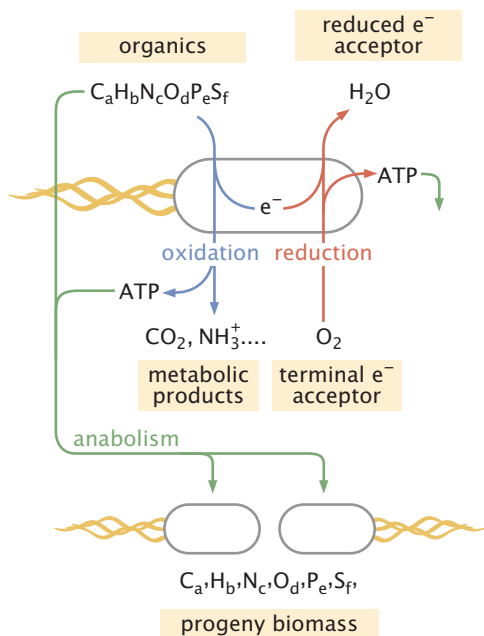


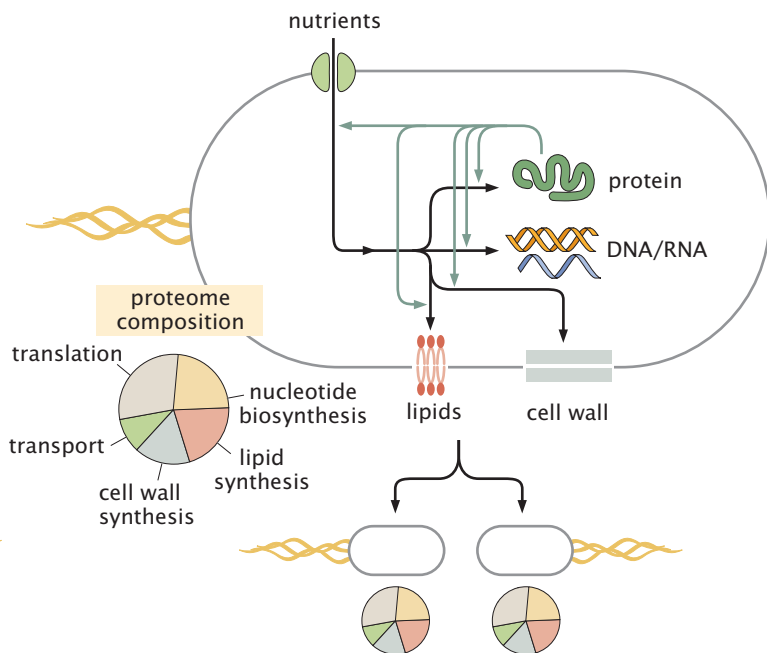
(A) growth as redox chemistry



chemically specific? ✓

intrinsic max rates? ✗

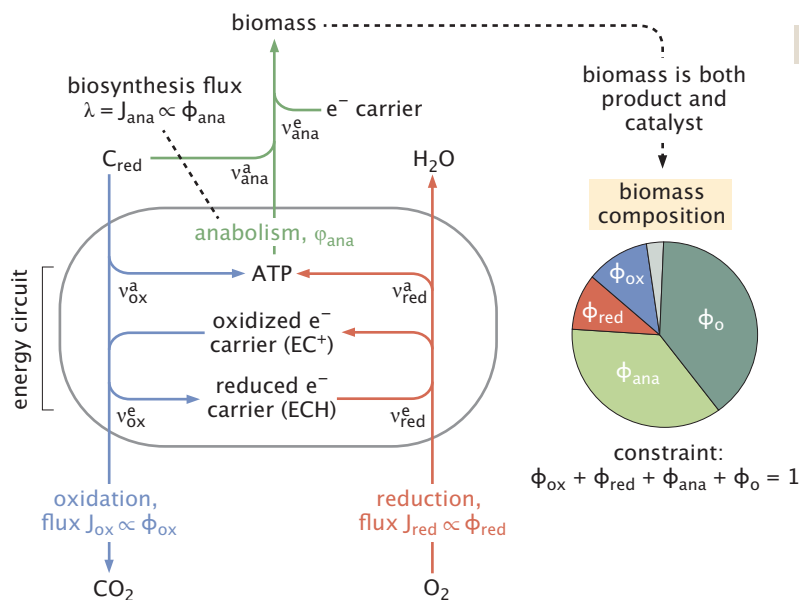
(B) growth as self-replication



chemically specific? ✗

intrinsic max rates? ✓

(C) unified model: self-replicating redox chemistry



glossary of terms

|                 |  |
|-----------------|--|
| $J_\alpha$      | mass-specific flux through process $\alpha$      |
| $\phi_\alpha$   | biomass fraction catalyzing process $\alpha$     |
| $\phi_o$        | non-catalytic biomass fraction                   |
| $v_\alpha^a$    | ATP stoichiometry for process $\alpha$           |
| $v_\alpha^e$    | $e^-$ carrier stoichiometry for process $\alpha$ |
| $\gamma_\alpha$ | kinetic constant for process $\alpha$            |
| $Z_{C,x}$       | average redox state of C in pool x               |

chemically specific? ✓

intrinsic max rates? ✓