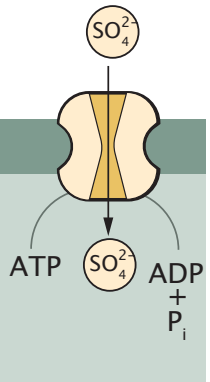
sulfur transport



$m_S^{(cell)} \approx 0.01 \times m_{dry} \approx 3$ fg — BNID: 109665 — cellular sulfur mass

$am_S \approx 32$ Da $\approx 5 \times 10^{-8}$ fg — atomic weight

$$N_S^{(cell)} \approx \frac{m_S^{(cell)}}{am_S} \approx \frac{3 \text{ fg}}{\text{cell}} \times \frac{1 \text{ S}}{5 \times 10^{-8} \text{ fg}} \approx 5 \times 10^7 \text{ S / cell}$$

sulfur atoms per cell

$N_S^{(sulfate)} = 1$ S / sulfate — sulfur atoms per sulfate

$$r_{transport} \approx \frac{10 \text{ sulfate / sec}}{\text{transporter}}$$

BNID: 109035 — sulfate transport rate

$$N_{transporters} \approx \frac{N_S^{(cell)}}{N_S^{(sulfate)} \times r_{transport} \times t_{division}} \approx \frac{5 \times 10^7 \frac{S}{cell}}{1 \frac{S}{sulfate} \times 10 \frac{sulfate}{sec \times transporter} \times 5000 \frac{sec}{cell}}$$

≈ 1000 transporters

number of sulfate transporter complexes