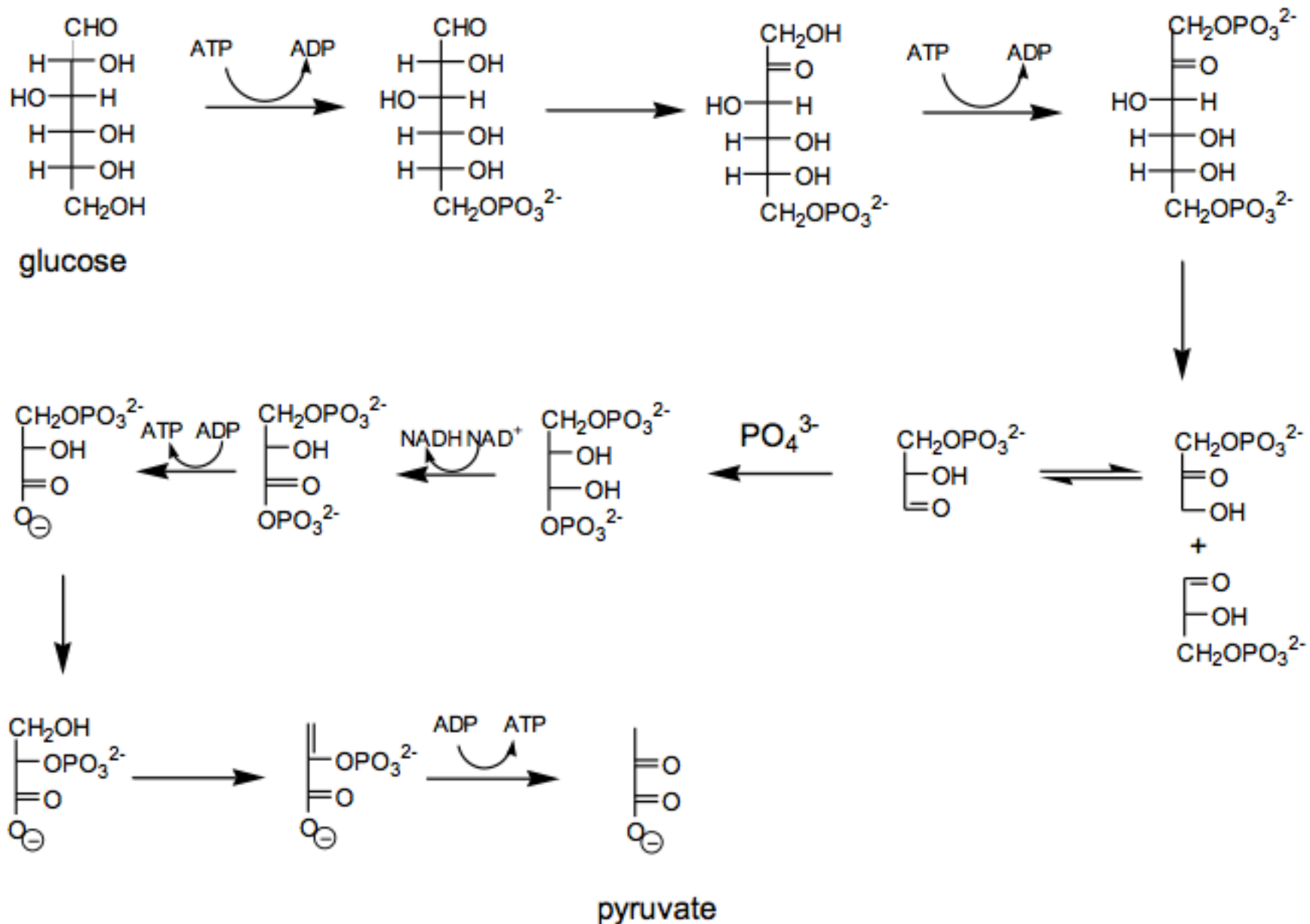


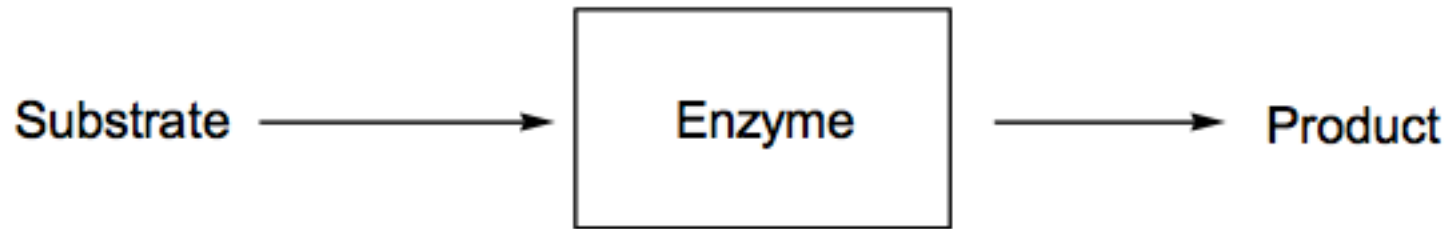
Glycolysis Consists of 10 Reaction Steps



