGGTTGTTCCCTG
consensus 451  *****

UT4-a  489  GTGGCGGGCGGCAGCGCTTGAAGGGTGTGGATGGAGGGGGGGG-GTGATTGT
UT4-b  490  GTGGCGGGCTGCAGGCGCTTGAAGAGTTGGATGGAG--GGGG-GTGATTAGT
UT4-c  490  GTGGCGGGCGGCAGCGCTTGAAGGGTGTGGATGGTGGGGGT-GTGATTGT
UT4-d  490  GTGGCGGGCGGCAGCGCTTGAAGGGTGTGGATGGAGGGGGGT-GTGATTGT
UT4-e  473  GTGGCGGGCTGCAGCACTTGAAGGGTGTGGATGGAGGGGGGGGTTGATTGT
consensus 501  *****.****.******.******.*.**.****.***

UT4-a  538  ATGTTGGTGTGGGAGTGGGGATGGATGGGATGAGGAATGAATGTGTCA
UT4-b  537  ATTTTGTGTGGGAGTGGGGATGGATGGGATGAGGATTGAATGTGTCA
UT4-c  539  ATGTTGGTGTGGGAGTGGGGATGGATGGGATGAGGATTGAATGAA--G
UT4-d  539  ATGTTGGTGTGGGAGCGGGGATGGATGGGATGAGGATTGAATGAA--G
UT4-e  523  ATGTTGGTGTGGGAGTGGGGATGGATGGGATGAGGATTGAATGTGTCA
consensus 551  **.****.******.******.******.****.***.*.....

UT4-a  588  ACGGCTGGAGCGCTGCAC-----CGCTGCAC
UT4-b  587  ACGGCTGGAGCGCTGCACCGCTGCACCCTGCACCCTGCACCCTGCAC
UT4-c  587  ACGGCTGGAGCGCTGCAC-----CGCTGCAC
UT4-d  587  ACGGCTGGAGCGCTGCAC-----CGCTGCAC
UT4-e  573  ACGGCTGGAGCGCTGCAC-----CGCTGCAC
consensus 601  ****.******.******

UT4-a  614  GGCTGGACGGCTCAACCGCTGATAGGGTTA-----
UT4-b  637  CGCTGGACGGCTCAACCGCTGATAGGGTTA-----
UT4-c  605  GGCTGGACGGCTCAACCGCTGATAGGGATAGGGTTA-----
UT4-d  605  GGCTGGACGGCTCAACCGCTGATAGGGATAGGGTTA-----
UT4-e  591  GGCTGGACGGCTCAACCGCTGATAGGGTTA-----
consensus 651  *****

```

TTAGGG

Supp. Fig. 1. Sequences of UT4/5 STELA products

The sequences of 5 clones derived from a UT4/5 STELA reaction are aligned. Highlighted in yellow are the UT4/5-F primer and the start of the TTAGGG repeats in each clone.

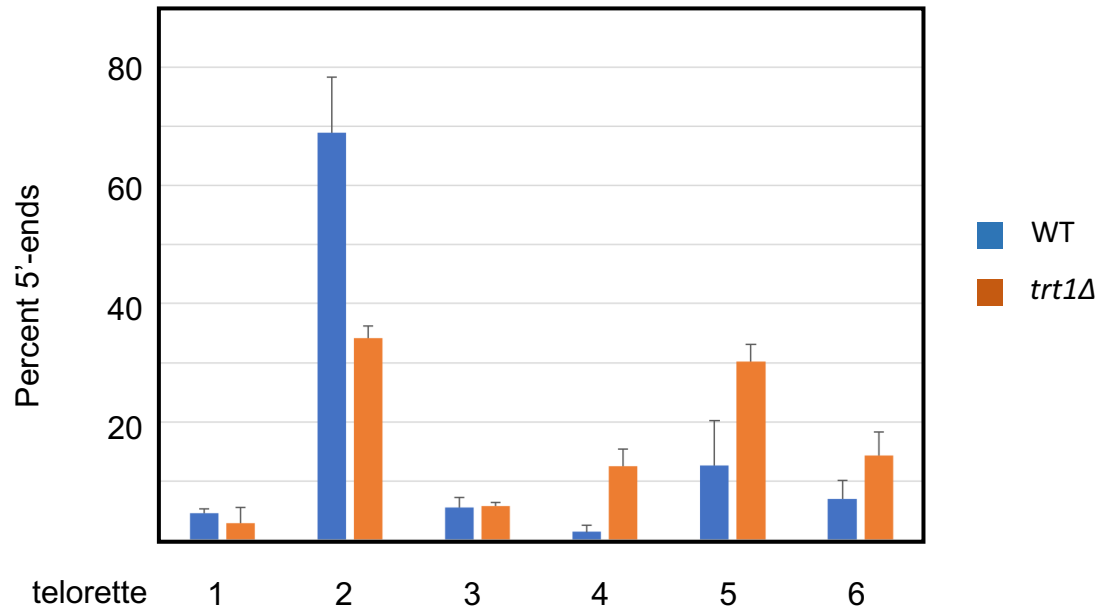
UT6-F

UT6-a	1	-----CTACTACACA	UT6-a	410	GGGCAGTGGATGATTGGTACAGCGGATGGACGGCAGATATATATTGTGAG
UT6-b	1	-----CTACTACACA	UT6-b	410	GGGCAGTGGATGATTGGTACAGCGGATGGACGGCAGATATATATTGTGAG
UT6-c	1	CTACTACACATCGGTTTCAGGAGCGATCCNNCGC-C-ACGCTACTACACA	UT6-c	448	GGGCAGTGGATGATTGGTACAGCGGATGGACGGCAGATATATATTGTGAG
