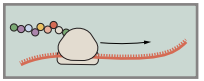
(A)

translation-limited growth rate



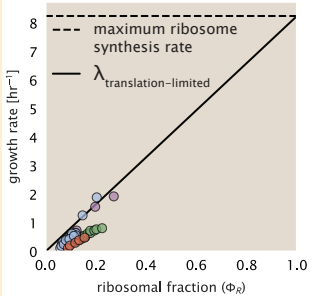
$$\lambda_{translation\text{-}limited} = \frac{r_t \times R}{N_{aa}}$$

R is related to protein mass by,

$$\Phi_R = \frac{m_R}{m_{protein}}, \quad R \approx m_R \times \frac{1\ ribosome}{L_R \times 110\ Da} \times \frac{6 \times 10^{11}\ Da}{1\ pg}$$

Naa is related to protein mass by,

$$N_{aa} \approx m_{protein} \times \frac{1\ aa}{110\ Da} \times \frac{6 \times 10^{11}\ Da}{1\ pg}$$



$$\lambda_{translation\text{-}limited} \approx \frac{r_t}{L_R} \Phi_R$$

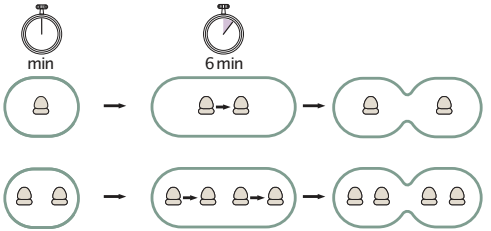
$r_t \approx 17$ aa/s

$L_R \approx 7{,}500$ aa

- Li et al. 2014
- Peebo et al. 2015
- Schmidt et al. 2016
- Valgepea et al. 2013

(B)

maximum growth rate is set by ribosomes



(C)

ribosome synthesis will become rRNA limited at fast growth