

Regulation with cell size ensures mitochondrial DNA homeostasis during cell growth

In the format provided by the
authors and unedited

Supplementary Information

Supplementary Table 1: Testing ASY39-1 (ρ^0 strain) for mtDNA by qPCR. Raw Cq-values obtained for mitochondrial (*COX2*, *COX3*) and nuclear DNA (*ACT1*) sequences are shown for WT (MMY116-2c), haploid microscopy strain (ASY13-1) and ρ^0 strain (ASY39-1).

Gene	WT Cq-value +/- StD	ρ^+ Cq-value +/- StD	ρ^0 Cq-value +/- StD
<i>COX2</i>	18.96 +/- 0.19	19.30 +/- 0.15	Cq-values not measurable or higher than 36
<i>COX3</i>	18.53 +/- 0.30	18.73 +/- 0.15	Cq-values not measurable or higher than 34
<i>ACT1</i>	22.83 +/- 0.33	22.70 +/- 0.33	21.84 +/- 0.26

Supplementary Table 2: Strains used in this study.

Name	Genotype	Description	Origin	Figure
ASY004-1	<i>Mat α; ADE2, ABF2-linker-mCitrine-CglaTRP1</i>	<i>ABF2-mCitrine</i> in MMY116-2c	This study	4e, E.D.fig. 5a-b
ASY006-1	<i>Mat α; ADE2, MIP1-linker-mCitrine- ADH1term-CglaTRP1</i>	<i>MIP1-mCitrine</i> in MMY116-2c	This study	4d, E.D.fig. 5c-g
ASY007-2	<i>Mat α; ADE2, MIP1-linker-mCitrine:CglaTRP1, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-AD-TF-HIS3</i>	<i>MIP1-mCitrine-Adh1term-CglaTRP1</i> (KCE001-2) in MS63-1	This study	E.D.fig. 5e
ASY013-1	<i>Mat α; mt-LacO, ADE2, TRP1, whi5Δ::KlacURA3, LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-LBD-HIS3, Pcup1-Su9-2xNEON-LacI-Pgk1-Su9-mKate2-KanMX4</i>	Haploid microscopy strain, Whi5-inducible	This study	2c-e; 3a-d; E.D.fig. 2b; 4a-b; 10
ASY015-1	<i>Mat α/a; mt-LacO, ADE2/ADE2, $\Delta whi5$::KlacURA3/WHI5, LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-LBD-HIS3, Pcup1-Su9-2xNEON-LacI-Pgk1-Su9-mKate2-KanMX4</i>	Diploid microscopy strain, Whi5-inducible	This study	2b-e; E.D.fig. 2a-b; 10
ASY020-1	<i>Mat α/a; ADE2/ADE2, URA3/ura3, leu2/LEU2</i>	Diploid WT	This study	1b; 5b-c; 7a-b; E.D.fig. 7
ASY023-1	<i>Mat α/a; ADE2/ADE2, ura3-1/URA3, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2/WHI5, his3::LexA-ER-AD-TF-HIS3/his3-11,15</i>	Whi5-inducible strain	This study	1b; 7b

ASY024-1	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, ura3-1/URA3, mip1::CgalTRP1/MIP1</i>	Hemizygous <i>MIP1</i> strain	This study	5b-c; 7a-b; E.D.fig. 7
ASY025-1	<i>Mat α/a; ADE2/ADE2, ura3-1/URA3, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2/WHI5, his3::LexA-ER-AD-TF-HIS3/his3-11,15, mip1::CgalTRP1/MIP1</i>	Hemizygous <i>MIP1</i> strain, Whi5-inducible	This study	7b; E.D.fig. 7 b-d
ASY033-1	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, pif1::TRP1/PIF1</i>	Hemizygous <i>PIF1</i> strain	This study	5b; E.D.fig. 7a
ASY034-1	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, rad53::TRP1/RAD53</i>	Hemizygous <i>RAD53</i> strain	This study	5b; E.D.fig. 7a
ASY035-1	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, rrm3::TRP1/RRM3</i>	Hemizygous <i>RRM3</i> strain	This study	5b; E.D.fig. 7a
ASY039-1	<i>Mat α/a; ADE2, Δwhi5::KlacURA3, hiWHI5:LEU2, LexA-ER-LBD:HIS3, Pcup1-Su9-2xNEON-Lacl--Pgk1-Su9-mKate2:KanMX4, TRP1, mip1::clonNAT</i>	<i>mip1Δ</i> microscopy strain	This study	3a-d; E.D.fig. 4a-b; Supp. Table 1
ASY046-1	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, ura3-1/URA3, mip1::CgalTRP1/MIP1, abf2::clonNAT/ABF2</i>	Double hemizygous <i>MIP1 ABF2</i> strain	This study	7a-b; E.D.fig. 7 b-d
ASY049-2	<i>Mat α/a; whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-AD-TF-HIS3, mip1::CgalTRP1/MIP1, abf2::clonNAT/ABF2</i>	Double hemizygous <i>MIP1 ABF2</i> strain; Whi5-inducible	This study	7b; E.D.fig. 7 b-d
ASY051-2	<i>Mat α; ADE2, ura3::URA3/ABF2</i>	Haploid WT with additional copy of <i>ABF2</i>	This study	7d-e; E.D.fig. 7e-g
ASY052-5	<i>Mat α; ADE2, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-AD-TF-HIS3, ura3::URA3/ABF2</i>	Haploid Whi5-inducible strain with additional copy of <i>ABF2</i>	This study	7e; E.D.fig. 7e-g
ASY057-3	<i>Mat α; ADE2, trp1::TRP1/MIP1</i>	Haploid WT with additional copy of <i>MIP1</i>	This study	7d-e; E.D.fig. 7e-g
ASY058-1	<i>Mat α; ADE2, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-AD-TF-HIS3, trp1::TRP1/MIP1</i>	Haploid Whi5-inducible strain with additional copy of <i>MIP1</i>	This study	7e; E.D.fig. 7e-g

