

# Anaerobic fermentation technology

---

Soil Quality Lab  
Kyoungphile Nam

# Objectives

---

- ✓ **Understanding the difference between respiration and fermentation**
- ✓ **Understanding the primary and secondary fermentation**
- ✓ **Understanding the importance of the environmental condition on fermentation process**

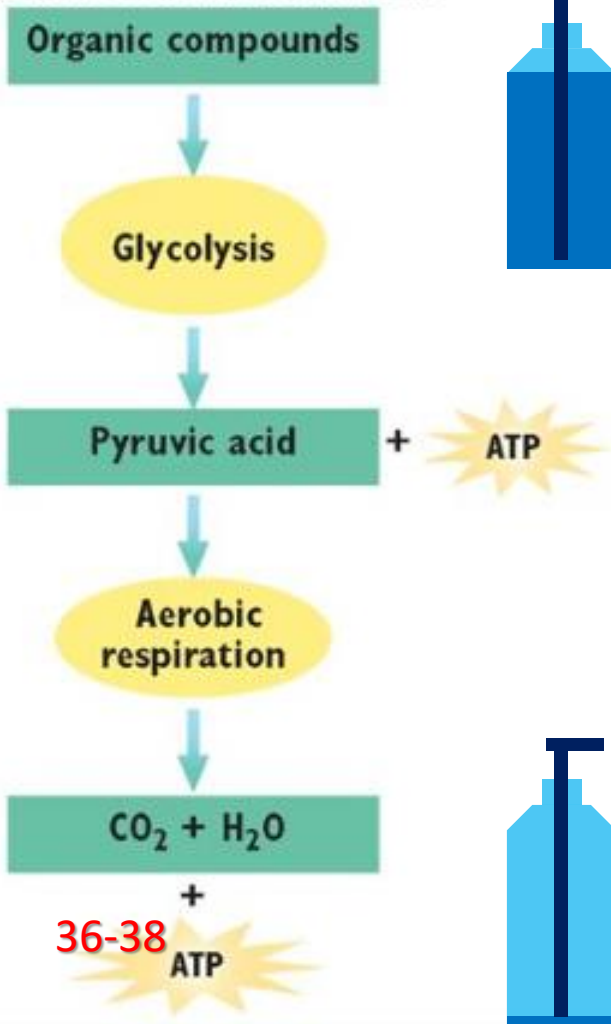
- References

Environmental Biotechnology (Rittmann, McCarty)

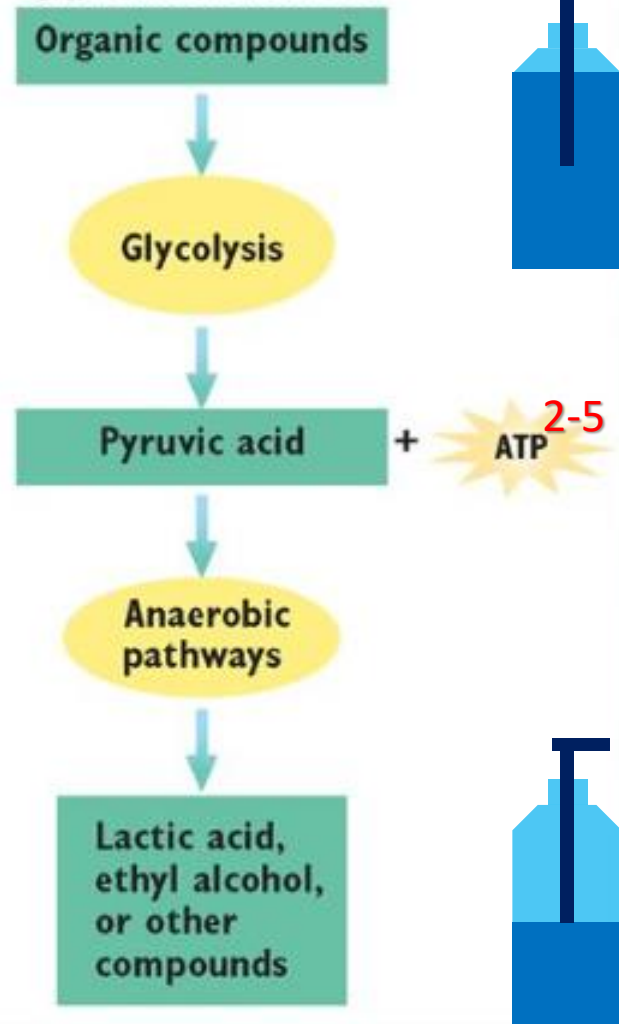
Lehninger 9Principles of Biochemistry (Nelson, Cox)

