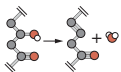


lipid synthesis



$$A_{\text{surface}} \approx 5 \mu\text{m}^2$$

BNID: 101792

surface area of cell

$$A_{\text{lipid}} \approx 0.5 \text{ nm}^2$$

BNID: 106993

area per lipid molecule

$$\Phi_{\text{surface}}^{(\text{lipid})} \approx 40\%$$

BNID: 100078

number of lipid leaflets

$$N_{\text{leaflets}} = 4$$

$$N_{\text{lipids}} \approx \frac{N_{\text{leaflets}} \times A_{\text{surface}} \times \Phi_{\text{surface}}^{(\text{lipid})}}{A_{\text{lipid}}} \approx \frac{4 \frac{\text{leaflets}}{\text{cell}} \times 5 \frac{\mu\text{m}^2}{\text{leaflet}} \times 0.4}{5 \times 10^{-7} \frac{\mu\text{m}^2}{\text{lipid}}}$$

number of lipids per cell

$$N_{\text{lipids}} \approx 2 \times 10^7 \text{ lipids / cell}$$

lipid turnover rate

$$r_{\text{ACP dehydratase}} \approx 1 \text{ lipid / sec}$$

Ruppe & Fox 2018;
Fiers et al. 2016;
Heath et al. 1996

$$N_{\text{ACP dehydratases}} \approx \frac{N_{\text{lipids}}}{r_{\text{ACP dehydratase}} \times t_{\text{division}}} \approx \frac{2 \times 10^7 \frac{\text{lipids}}{\text{cell}}}{1 \frac{\text{lipids}}{\text{sec}} \times 5000 \frac{\text{sec}}{\text{cell}}}$$

number of dehydratase complexes

$$\approx 4000 \text{ ACP dehydratases}$$