

# Types of Biological Reactions

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# Condensation Reaction

- \* Also known as dehydration synthesis
- \* Creates a covalent bond between two substances
- \* involves the removal of H from one substance and a hydroxyl (-OH) from another

# Condensation Reaction

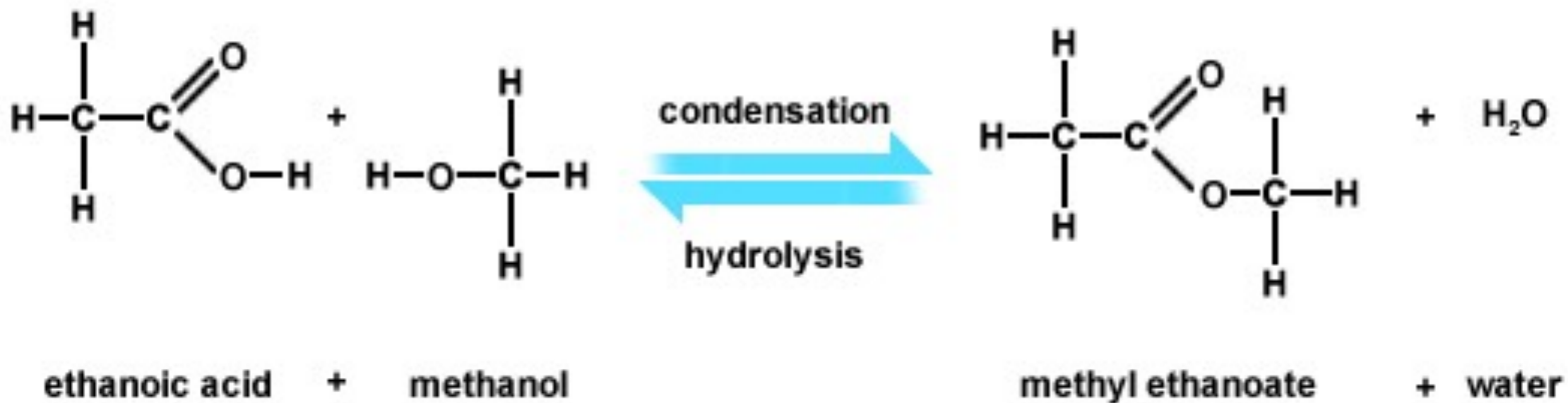
- \* H and OH form  $H_2O$
- \* absorbs energy
- \* anabolic reaction: construct larger molecules from smaller ones

# Hydrolysis Reaction

- \* Also known as decomposition
- \* water molecule breaks a covalent bond holding two molecules together
- \* provides an H to one molecule and a hydroxyl to another

# Hydrolysis Reaction

- \* releases energy
- \* catabolic reaction: break larger molecules into smaller ones.
- \*



# Other Biological Linkages

# Ether Linkage

\* Hydroxyl + Hydroxyl  $\rightarrow$  ether linkage + water

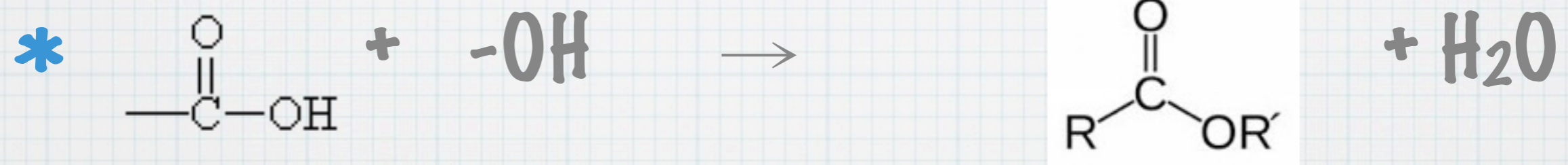
\*  $-OH$  +  $-OH$   $\rightarrow$   $-R-O-R-$  +  $H_2O$

