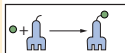


PROTEIN SYNTHESIS

tRNA charging

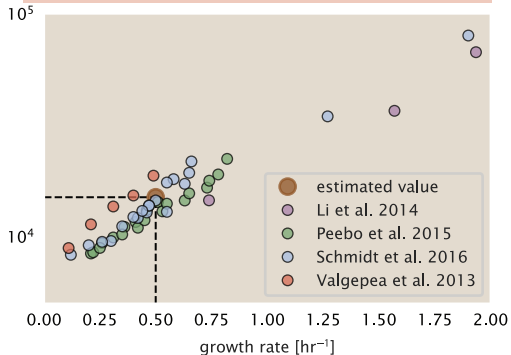


$$N_{\text{amino-acyl tRNA}} \approx 3 \times 10^6 \text{ proteins} \times \frac{300 \text{ amino acids}}{1 \text{ protein}} \approx 10^9 \text{ amino-acyl tRNAs}$$

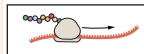
$$r_{\text{tRNA charging}} \approx 10 \text{ amino-acyl tRNA / sec} \quad \text{BNID: 104980}$$

$$N_{\text{tRNA synthetase}} \approx \frac{N_{\text{amino-acyl tRNA}}}{r_{\text{tRNA charging}} \times t_{\text{division}}} \approx 2 \times 10^4 \text{ tRNA synthetases}$$

total number of tRNA synthetases per cell



translation



$$N_{\text{peptide bonds}} \approx 3 \times 10^6 \text{ proteins} \times \frac{300 \text{ amino acids}}{1 \text{ protein}} \approx 10^9 \text{ peptide bonds}$$

$$r_{\text{translation}} \approx 15 \text{ peptide bonds / sec} \quad \text{BNID: 109043}$$

$$N_{\text{ribosomes}} \approx \frac{N_{\text{peptide bonds}}}{r_{\text{translation}} \times t_{\text{division}}} \approx 10^4 \text{ ribosomes}$$