ASY059-2	<i>Mat α; ADE2, ura3::URA3/ABF2, trp1::TRP1/MIP1</i>	Haploid WT with additional <i>ABF2</i> and <i>MIP1</i> copies	This study	7d-e; E.D.fig. 7e-g
ASY060-1	<i>Mat α; ADE2, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-AD-TF-HIS3, ura3::URA3/ABF2, trp1::TRP1/MIP1</i>	Haploid <i>Whi5</i> -inducible strain with additional copies of <i>ABF2</i> and <i>MIP1</i>	This study	7e; E.D.fig. 7e-g
JE611-c	<i>Mat α, cln1Δ, cln2Δ, cln3::leu2, lexOPr-Cln1-Leu2, ADE2, his3::cyc1-Pr-lexO TF-his3, TRP, URA</i>	<i>Cln1</i> -inducible strain	Jennifer Ewald, Skotheim lab	1c; E.D.fig. 1e-f
KSY244-1	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, abf2::TRP1/ABF2</i>	Hemizygous <i>ABF2</i> strain	This study	5b,c; E.D.fig. 7a-d
KSY245-1	<i>Mat α/a; ADE2/ADE2, ura3-1/URA3, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2/WHI5, his3::LexA-ER-AD-TF-HIS3/his3-11,15, abf2::CgalTRP1/ABF2</i>	Hemizygous <i>ABF2</i> strain; <i>Whi5</i> -inducible	This study	7b; E.D.fig. 7b-d
MMY116-2c	<i>Mat α; ADE2</i>	Haploid WT strain	Skotheim lab stock	1b, 2f-h; 7d-e; E.D.fig. 1, 3, 5, 7
MS63-1	<i>Mat α; ADE2, whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3::LexA-ER-AD-TF-HIS3</i>	Haploid <i>Whi5</i> -inducible strain	Matthew Swaffer, Skotheim lab	1b, 2f-h, 4a, 7e; E.D.fig. 1, 2b, 3, 5e, 6, 7
KCY005-1	<i>Mat α/a; ADE2/ADE2, whi5Δ::CgalTRP1/whi5Δ::kanMX6-LexApr-WHI5-ADH1term-LEU2, his3/his3::LexA-ERAD-TF-HIS3</i>	Diploid <i>Whi5</i> -inducible strain	Kora-Lee Claude, Schmoller lab	E.D.fig. 6a-c
KSY246	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, hmi1::TRP1/HMI1</i>	Hemizygous <i>HMI1</i> strain	This study	5b; E.D.fig. 7a
KSY253	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, rpo41::TRP1/RPO41</i>	Hemizygous <i>RPO41</i> strain	This study	5b; E.D.fig. 7a
KSY254	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, mtf1::TRP1/MTF1</i>	Hemizygous <i>MTF1</i> strain	This study	5b; 7a
KSY255	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, mhr1::TRP1/MHR1</i>	Hemizygous <i>MHR1</i> strain	This study	5b; E.D.fig. 7a