Biology: What Happens Inside the Box?

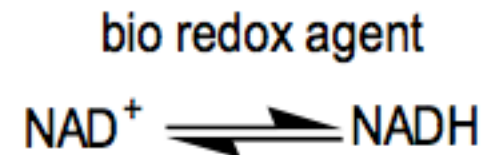
Enzymes Do Five Things (Reaction Types):

(Reference: I.D. Reingold, "Organic Chemistry: An Introduction Emphasizing Biological Connections", 2002)



1. Oxidation-Reduction

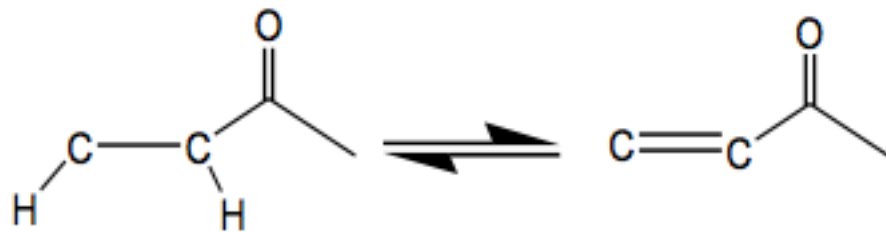
carbon-oxygen
bonds



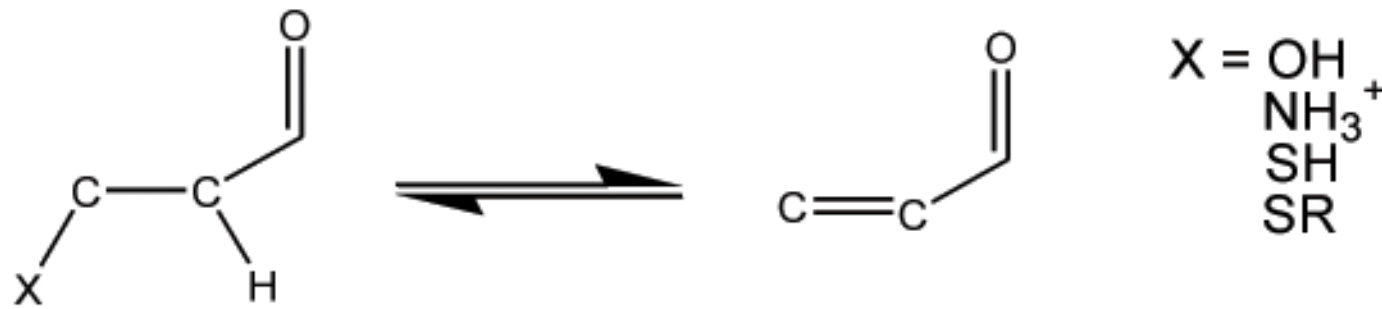
carbon-nitrogen
bonds



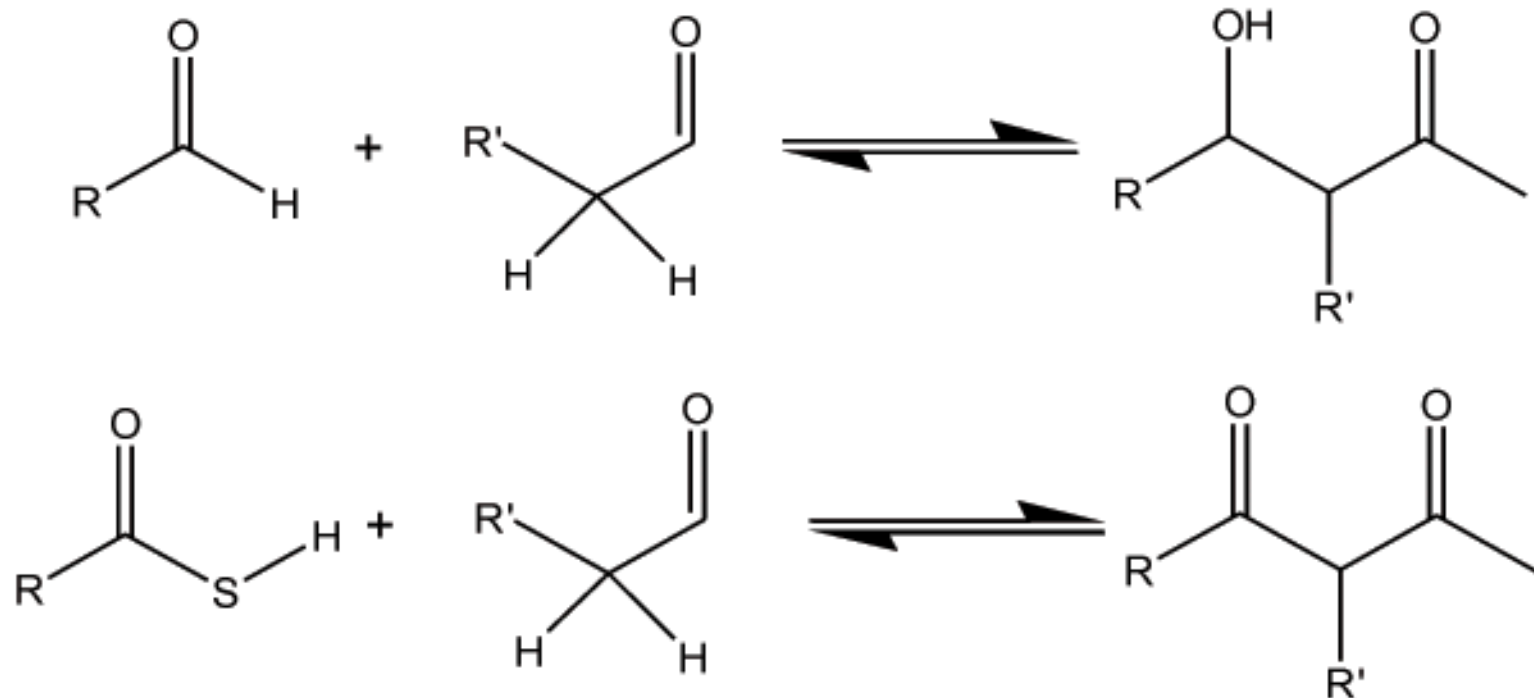
carbon-carbon
bonds



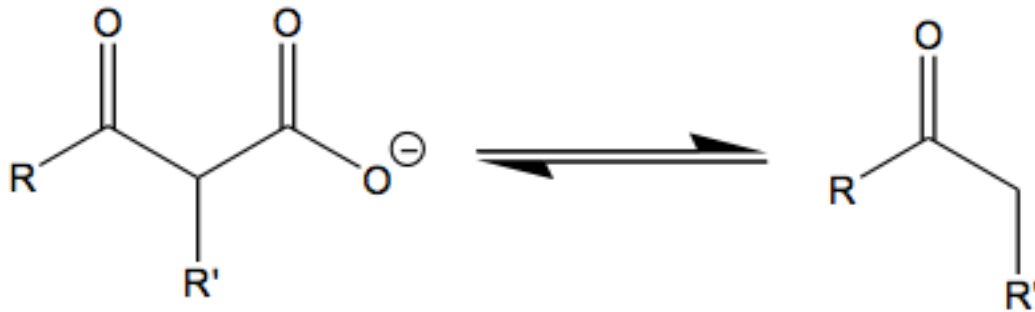
2. Elimination-Addition: restricted to double bonds conjugated to carbonyl groups, i.e., α,β -unsaturated carbonyls.