\*R represents a carbon side chain



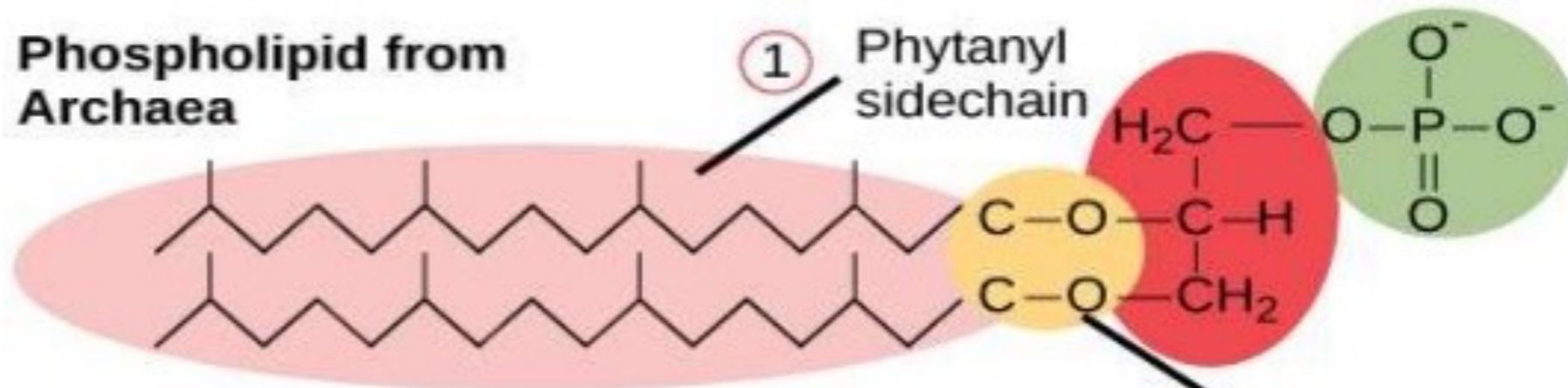
# Ester Linkage

\* Carboxyl + Hydroxyl  $\rightarrow$  ester linkage + water



# ESTER VS ETHER LINKAGES

Phospholipid from Archaea



Phospholipid from Bacteria and Eukarya

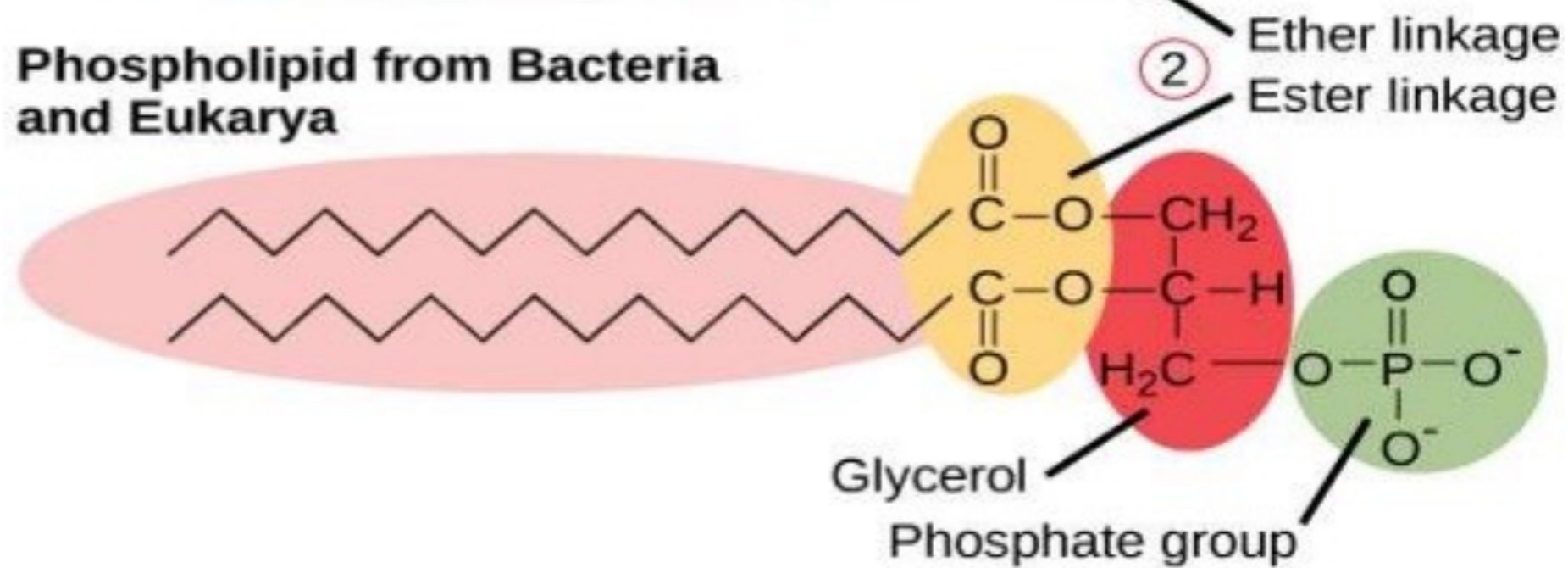
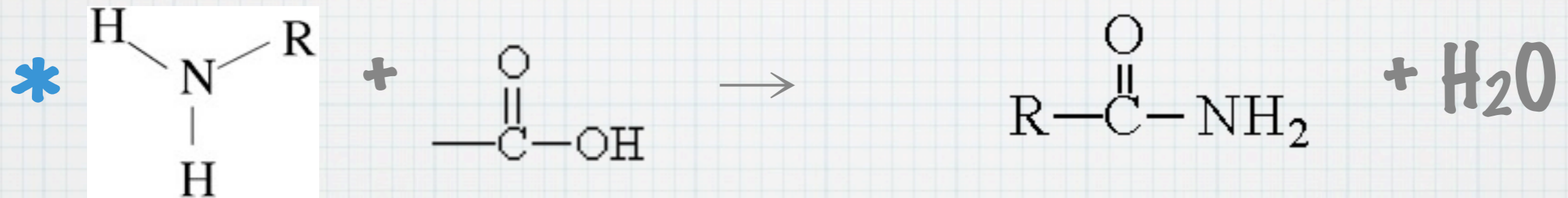


Image: [http://cnx.org/content/m44605/latest/figure\\_22\\_02\\_07f.jpg](http://cnx.org/content/m44605/latest/figure_22_02_07f.jpg)

# Amide Linkage

\* Amine + Carboxyl  $\rightarrow$  amide linkage + water



# Disulfide Linkage

\* Sulfhydryl + Sulfhydryl  $\rightarrow$  disulfide linkage