# Respiration vs Fermentation

(a) CELLULAR RESPIRATION

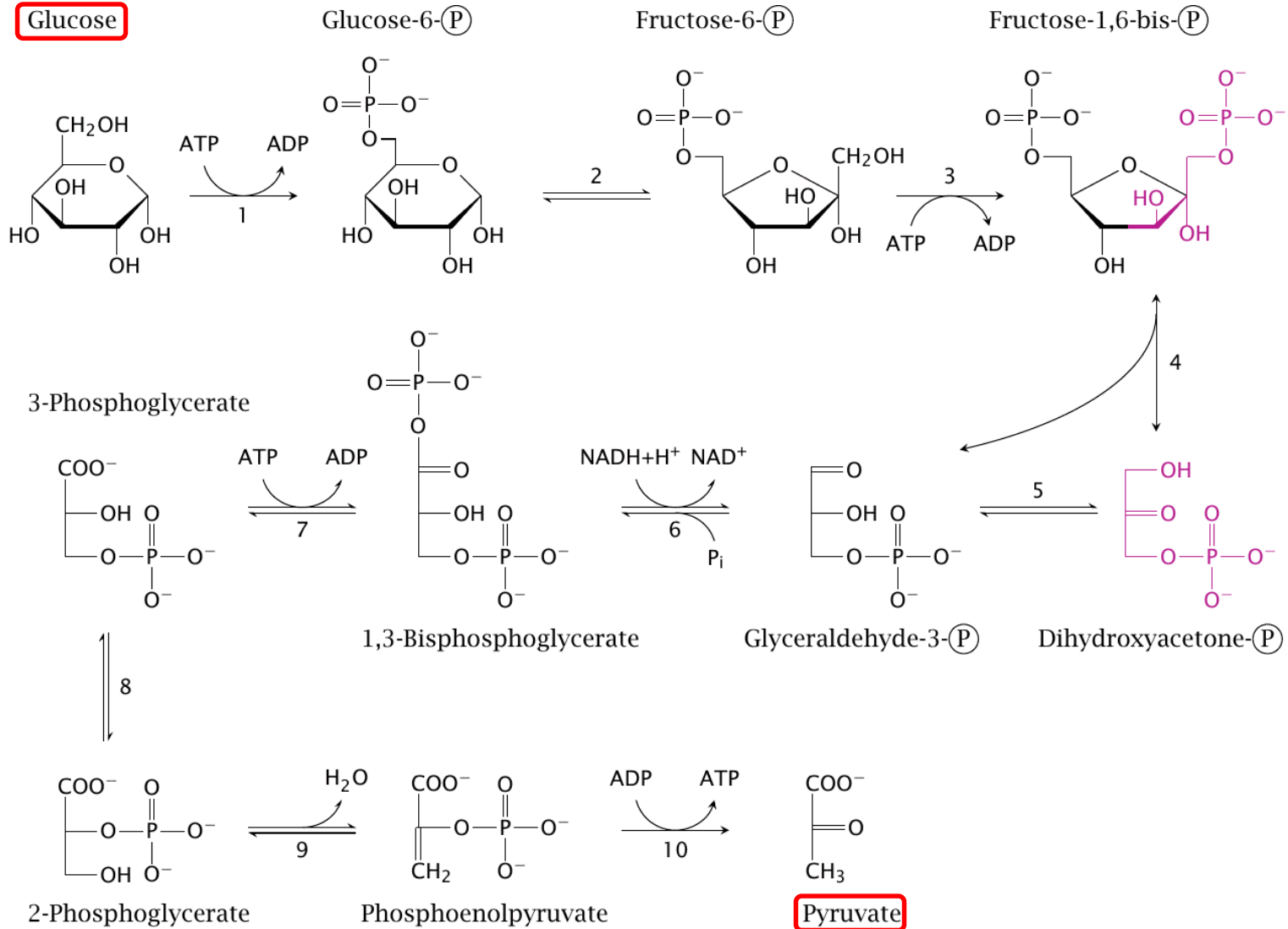


(b) FERMENTATION



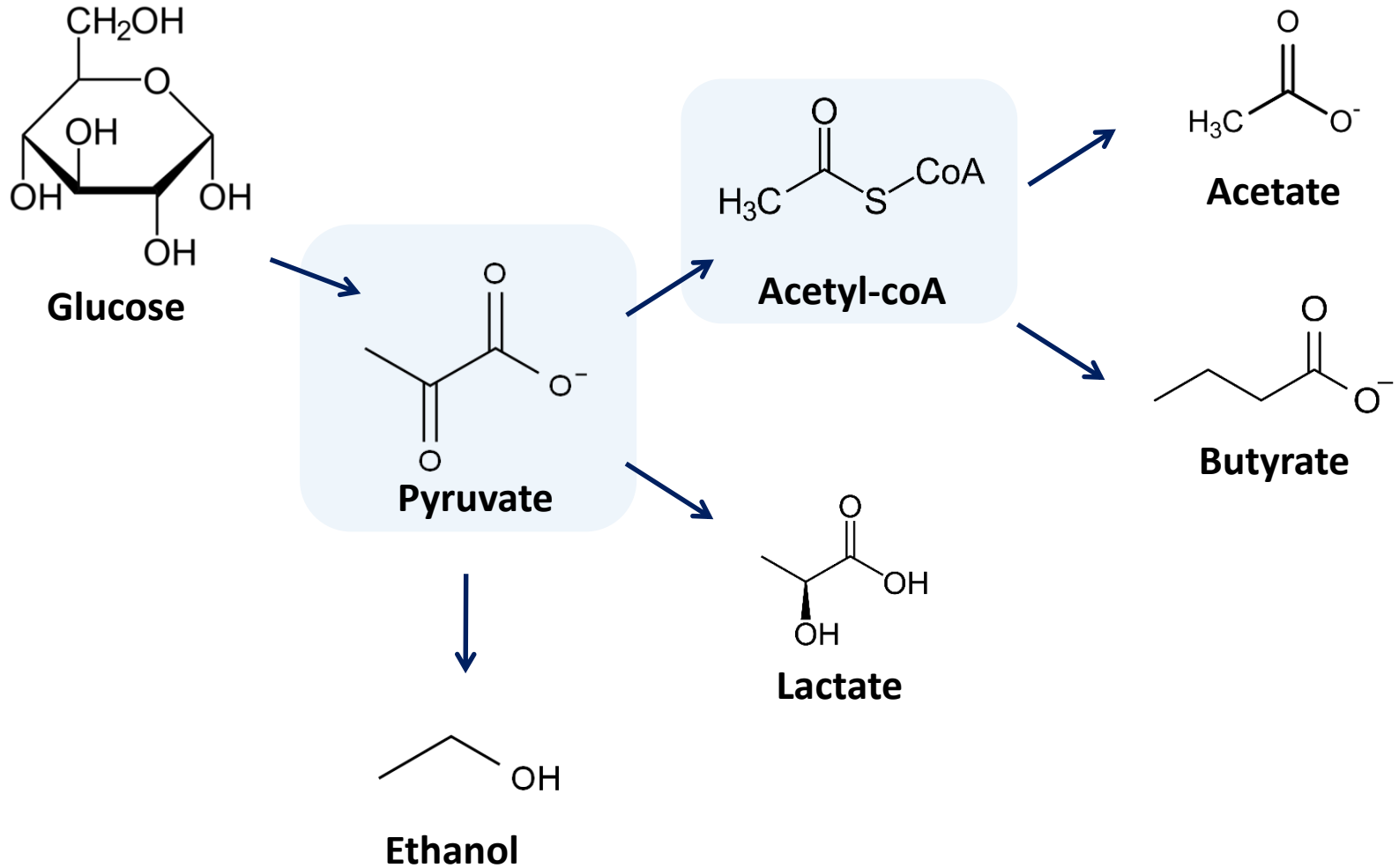
# Glycolysis

Glucose

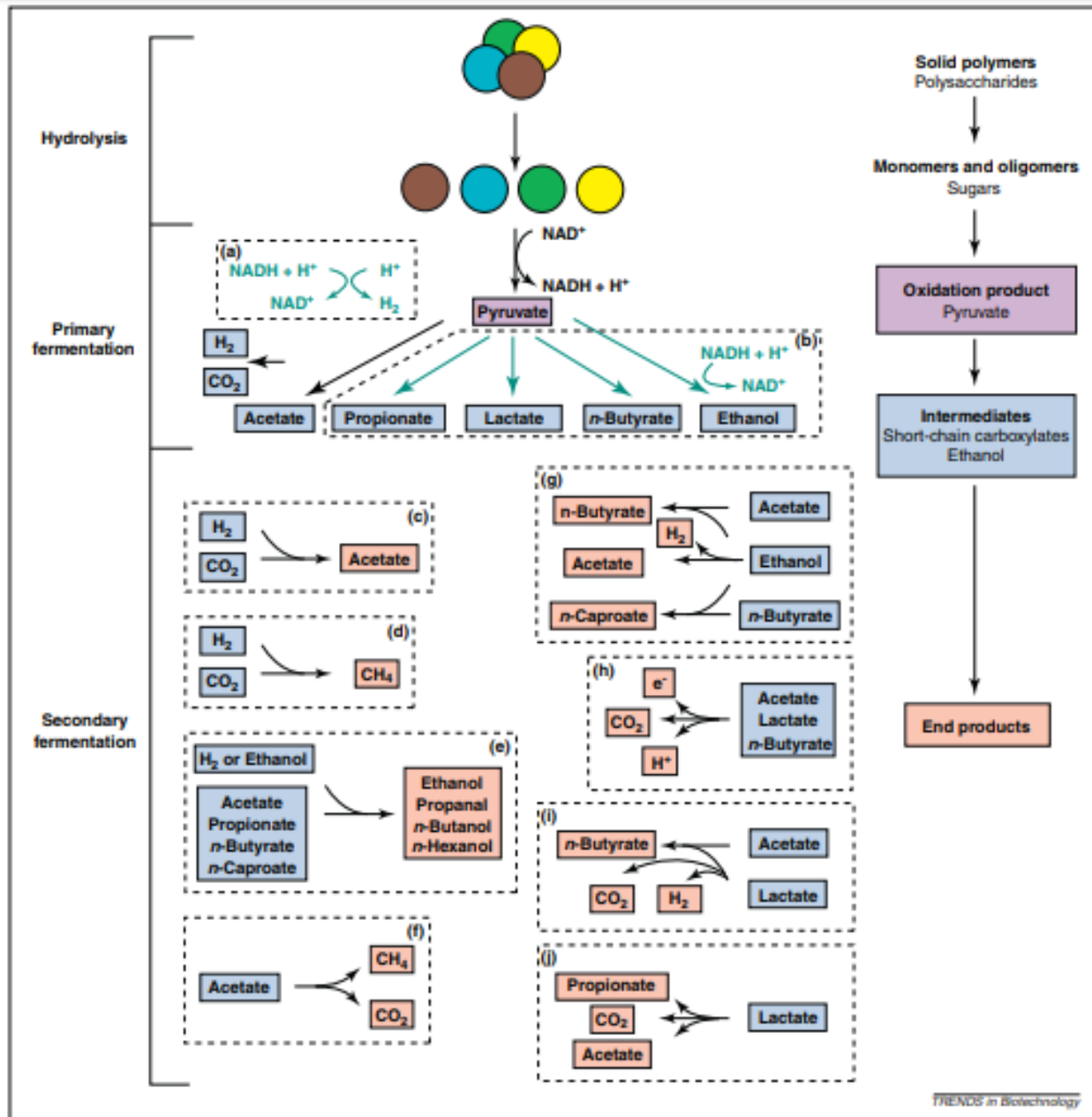


