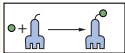


tRNA charging



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

$$r_{\text{consumption}} \approx \frac{N_{\text{amino-acyl tRNA}}}{t_{\text{division}}} = \frac{10^9 \text{ amino-acyl tRNAs}}{5,000 \text{ sec}} \approx \frac{2 \times 10^5 \text{ amino-acyl tRNAs}}{1 \text{ sec}}$$

$$r_{\text{tRNA charging}} \approx 20 \text{ amino-acyl tRNA} / \text{tRNA synthetase} \times \text{sec} \quad \text{BNID: 105279}$$

$$N_{\text{tRNA synthetase}} \approx \frac{r_{\text{tRNA supply}}}{r_{\text{tRNA charging}}} \approx 10^4 \text{ tRNA synthetases}$$

