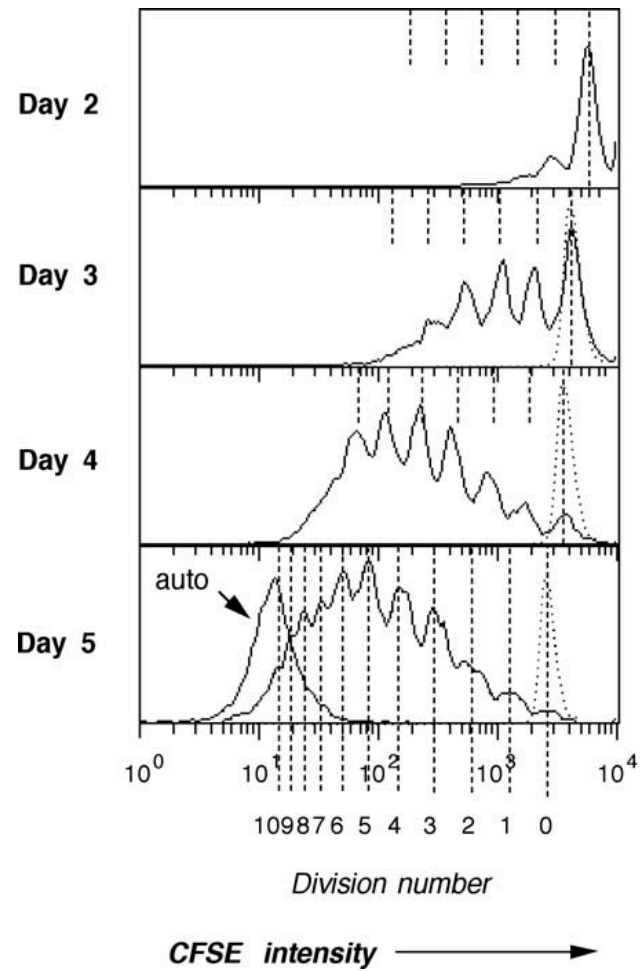# The kinetics via CFSE labeling assay

April 7, 2009

The experimental data

The statistical compilation

The CFSE profile of P-14 Tg naive CD8 T cells after adoptive transfer into irradiated hosts (Murali-Krishna and Ahmed, 2000)

	t (days)			
$X_n(t)$	0.5	1.25	3	8
n (divisions) 0	7.38	7.07	1.77	0.0
1	0.0	0.64	6.10	0.29
2	0.0	0.0	6.58	5.71
3	0.0	0.0	1.28	19.97
4	0.0	0.0	0.0	18.83
5	0.0	0.0	0.0	7.99
6+	0.0	0.0	0.0	4.00

The numbers above equal the number of cells per spleen divided by 10^4.
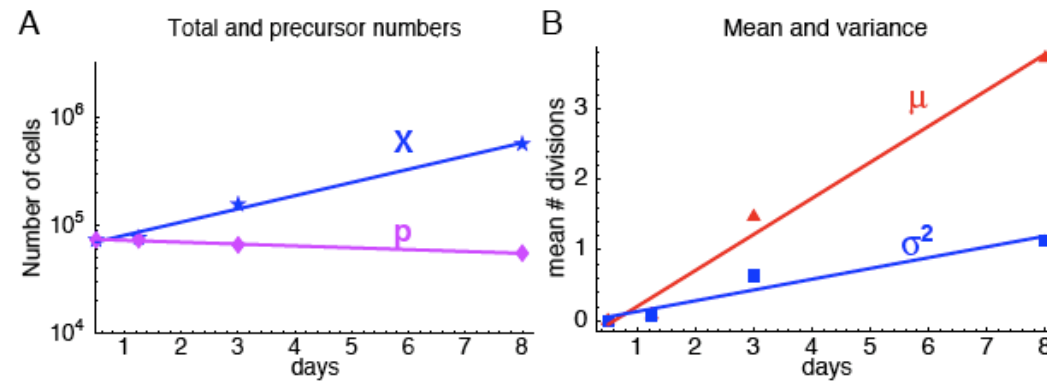
Visualized data

Fig. 4. Changes in several characteristics of P-14 Tg naive CD8 T cells after adoptive transfer into irradiated hosts (Murali-Krishna and Ahmed, 2000). Panel A shows the change in the total number of Tg cells X (stars) and precursors p (diamonds). Panel B shows the change in the mean μ (triangles) and the variance σ^2 (boxes) of the number of divisions cells have undergone. Solid lines represent the best regression lines, the slopes of the regressions are $r=0.28$ day^{-1}, $d=0.04$ day^{-1}, $a=\mu'=0.51$ day^{-1}, $b=(\sigma^2)'=0.15$ day^{-1}.

