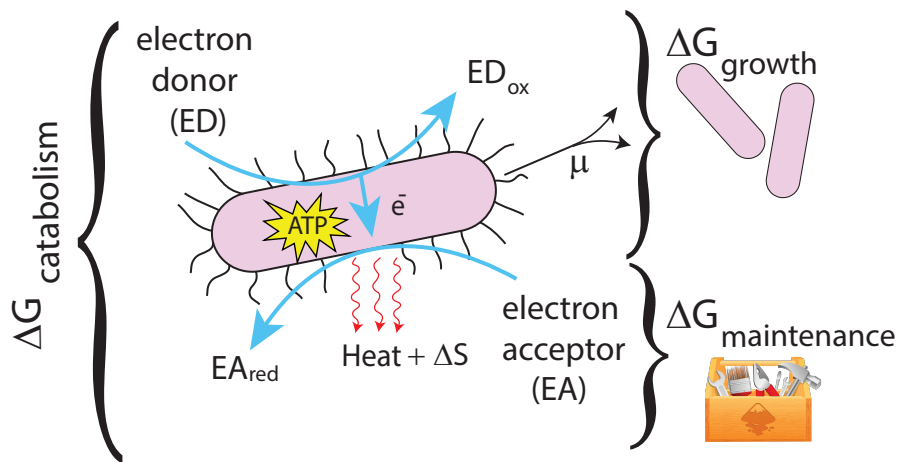


What is microbial bioenergetics?

The application of thermodynamics to quantitatively describe energy production and transformation in microbes.



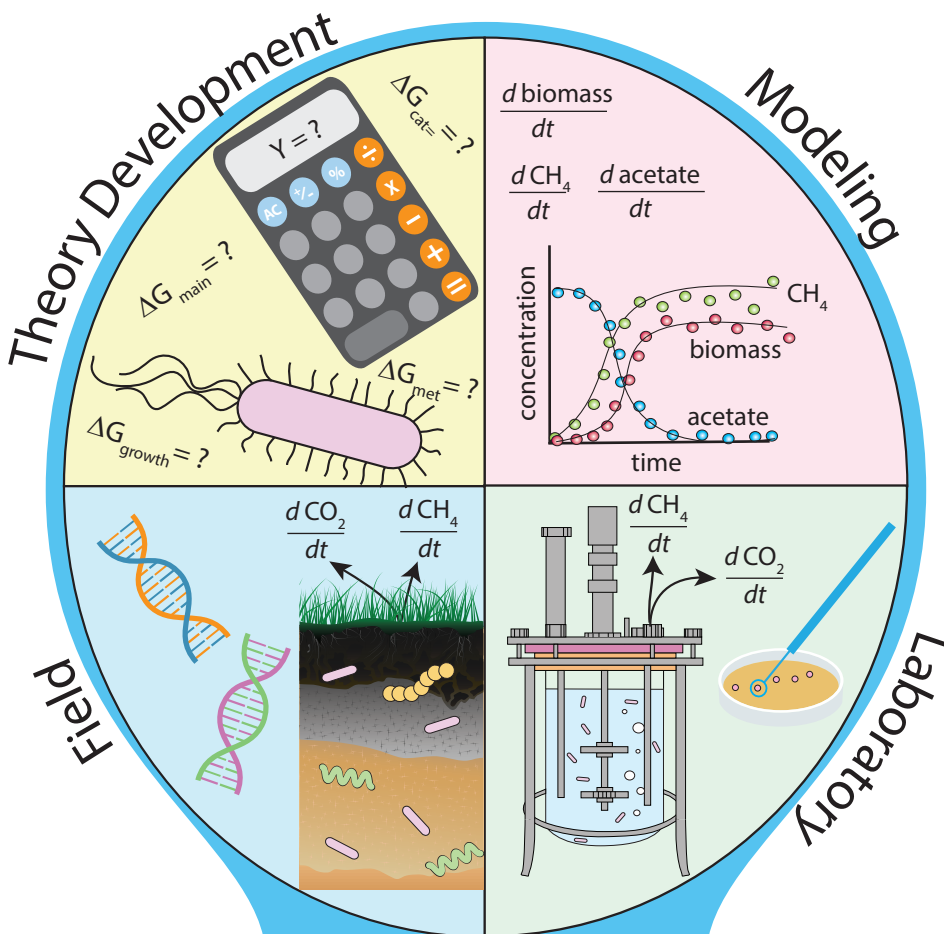
Energy production vs. consumption

The Gibbs energy of catabolism gained from fermentation or respiration (e.g., denitrification) is used for growth and maintenance.

Apply fundamental thermodynamic principles to describe the biochemical processes driving both growth and non-growth in micro-organisms.

Bioenergetics is used combined with transport, geochemical, and microbiological data to predict biogeochemical rates.

For example, the rate of methane production.



Bioenergetics-informed models explicitly account for energy and microbial growth to predict rates. Range in complexity from black box models to genome-informed models.

Examine the impact of energy on a process (e.g., wastewater treatment).

Typically includes batch, chemostat, and soil columns.

Calorimetry may be used to quantify the heats of reaction.