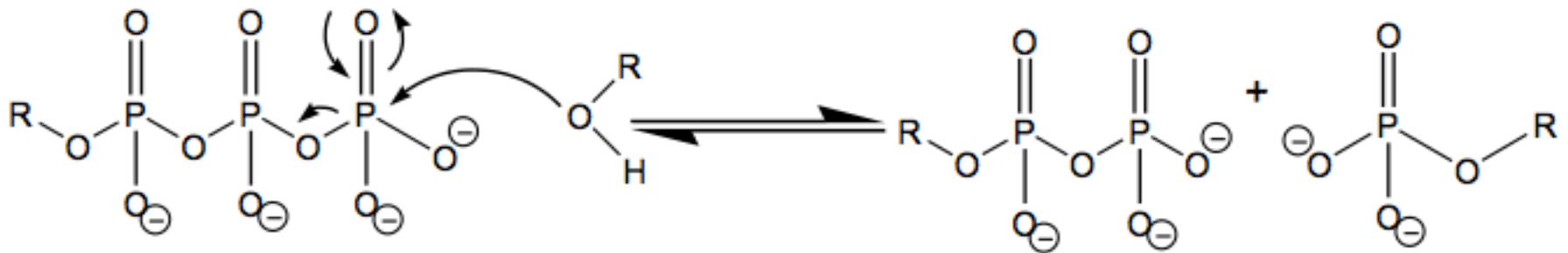
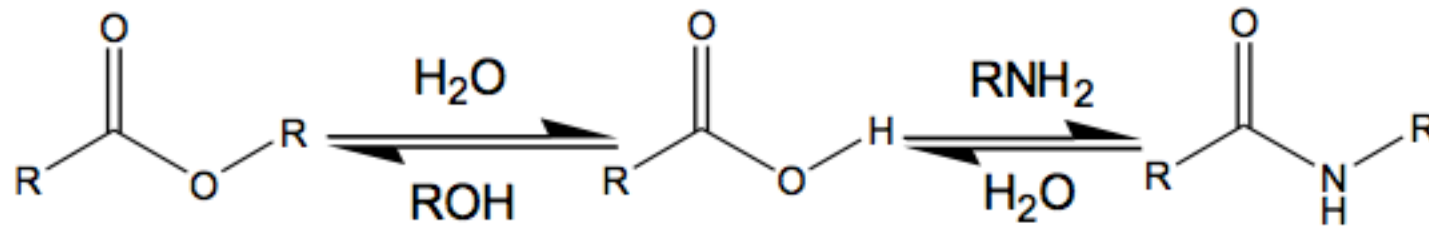
3. Aldol/Claisen: in biology, esters are usually thioesters



4. Decarboxylation: pH is around 7 in biology so conjugate base is present.

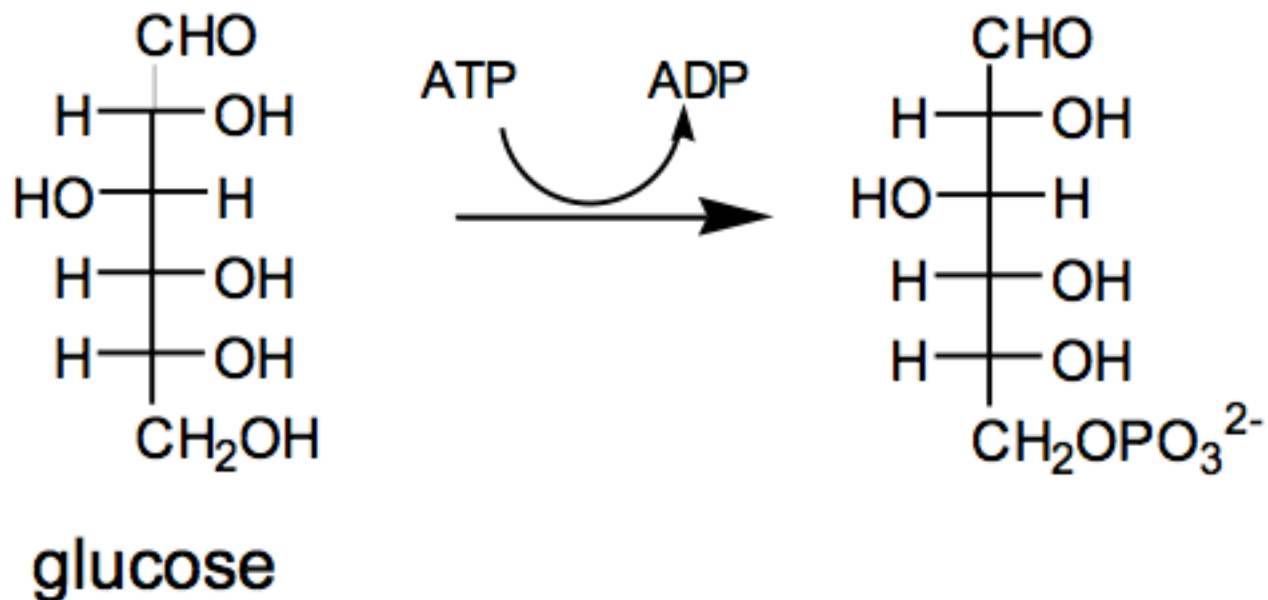


5. Acyl Transfer and Phosphoryl Transfer: Think of P as a C.



Acyl Transfer is the same as a _____ reaction.