The cell cycle
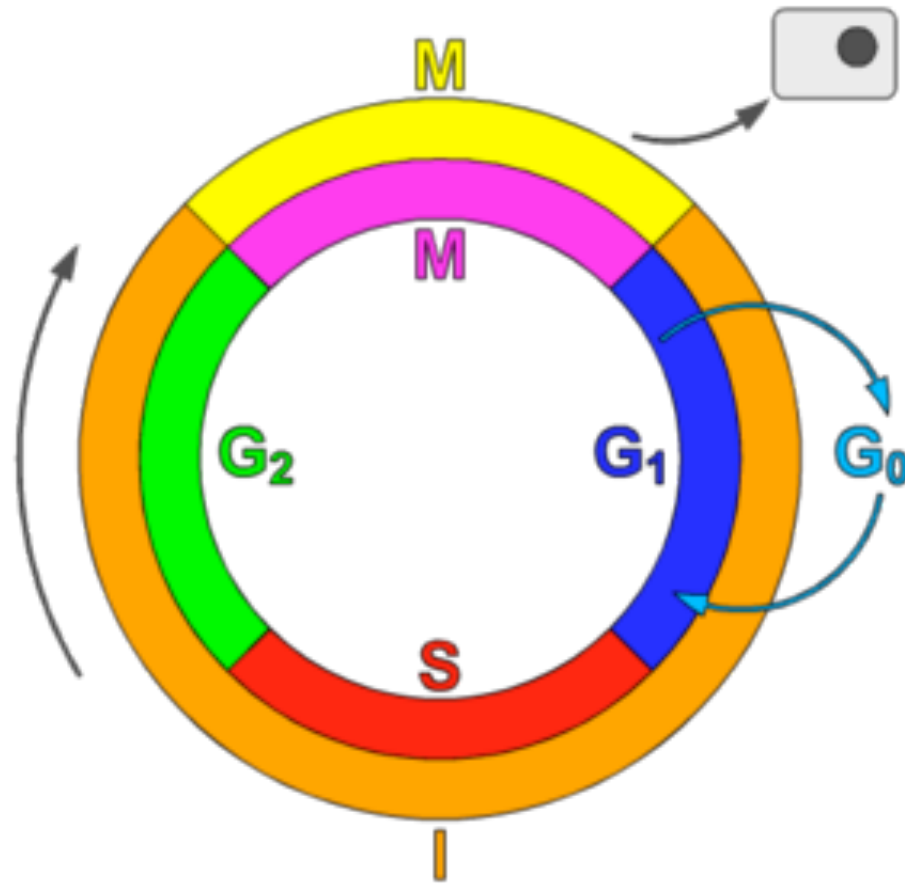
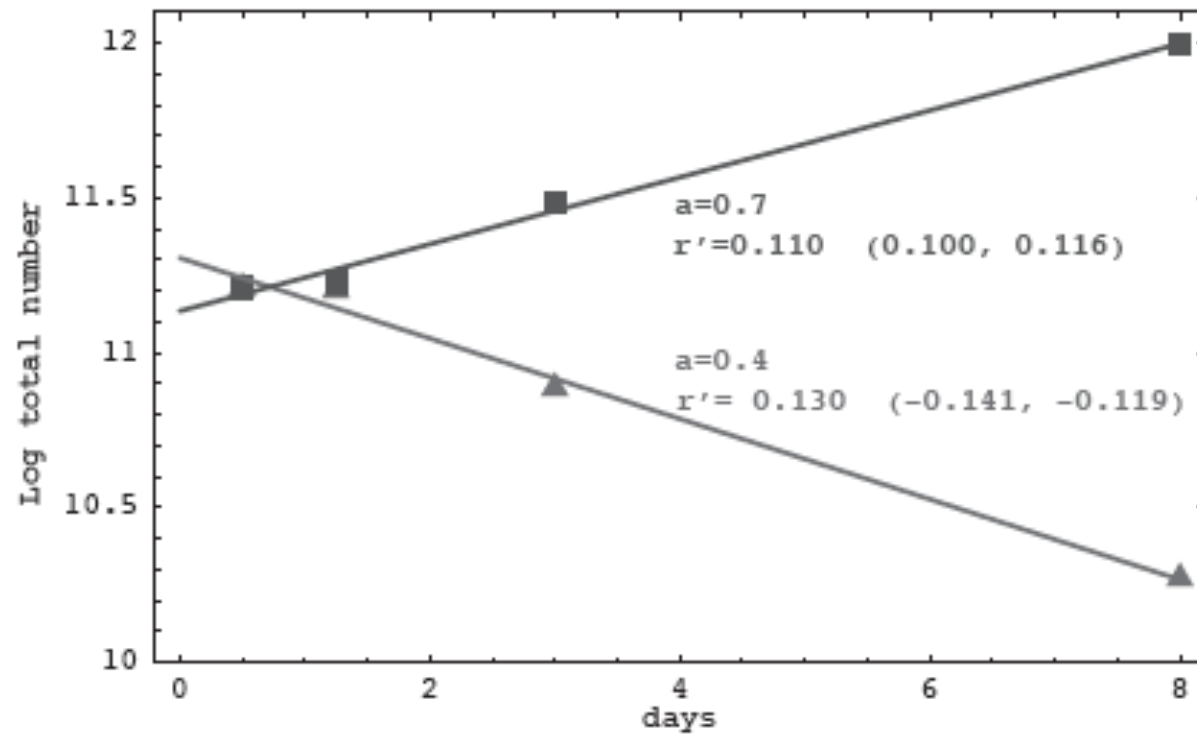# The Smith-Martin model