KSY256	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, mgm101::TRP1/MGM101</i>	Hemizygous <i>MGM101</i> strain	This study	5b; E.D.fig. 7a
KSY257	<i>Mat α/a; ADE2/ADE2, leu2-3/LEU2, URA3/ura3-1, rim1::TRP1/RIM1</i>	Hemizygous <i>RIM1</i> strain	This study	5b; E.D.fig. 7a
KSY299-1,2	<i>Mat α; ADE2, mip1::MIP1-ADH1term(short)-cglTRP1</i>	<i>MIP1</i> terminator replaced with <i>MIP1-Adh1term(short)</i> in MMY116-2C	This study	E.D.fig. 5f-g
KSY300-1,2	<i>Mat α; ADE2, mip1::MIP1-ADH1term(long)-cglTRP1</i>	<i>MIP1</i> terminator replaced with <i>MIP1-ADH1term(long)</i> in MMY116-2C	This study	E.D.fig. 5f-g
KSY301-1,2	<i>Mat α; ADE2, mip1::MIP1-mCitr-MIP1term-cglTRP1</i>	<i>MIP1-mCitrine-MIP1term</i> in MMY116-2C	This study	E.D.fig. 5f-g
yFT006	<i>Mat α/a; mt-LacO, ADE2/ADE2, TRP1/TRP1, HO::Pcup1-Su9-3xNeonGreen-LacI-PGK1-Su9-mKate-kanMX6/HO::Pcup1-Su9-3xNeonGreen-LacI-PGK1-Su9-mKate-kanMX6</i>	WT microscopy strain for <i>mic60Δ</i> microscopy	This study	3e-g; E.D.fig. 4d-h
yFT023	<i>Mat α/a; mt-LacO, ADE2/ADE2, TRP1/TRP1, HO::Pcup1-Su9-3xNeonGreen-LacI-PGK1-Su9-mKate-kanMX6/HO::Pcup1-Su9-3xNeonGreen-LacI-PGK1-Su9-mKate-kanMX6, Δmic60::Nourseothricin/Δmic60::Nourseothricin</i>	<i>mic60Δ</i> microscopy strain	This study	3e-g; E.D.fig. 4d-h

Supplementary Table 3: Plasmids constructed in this study. *MIP1* and *ABF2* promoters correspond to 1000 bp upstream of the start codon. *MIP1* terminator corresponds to 271 bp downstream of coding *MIP1*. *ABF2* terminator corresponds to 288 bp downstream of coding *ABF2*.

Plasmid	Description
ASE001-5	HO-homology-CuPr-SU9-2xmNeon-LacI
ASE002-2	pRS404-Mip1Pr-Mip1-Mip1term
ASE003-1	pRS406-Abf2Pr-Abf2-Abf2term

Supplementary Table 4: qPCR primers used in this study

Gene	qPCR primer direction	qPCR primer sequence (5'-3')
<i>ABF2</i>	forward	AACCAGCAGGACCCTTCATT
	reverse	AGTTGAGAGGGTAGCGAGCA
<i>ACT1</i>	forward	CACCCTGTTCTTTTGA CTGA
	reverse	CGTAGAAGGCTGGAACGTTG
<i>COX2</i>	forward	GTTGATGCTACTCCTGGTAGATT
	reverse	TTGCATGACCTGTCCCACAC
<i>COX3</i>	forward	TTGAAGCTGTACAACCTACC
	reverse	CCTGCGATTAAGGCATGATG
<i>MIP1</i>	forward	CCATCACAAGCAAGAACGGC
	reverse	GTCCCTTTCCAGCTCAACCA
<i>MRX6</i>	forward	CATCCGACGTGGTGCTCTTA
	reverse	TCTCATCTCTCCCTCCACCC
<i>MTF1</i>	forward	TTGCTAATGTGACGGGGGAG
	reverse	CTGTTGTGCTTGGCATCCAT
<i>PIM1</i>	forward	ACCCTACATTGGCGCTTTCA
	reverse	AGTGCCCGTCTTTTCGTCTT
<i>RDN18</i>	forward	AACTCACCAGGTCCAGACACAATAAGG
	reverse	AAGGTCTCGTTCGTTATCGCAATTAAGC
<i>RPO41</i>	forward	TCTGGGTAGAACACCGTGGA
	reverse	TTCGTCTTGTGCACCTGGAA

Supplementary Table 5: Terminator sequences used in Extended Data figure 4.

	Sequence
<i>ADH1</i> terminator (short)	GCGAATTTCTTATGATTTATGATTTTTATTATTAAATAAGTTAT AAAAAAAATAAGTGATACAAATTTTAAAGTGACTCTTAGGTT TTAAACGAAAATTCTTATTCTTGAGTAACTCTTTCCTGTAGG TCAGGTTGCTTTCTCAGGTATAGCATGAGGTCGCTCTTATTG ACCACACCTCTACCGG
<i>ADH1</i> terminator (long)	GGCGCGCCACTTCTAAATAAGCGAATTTCTTATGATTTATGAT TTTTATTATTAAATAAGTTATAAAAAAATAAGTGATACAAATT TTAAAGTGACTCTTAGGTTTTAAACGAAAATTCTTATTCTTGA GTA ACTCTTTCCTGTAGGTCAGGTTGCTTTCTCAGGTATAGCA TGAGGTCGCTCTTATTGACCACACCTCTACCGG
<i>MIP1</i> terminator sequence	GCAAAATCTGCATTAGCTTTCGCATTTGTATTTATATATACAGC ACATTATAATATTATTTTTTTATTTATTTCTACTTACTTTTTTCG CCAAATGAGAAAACAAAAGTAAGTTGCCCTATTAGAAAAAGA GTTAACATTAGGAAACGGGGACAAAACAAAAGGTAGAATTCA AAATAGGAATTCAAAACCCAAATTATCTGCATCTTCTCGTTAG CTAAGATTTTATAGATCATTGCAGGCTCGATAAATTTTACATG GTAACGAAAC