SUPPLEMENTARY INFORMATION

The CDK regulators Cdh1 and Sic1 promote efficient usage of DNA replication origins to prevent chromosomal rearrangements at a chromosome arm

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Supplementary Tables 1 and 2; Supplementary Figure legends and Supplementary Figures 1-5.
### Supplementary Table 1. Yeast strains

<table>
<thead>
<tr>
<th>Strain</th>
<th>Genotype</th>
<th>Source</th>
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<td>YAC36</td>
<td>W303-1a MAT&lt;sup&gt;a&lt;/sup&gt; ade2-1 ura3-1 his3-11,15 trp1-1 leu2-3,112 can1-100</td>
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<td>S288C MAT&lt;sup&gt;a&lt;/sup&gt; ura3-52, leu2Δ1 trp1Δ63 his3Δ200 lys2ΔBgl hom3-10 ade2Δ 1 ade8 YEL069::URA3</td>
<td>Chen and Kolodner, 99</td>
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<tr>
<td>YAC177</td>
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<td>YAC198</td>
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### Supplementary Table 2. Maintenance of origin efficiency in the absence of Cdh1 or Sic1 is independent on normal origin efficiency, firing timing, or chromosomal location.

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<tr>
<th>Origin</th>
<th>Genomic location (1)</th>
<th>Analysed by 2D gels (1)</th>
<th>Replication Index</th>
<th>Origin efficiency in this study (4)</th>
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</table>

(1) See www.OriDB.com  
(2) Raghuraman et al. (62).  
(3) Yabuki et al. (86).  
(4) As detected in 2D blots in either Δcdh1 or Sic1-depleted cells, versus control cells.  
* Likely ARS  
** in Δcdh1 cells  
* in Sic1 cells  
n.d. Not determined  

SUPPLEMENTARY FIGURE LEGENDS

Supplementary Figure 1. Cell growth and cell cycle distribution analysis of cells lacking Cdh1 and Sic1. (a) Dilution spotting of control, single, and double mutants in the indicated conditions in W303-1a (i) and S288C (ii) cells. (b) FACS analysis of cells of the indicated strains of W303-1a (i) and S288C (ii) backgrounds in logarithmic growth. sic1 cells are shown in expressing (RaffGal, so that Sic1 is overexpressed) and repressing conditions (after switching to glucose for 4 hours, and Sic1 is depleted). Cultures in glucose correspond to cells employed for 2D gel analysis. Note S288C cells show milder phenotypes for cells lacking Cdh1 or Sic1.

Supplementary Figure 2. Depletion of Sic1 upon addition of glucose to GAL1,10p-SIC1 cells. (a) Sic1 levels in control and GAL1,10p-SIC1 W303-1a, and (b) S288C cells, in raffinose-galactose or glucose as indicated. As, asynchronous cells; Noc, nocodazole; α-F, alpha-factor. Pgk1 levels are shown as a loading control. Note a less efficient Sic1-depletion in S288C cells than in W303-1a cells. sic1 cells are shown in expressing (RaffGal) and repressing conditions (Glucose).

Supplementary Figure 3. Origin firing activity in ∆sic1 cells. 2D gels of the indicated origins in control and ∆sic1 cells performed in parallel. Origin efficiencies are indicated in the upper right corner. When firing efficiency loses are detected in ∆sic1 cells relative to wt cells, white arrowheads denote the active, bubble-arcs, and black arrowheads the passive Y-arcs.

Supplementary Figure 4. (a) Repetition of some 2D gels for the indicated origins in control, single and double mutants, performed in parallel to evaluate reproducibility. (b) Repetition of some 2D gels from Figure 1B in double mutant cells of the S288C background. Origin efficiencies are indicated in the upper right corner. Open arrowheads show loss of efficiency relative to control cells.

Supplementary Figure 5. Analysis of fork direction at a region adjacent to ARS305 as in Figure 1C. The restriction fragment analysed -HindIII-BamHI (3.04 kb, chr. III, coordinates 41817-44862 ‘downstream ARS305’), the EcoRI in-gel digestion (chr. III, 42444), the probe downstream ARS305 (44213-44681 chr. III), and signal quantifications were performed as indicated (see Material and methods).
Supplementary Figure 1

(a) i) W303-1a (YAC188) Δsic1 (YAC1158) Δcdh1 (YAC308) sic1 (YAC198) sic1 Δcdh1 (YAC314) S288C (YAC177) Δsic1 (YAC571) Δcdh1 (YAC300) sic1 (YAC217) sic1 Δcdh1 (YAC304) 25 ºC 25 ºC 37 ºC 38.5 ºC RaffGal Glucose Glucose Glucose

(b) i) W303-1a (YAC188) sic1 (YAC198) Δcdh1 (YAC308) sic1 Δcdh1 (YAC314) Glucose Cell number 1C 2C Fluorescence (DNA content) 1C 2C 4C 1C 2C 4C 1C 2C 4C 1C 2C 4C RaffGal

ii) S288C (YAC177) sic1 (YAC217) Δcdh1 (YAC300) sic1 Δcdh1 (YAC304) Glucose Cell number 1C 2C Fluorescence (DNA content) 1C 2C 4C 1C 2C 4C 1C 2C 4C 1C 2C 4C 1C 2C 4C RaffGal
Supplementary Figure 2

(a) W303-1a (YAC272) vs. sic1 (YAC276)

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<th>sic1 (YAC276)</th>
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<td></td>
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<td>Noc</td>
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<td>Pgk1</td>
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(b) S288C (YAC177) vs. sic1 (YAC217)

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<td>Pgk1</td>
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</table>
Supplementary Figure 3

ARS306  ARS305  ARS522 (ARS501)

W303-1a Control (YAC188)

ARS306  ARS305  ARS522 (ARS501)

\( \Delta \text{sic1} \) (YAC1158)
Supplementary Figure 5

EcoRI Probe

HindIII BamHI

ARS305

>90%

∆cdh1
(W303-1a (YAC188))

W303-1a (YAC188)

∆cdh1 (YAC308)

>90%

>90%