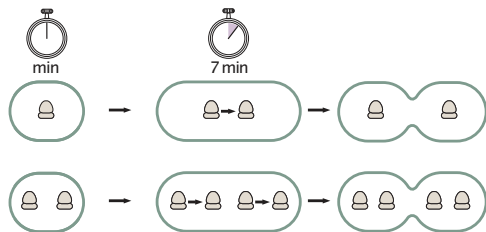
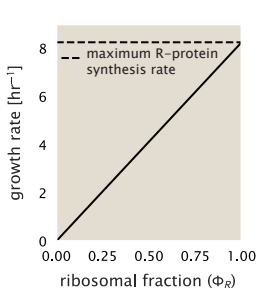
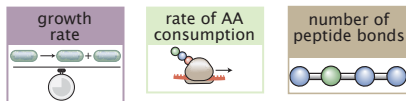


## maximum growth rate is set by ribosomes



(B)

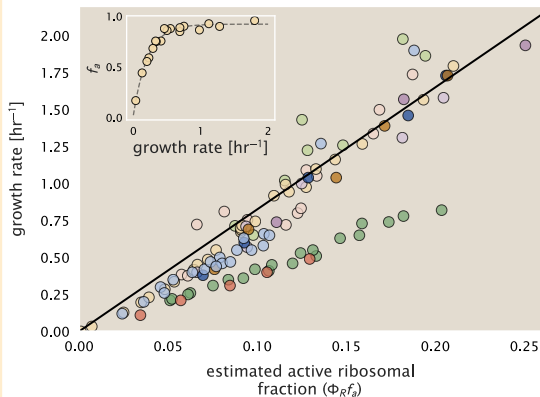
## translation-limited growth rate



$$\lambda = \frac{R \times r_t \times f_a}{N_{\text{pep}}} \approx \frac{r_t}{L_R} \times \Phi_R \times f_a$$

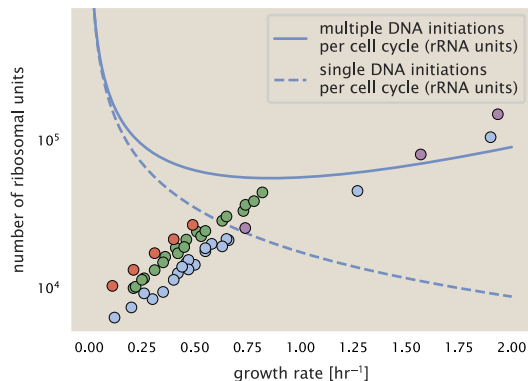
$r_t = 17 \text{ aa/s}$   
 $L_R = 7,459 \text{ aa}$   
 $f_a = 1$

(C)



(D)

## limitations on rRNA synthesis



- Li et al. 2014
- Schmidt et al. 2016
- Si et al. 2017
- Peebo et al. 2015
- Valgepea et al. 2013
- Dai et al. 2016
- Scott et al. 2010
- Forchhammer & Lindahl 1971
- Bremmer & Dennis 2006