UT6-d	1	CTACTACACATCGGTTTCAGGAGCGATCCACCGCCACA-CTACTACACA	UT6-d	449	GGGCAGTGGATGATTGGTACAGCGGACGGACGGCAGATATATATTGTGAG
UT6-e	1	CTACTACACATCGGTTTCAGGAGCGATCCCCCNCCACTTTATTACACA	UT6-e	450	GGGCAGTGGATGATTGGTACAGCGGATGGACGGCAGATATATATTGTGAG
consensus	1*..*****	consensus	451	*****
UT6-a	11	TCGGTTCAGGATCGATCCTCACCGACCGCCCTCAACGCATGAGACCGA	UT6-a	460	TGGAATATGATTTAAATTTTAAATTTTAAATG-TTTTTTTTTAAATTTG
UT6-b	11	TCGGTTCAGGATCGATCCTCACCGACCGCCCTCAACGCATGAGTCCGA	UT6-b	460	TGGAATATGATTTAAATTTTAAATTTTAAATG-T-TTTTTTTTTAAATTTG
UT6-c	49	TCGGTTCAGGATCGATCCTCACCGACCGCCCTCAACGCATGAGACCGA	UT6-c	498	TGGAATATGATTTAAATTTTAAATTTTAAATGTTTTTTTTTTAAATTTG
UT6-d	50	TCGGTTCAGGATCGATCCTCACCGACCGCCCTCAACGCATGAGACCGA	UT6-d	499	TGGAATATGATTTAATTTTAAATTTTAAATG----TTTTTTAAATTTG
UT6-e	51	TCGGTTCAGGATCGATCCTCANCGACCGCCCTCAACGCATGAGACCGA	UT6-e	500	TGGAATATGATTTAATTTTAAATTTTAAATG----TTTTTTAAATTTG
consensus	51	*****	consensus	501	*****
UT6-a	61	CACCGACACACTCTCTGACTCGACGGCTAAGCACAAATGGCGTTCGACAC	UT6-a	509	GTATTTAAATTTGGAGATTATTAATTTGATTTTGGTGGCAACATTTGGGTGA
UT6-b	61	CACCGACACACTCTCTGACTCGACGGCTAAGCACAAATGGCGTTCGACAC	UT6-b	508	GTATTTAAATTTGGAGATTATTAATTTGATTTTGGTGGCAACATTTGGGTGA
UT6-c	99	CACCGACACACTCTCTGACTCGACGGCTAAGCACAAATGGCGTTCGACAC	UT6-c	548	GTATTTAAATTTGGAGATTATTAATTTGATTTTGGTGGCAACATTTGGGTGA
UT6-d	100	CACCGACACACTCTCTGACTCGACGGCTAAGCACAAATGGCGTTCGACAC	UT6-d	544	GTATTTAAATTTGGAGATTATTAATTTGATTTTGGTGGCAACATTTGGGTGA
UT6-e	101	CACCGACACACTCTCTGACTCGACGGCTAAGCACAAATGGCGTTCGACAC	UT6-e	545	GTATTTAAATTTGGAGTTATTAATTTGATTTTGGTGGCAACATTTGGGTGA
consensus	101	*****	consensus	551	***.*****
UT6-a	111	CTTCCATCACAAACAGAGCATGGCGTTATTGTTTTCGGCAGTGTGAGA	UT6-a	559	GCACCTGAATGGAGT-----CTG-----AGTAT
UT6-b	111	CTTCCATCACAAACAGAGCATGGCGTTATTGTTTTCGGCAGTGTGAGA	UT6-b	558	GCACCTGAATGGAGT-----CTG-----AGTAT
UT6-c	149	CTTCCATCACAAACAGAGCATGGCGTTATTGTTTTCGGCAGTGTGAGA	UT6-c	598	GCACCTGAATGGAGT-----CTG-----AGTAT
UT6-d	150	CTTCCATCACAAACAGAGCATGGCGTTATTGTTTTCGGCAGTGTGAGA	UT6-d	594	GCAGTGAAGGGAGTGTGAGTGTGGCTGGTATAGTGTGGGGGTGAGTAT
