

Supporting Table 2: Kinetic parameters of the mathematical model

Parameter	Symbol	Value	Unit	
<i>Licensing</i>				
Binding of Cdc6	k_1	2×10^5	$(\text{Ms})^{-1}$	<i>a,b</i>
Dissociation of Cdc6	k_{-1}	0.2	s^{-1}	<i>a,b</i>
Degradation of Cdc6	δ_2	0.005	s^{-1}	<i>a,c</i>
Binding of Cdt1-Mcm2-7	k_3	1×10^5	$(\text{Ms})^{-1}$	<i>a</i>
Dissociation of Cdt1-Mcm2-7	k_{-3}	0.05	s^{-1}	<i>a</i>
Binding of Cdt1 and Mcm2-7	k_4	2×10^5	$(\text{Ms})^{-1}$	<i>a</i>
Dissociation of Cdt1 and Mcm2-7	k_{-4}	0.02	s^{-1}	<i>a</i>
Binding of Cdt1 and Mcm2-7p	k_5	2×10^3	$(\text{Ms})^{-1}$	<i>a</i>
Dissociation of Cdt1 and Mcm2-7p	k_{-5}	2	s^{-1}	<i>a</i>
Phosphorylation of (Cdt1-)Mcm2-7	α_6	0.002	s^{-1}	<i>a</i>
Export of Cdt1	k_7	0.005	s^{-1}	<i>a</i>
Export of (Cdt1-)Mcm2-7p	k_8	0.005	s^{-1}	<i>a</i>
Dissociation of Cdc6, Cdt1	k_9	0.167	s^{-1}	<i>a</i>
<i>S-Cdk activation</i>				
Binding of G ₁ -Cdk and S-Cdk-Sic1	k_{24}	5×10^5	$(\text{Ms})^{-1}$	<i>a</i>
Dissociation of G ₁ -Cdk and S-Cdk-Sic1	k_{-24}	5	s^{-1}	<i>a</i>
Phosphorylation of S-Cdk-Sic1	α_{24}	0.1	s^{-1}	<i>a</i>
Binding of Cdc14 and S-Cdk-Sic1	k_{25}	5×10^4	$(\text{Ms})^{-1}$	<i>a</i>
Dissociation of Cdc14 and S-Cdk-Sic1	k_{-25}	0.5	s^{-1}	<i>a</i>
Dephosphorylation of S-Cdk-Sic1	β_{25}	2.5	s^{-1}	<i>a</i>
Binding of Sic1(<i>ip</i>) and S-Cdk	k_{26}	2.5×10^6	$(\text{Ms})^{-1}$	<i>a,d</i>
Dissociation of Sic1(<i>ip</i>) and S-Cdk	k_{-26}	0.0092	s^{-1}	<i>a,e</i>
Degradation of Sic1(<i>ip</i>), $i = 6, \dots, 9$	δ_{27}	1	s^{-1}	<i>a</i>

^aFixed, not optimized parameter value

^bFeng et al (2000)

^cDrury et al (2000)

^dBarberis et al (2007)

^eBarberis et al (2005)

11-3-2 activator formation				
Binding of S-Cdk and Sld2/3	k_{17}/k_{19}	6.4×10^4	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of S-Cdk and Sld2/3	k_{-17}/k_{-19}	7.9×10^{-3}	s^{-1}	<i>f</i>
Phosphorylation of Sld2/3	α_{17}	0.2	s^{-1}	<i>f</i>
Phosphorylation of Thr84 in Sld2	α_{19}	0.9	s^{-1}	<i>f</i>
Binding of Cdc14 and Sld2/3	k_{18}/k_{20}	1.1×10^3	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of Cdc14 and Sld2/3	k_{-18}/k_{-20}	9.9×10^{-3}	s^{-1}	<i>f</i>
Dephosphorylation of Sld2/3	β_{18}	0.3	s^{-1}	<i>f</i>
Dephosphorylation of Thr84 in Sld2	β_{20}	0.5	s^{-1}	<i>f</i>
Binding of Sld2p and Dpb11	k_{21}	5.0×10^5	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of Sld2p and Dpb11	k_{-21}	0.005	s^{-1}	<i>a</i>
Binding of Sld3p and Dpb11	k_{22}	1.7×10^5	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of Sld3p and Dpb11	k_{-22}	0.005	s^{-1}	<i>a</i>
Firing				
Binding of S-Cdk and Mcm2-7	k_{10}	7.3×10^4	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of S-Cdk and Mcm2-7	k_{-10}	8.2×10^{-3}	s^{-1}	<i>f</i>
Phosphorylation of Mcm2-7 by S-Cdk	α_{10}	0.1	s^{-1}	<i>f</i>
Binding of Ddk and Mcm2-7	k_{11}	3.0×10^4	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of Ddk and Mcm2-7	k_{-11}	0.01	s^{-1}	<i>f</i>
Phosphorylation of Mcm2-7 by Ddk	α_{11}	0.8	s^{-1}	<i>f</i>
Binding of Cdc45	k_{12}	1.1×10^5	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of Cdc45	k_{-12}	0.005	s^{-1}	<i>b</i>
Binding of Sld3p-Dpb11-Sld2p	k_{13}	5×10^5	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of Sld3p-Dpb11-Sld2p	k_{-13}	0.005	s^{-1}	<i>a</i>
Binding of GINS and polymerase	k_{14}	3.3×10^5	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of GINS and polymerase	k_{-14}	0.005	s^{-1}	<i>a</i>
Dissociation of 11-3-2 activator	k_{15}	0.9	s^{-1}	<i>f</i>
Dissociation of Mcm2-7, Cdc45, GINS, and polymerase; resetting of origins after replicon completion	k_{16}	0.005	s^{-1}	<i>a</i>
Binding of S-Cdk and Orc6	k_{23}	6.3×10^3	$(\text{Ms})^{-1}$	<i>f</i>
Dissociation of S-Cdk and Orc6	k_{-23}	9.2×10^{-3}	s^{-1}	<i>f</i>
Phosphorylation of Orc6	α_{23}	0.7	s^{-1}	<i>f</i>

^aFixed, not optimized parameter value

^fParameter value from a reference set, selected from all 109 optimized parameter sets

References

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