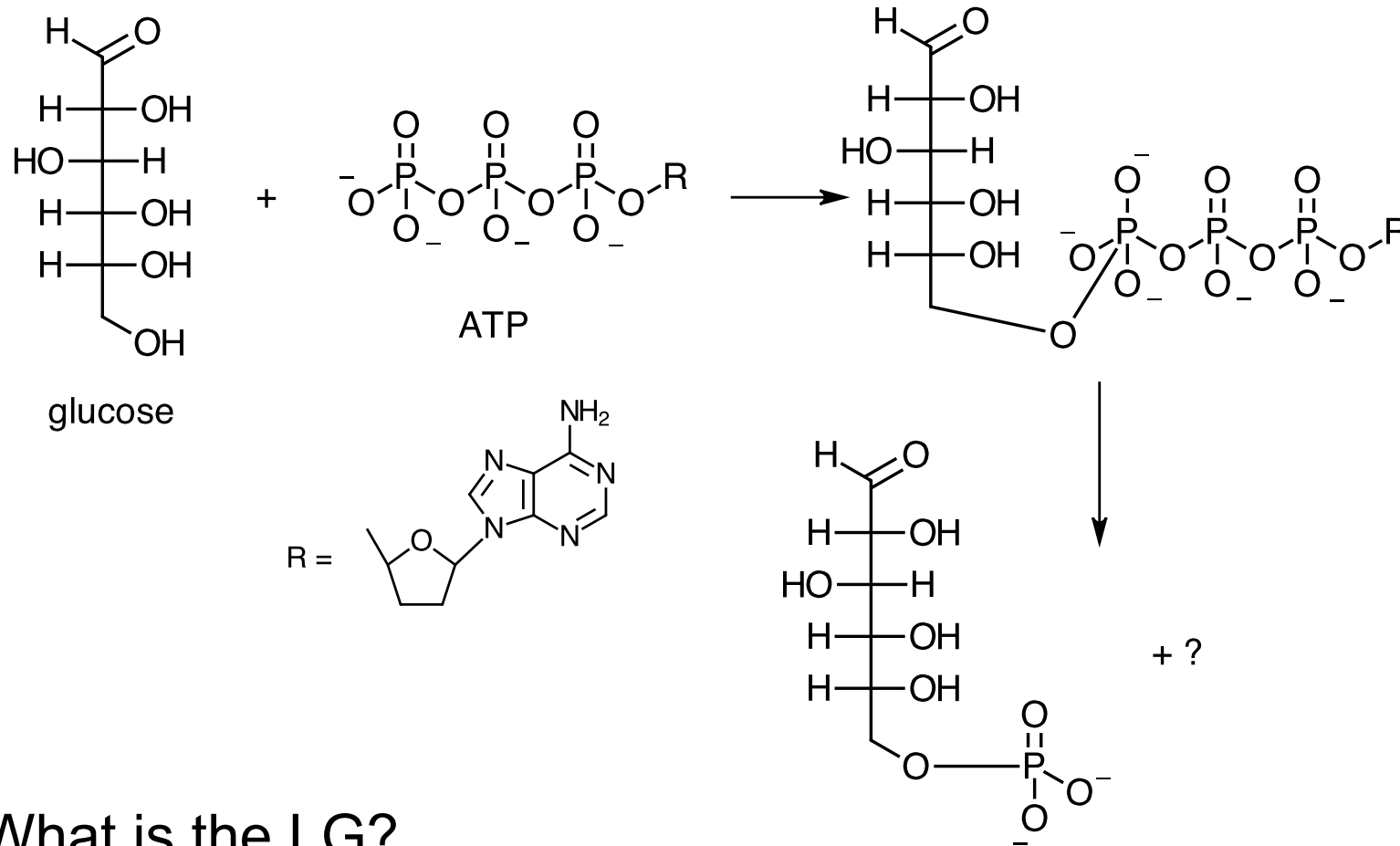
Glycolysis 1st step: phosphoryl transfer



Phosphoryl transfer is like a Nu:⁻ acyl substitution reaction.
Treat the P like a carbonyl C.

Glycolysis 1st Step: phosphoryl transfer

Use curved arrows to show how bonds break and form.



What is the LG?

What is the 2nd product?