UT6-e	151	CTTCCATCACAAACAGAGCATGGCGTTATTGTTTTCGGCAGTGTGAGA	UT6-e	595	GCAGTGAAGGGAGTGTGAGTGTGGCTGGTATAGTGTGGGGGTGAGTAT
consensus	151	*****	consensus	601	***.***.***.***
UT6-a	161	CCTGCCTGGGGTTAGGGTGCACGATTTCCACTTTGGCATCCACAT-CCAC	UT6-a	581	GGTGGGTTGTTCTTGGTGGCGGGCTGCAGCGCTTGAAGGTTGGATGGAC
UT6-b	161	CCTGCCTGGGGTTAGGGTGCACGATTTCCACTTTGGCATCCACAT-CCAC	UT6-b	580	GGTGGGTTGTTCTTGGTGGCGGGCTGCAGCGCTTGAAGGTTGGATGGAC
UT6-c	199	CCTGCCTGGGGTTAGGGTGCACGATTTCCACTTTGGCATCCACAT-CCAC	UT6-c	620	GGTGGGTTGTTCTTGGTGGCGGGCTGCAGCGCTTGAAGGTTGGATGGAC
UT6-d	200	CCTGCCTGGGGTTAGGGTGCACGATTTCCACTTTGGCATCCACAT-CCAC	UT6-d	644	GGTGGGTTGTTCTTGGTGGCGGGCTGCAGCGCTTGAAGCTTGTATGGAC
UT6-e	201	CCTGTCT-GGGTTAGGGTGCACGATTTCCACTTTGGCATCCACATTTCCAC	UT6-e	645	GGTGGGTTGTTGTGGTGGCGGGCTGCAGGGCTTGAAGATTGTATGGAG
consensus	201	***.***.*****	consensus	651	*****.***.*****
UT6-a	210	CTCCACCCCAACGACGACTCGCACCTCCACACCAACGATGACCTGCACAT	UT6-a	631	GGGCGTGTGATTGTATGTTGGTGTGAGAGTGGGGATGGATGGGATGAGG
UT6-b	210	CTCCACCCCAACGACGACTCGCATCTCCACACCAAGGATGACCTGCACAT	UT6-b	630	GGGCGTGTGATTGTATGTTGGTGTGAGAGTGGGGTGGATGGGATGAGG
UT6-c	248	CTCCACCCCAACGACGACTCGCACCTCCACACCAACGATGACCTGCACAT	UT6-c	670	GGGCGTGTGATTGTATGTTGGTGTGAGAGTGGGGATGGATGGGATGAGG
UT6-d	249	CTCCACCCCAACGACGACTCGCACCTCCACACCAACGATGACCTGCACAT	UT6-d	694	GGGCGTGTGATTGTATGTTGGTGTGAGAGTGGGGATGGATGGGATGAGG
UT6-e	250	CTCCACCCCAACGACGACTCGCACCTCCACACCAACGATGACCTGCACAT	UT6-e	695	GGGCGTGTGATTGTATGTTGGTGTGAGAGTGGGGATGGATGGGATGAGG
consensus	251	*****	consensus	701	***.*****
UT6-a	260	CCGCATCCACCTTGACGCTGAGCAGCTGGACGCCAGGGCGGAGCTGGACG	UT6-a	681	GATTGAATGTGTCAACGGCTGGAGCGCTGGACGGTCAACCGCTGATAGG
UT6-b	260	CCGCATCCACCTTGACGCTGAGCAGCTGGACGCCAGGGCGGAGCTGGACG	UT6-b	680	GATTGAATGTGTCAACGGCTGGAGCGCTGGACGGTCAACCGCTGATAGG
UT6-c	298	CCGCATCCACCTTGACGCTGAGCAGCTGGACGCCAGGGCGGAGCTGGACG	UT6-c	720	GATTGAATGTGTCAACGGCTGGAGCGCTGGACGGTCAACCGCTGATAGG
UT6-d	299	CCGCATCCACCTTGACGCTGAGCAGCTGGACGCCAGGGCGGAGCTGGACG	UT6-d	744	GATTGAATGTGTCAACGGCTGGAGCGCTGGACGGTCAACCGCTGATAGG
