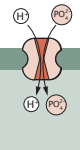


phosphorus transport



$$m_p^{(cell)} \approx 0.03 \times m_{dry} \approx 10 \text{ fg} \quad \text{BNID: 100653}$$

$$am_p \approx 30 \text{ Da} \approx 6 \times 10^{-8} \text{ fg}$$

cellular phosphorus mass

atomic weight

$$N_p^{(cell)} \approx \frac{10 \text{ fg}}{\text{cell}} \times \frac{1 \text{ P}}{6 \times 10^{-8} \text{ fg}} \approx 2 \times 10^8 \text{ P / cell}$$

phosphorus atoms per cell

$$N_p^{(phosphate)} = 1 \text{ P / phosphate}$$

phosphorus atoms per phosphate

$$r_{transport} \approx \frac{300 \text{ phosphate / sec}}{\text{transporter}}$$

phosphate transport rate

$$N_{transporters} \approx \frac{N_p^{(cell)}}{N_p^{(phosphate)} \times r_{transport} \times t_{division}} \approx \frac{2 \times 10^8 \frac{\text{P}}{\text{cell}}}{1 \frac{\text{P}}{\text{phosphate}} \times 300 \frac{\text{phosphate}}{\text{sec} \times \text{transporter}} \times 5000 \frac{\text{sec}}{\text{cell}}} \approx 150 \text{ transporters}$$

number of phosphate transporter complexes