(A)

(B)
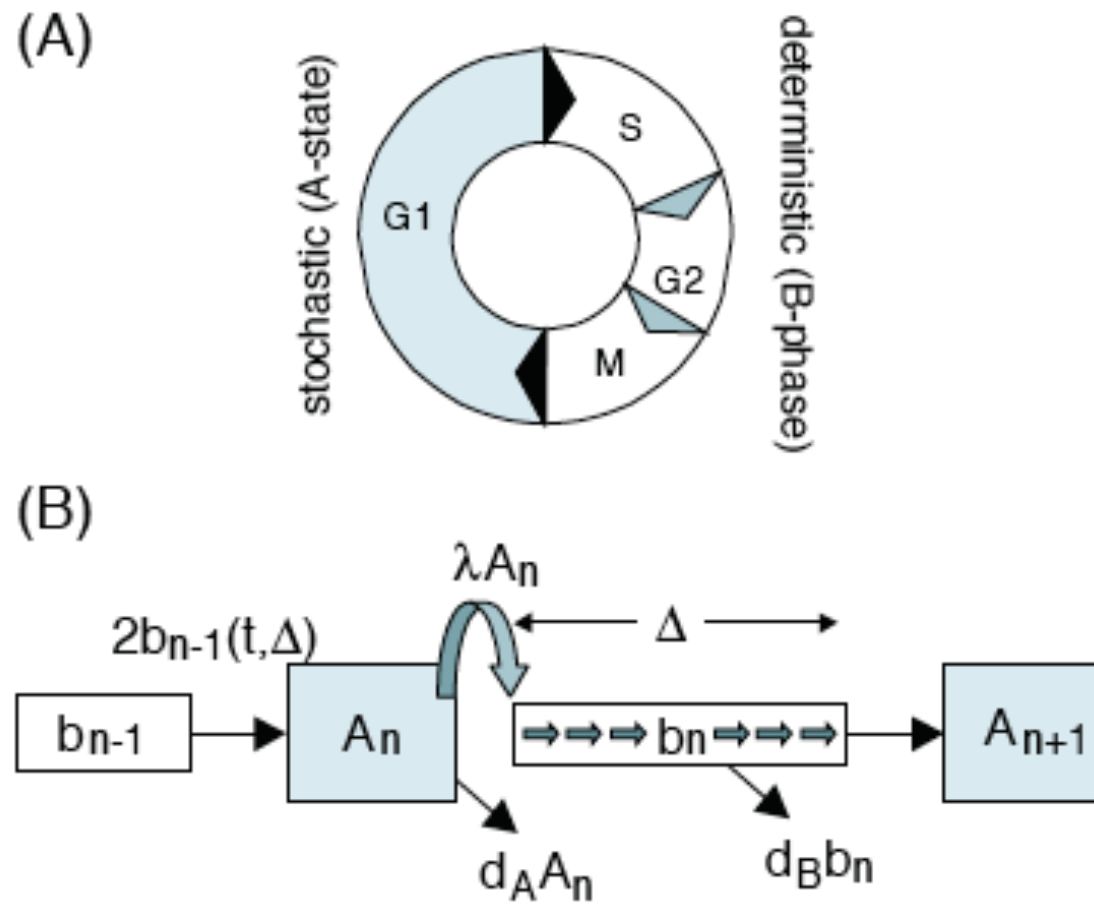
The rescaling method

The rescaling method

The characteristic equation and 67% CI
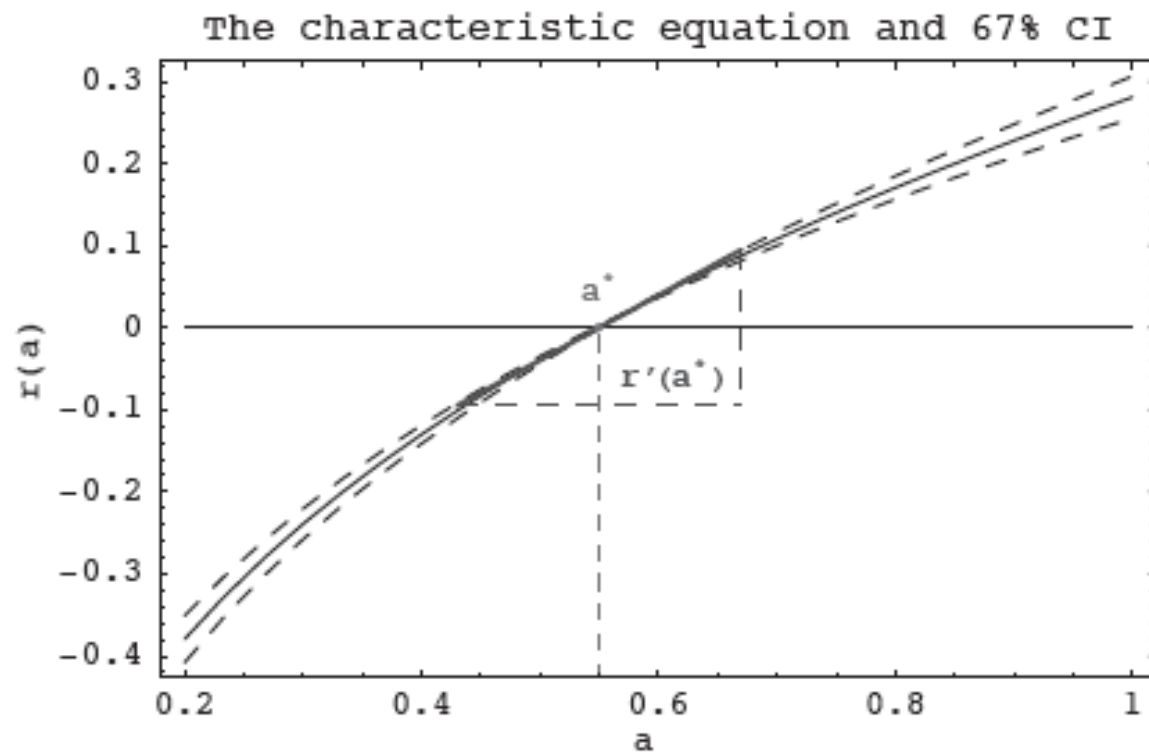
Comparing methods

The estimates for the parameters of the SM model obtained by direct fitting of the analytical solution of the model (Method 1), indirect fitting (Method 2), and the rescaling method (Method 3)

Parameters	Direct fitting		Indirect fitting		Rescaling method	
	Method 1		Method 2		Method 3	
	Mean	67% CIs	Mean	67% CIs/range	Mean	67% CIs/range
λ, day^{-1}	1.57	(0.62, 1.49)	–	(0.60–0.65)*	–	(0.67, 0.74)*
Δ, day	1.13	(0.92, 1.25)	0.89	(0.63, 1.20)	0.97	(0.67, 1.46)
d_A, day^{-1}	0.00	(0.0, 0.0)	–	(0–0.05)*	–	(0–0.07)*
d_B, day^{-1}	0.09	(0.02, 0.16)	–	(0–0.10)*	–	(0–0.10)*
T, day	2.31	(2.03, 2.58)	–	(2.42–2.56)*	–	(2.33–2.47)*
δ	0.09	(0.01, 0.15)	0.08	–	0.09	(0.08, 0.11)

For the Method 1, confidence intervals were calculated using a bootstrap method with 1000 resamplings of the residuals. For the Method 2 the confidence intervals are calculated using standard methods for linear regressions. For the Method 3, confidence intervals are calculated using standard methods for linear regressions where the errors in the estimated values for the rate of increase $r(a)$ are also taken into account. The 67% confidence intervals are shown is brackets with a comma. The ranges for parameters found by indirect fitting or rescaling method are shown in backets with a dash. The estimate of the average division time using the Gett–Hodgkin method is $(\mu'_2)^{-1}=2.39$ days (2.22, 2.60).

* Ranges for the relevant parameters.