UT6-e	300	CCGCATCCACCTTGACGCTGAGCAGCTGGACGCCAGGGCGGAGCTGGACG	UT6-e	745	GATTGAATGTGTCAACGGCTGGAGCGCTGGACGG-----
consensus	301	*****	consensus	751	*****
UT6-a	310	AGCAACTGAAGAAGGCGATCCCGGAGCTGTTGGTATCGGTATGTCCTGT	UT6-a	731	-----CTTAG-----GGTTAGGG
UT6-b	310	AGCAACTGAAGAAGGCGATCCCGGAGCTGTTGGTATCGGTATGTCCTGT	UT6-b	730	-----GTTAGGTTAGGGTTAGGG
UT6-c	348	AGCAACTGAAGAAGGCGATCCCGGAGCTGTTGGTATCGGTATGTCCTGT	UT6-c	770	-----GTTAG-----GGTTAGGG
UT6-d	349	AGCAACTGAAGAAGGCGATCCCGGAGCTGTTGGTATCGGTATGTCCTGT	UT6-d	794	CTCAACCGCTGATAGGGTTAG-----GGTTAGGG
UT6-e	350	AGCAACTGAAGAAGGCGATCCCGGAGCTGTTGGTATCGGTATGTCCTGT	UT6-e	780	-TCAACCGCTGATAGGGTTAG-----GGTTAGGG
consensus	351	.*****	consensus	801	****.*****

TTAGGG

Supp. Fig. 2. Sequences of UT6 STELA products

The sequences of 5 clones derived from a UT6 STELA reaction are aligned. Highlighted in yellow are the UT6-F primer and the start of the TTAGGG repeats in each clone.



Supp. Fig. 3. *Telomere C-strand 5'-end distributions in wild type and trt1Δ strains*

The number of UT4/5 STELA products generated from wild type and *trt1Δ* DNA by each telorette oligo was determined, and plotted as the percentage of total STELA products. Data (average \pm S.D.) are from three independent experiments.

References

1. Kojic M, Kostrub CF, Buchman AR, Holloman WK (2002). BRCA2 homolog required for proficiency in DNA repair, recombination, and genome stability in *Ustilago maydis*. **Mol Cell** 10(3): 683-691. doi: S1097276502006329 [pii].
2. Yu EY, Hsu M, Holloman WK, Lue NF (2018). Contributions of recombination and repair proteins to telomere maintenance in telomerase-positive and negative *Ustilago maydis*. **Molecular microbiology** 107(1): 81-93. doi: 10.1111/mmi.13866.
3. Mao N, Kojic M, Holloman WK (2009). Role of Blm and collaborating factors in recombination and survival following replication stress in *Ustilago maydis*. **DNA Repair (Amst)** 8(6): 752-759. doi: 10.1016/j.dnarep.2009.02.006.