# Glycolysis

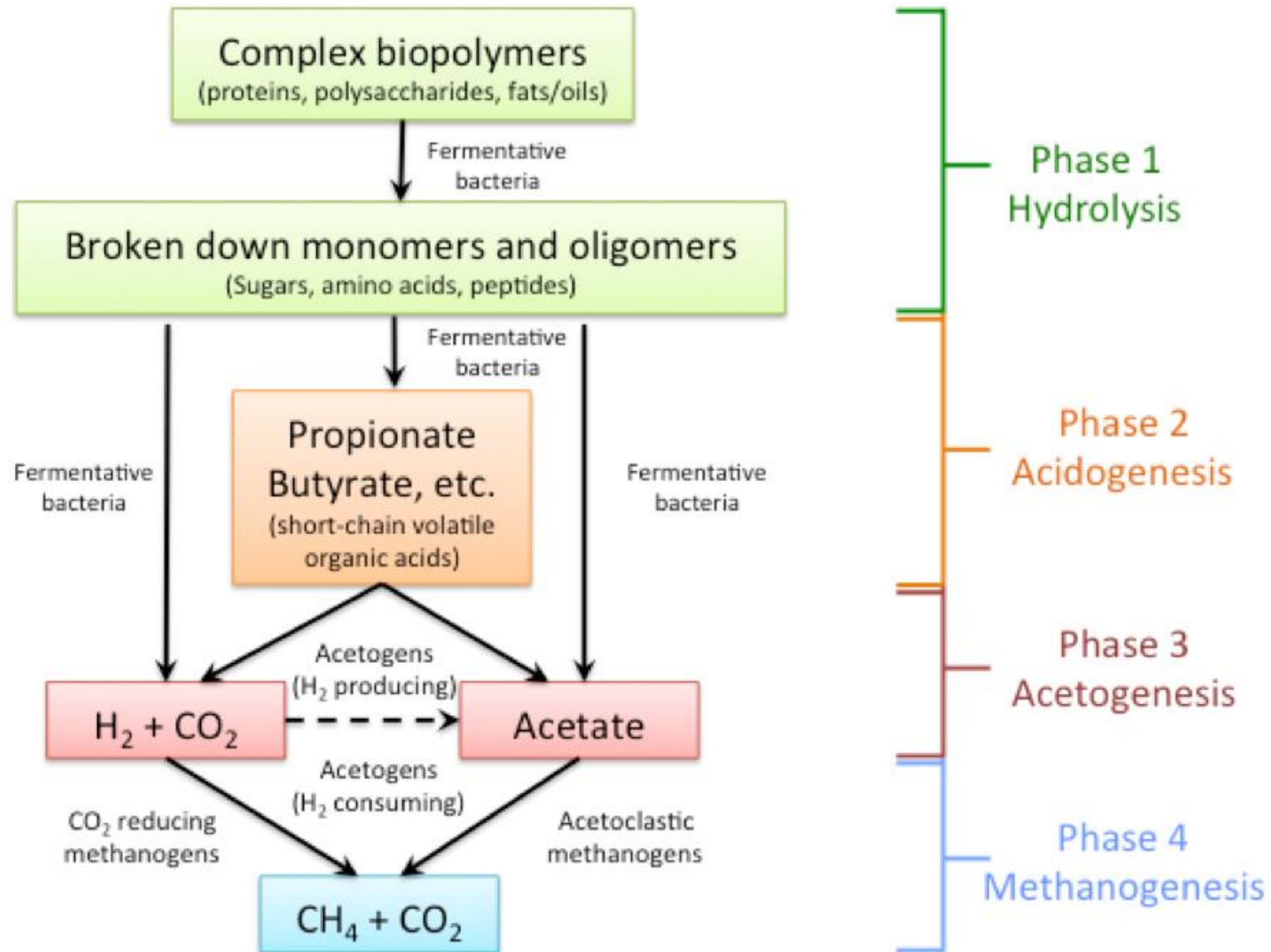
---



# Anaerobic Fermentation



# Anaerobic Digestion



# The way to manipulate the fermentation process

---

## ❖ Genetic modification

- When pure culture microorganisms are used, it is possible to change the composition and amount of the fermentation product produced by manipulating a specific gene involved in metabolism.

## ❖ Controlling the environmental condition

- It is difficult to use pure cultured microorganisms in the general environment: it is very difficult to control fermentation products by genetic modification
- By controlling the environmental condition in the reactor, engineers can enrich shape target microbiome and select appropriate metabolism  
ex) pH, Temperature, HRT, SRT, OLR