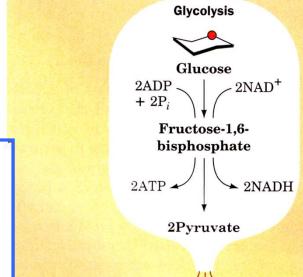
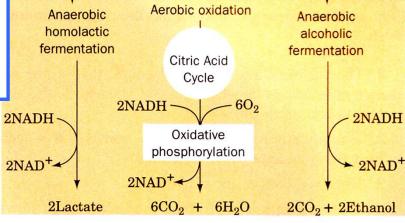
Glycolysis

Voet & Voet, Chapter 17

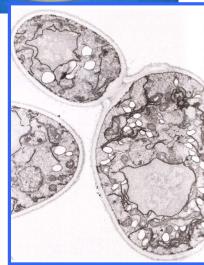
(glykos, sweet; lysis, loosening)





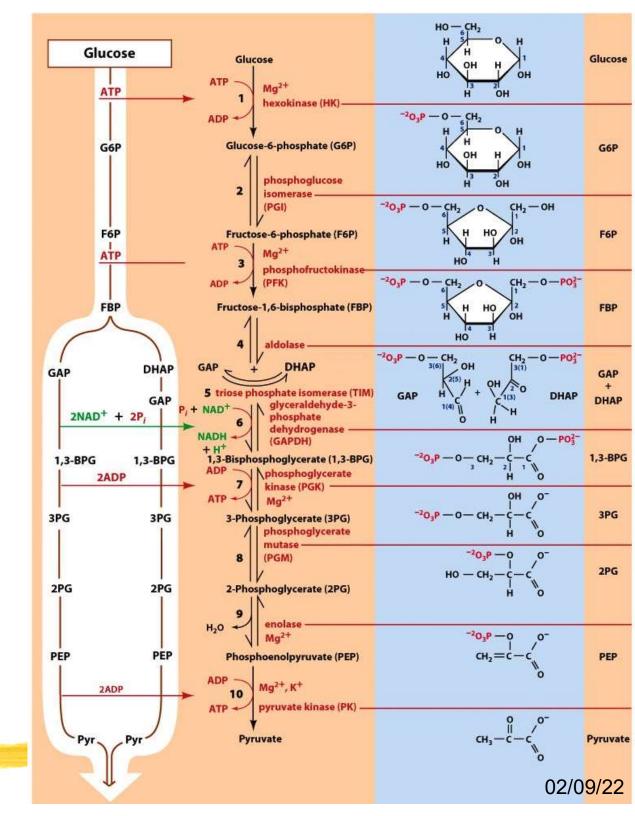




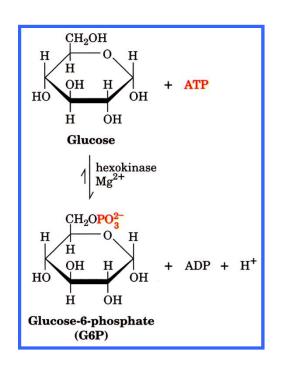


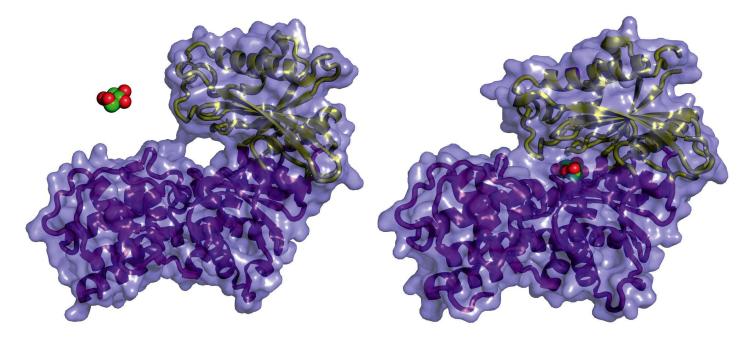
Nils Walter: Chem

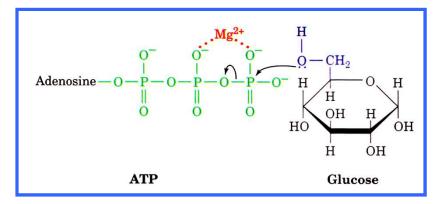
More shock and awe: Overview



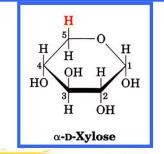
Step 1: Hexokinase employs ATP to make the first step irreversible and trap glucose





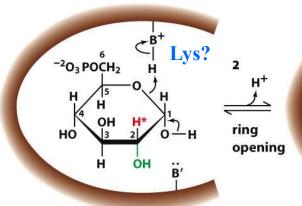


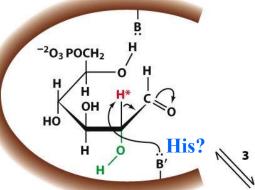
>decoy leads to ATP hydrolysis



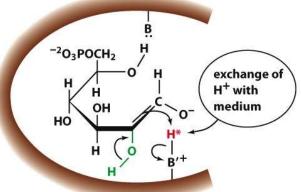


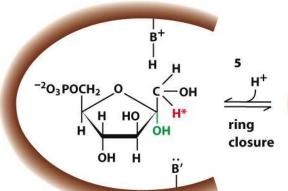
Step 2: Phosphoglucose isomerase

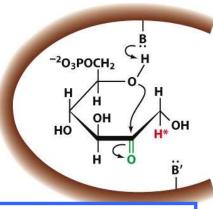




Glucose-6-phosphate (G6P)







4 / cis-Enediolate intermediate

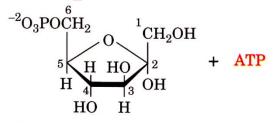
Fructose-6-phosphate (F6P)

> stereospecific

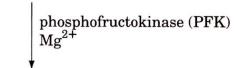


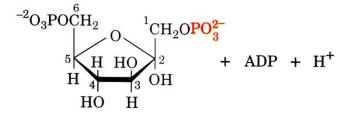
Steps 3 & 4: Phosphofructokinase and Aldolase

Phosphofructokinase



Fructose-6-phosphate (F6P)





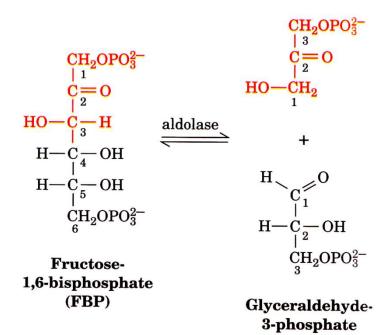
Fructose-1,6-bisphosphate (FBP)

- **►Installs a second phosphate**
- ➤ Provides a second "irreversible", rate-limiting, controllable step
- ➤ Generates a near-symmetric bisphosphate

Aldolase

Dihydroxyacetone phosphate (DHAP)

(GAP)



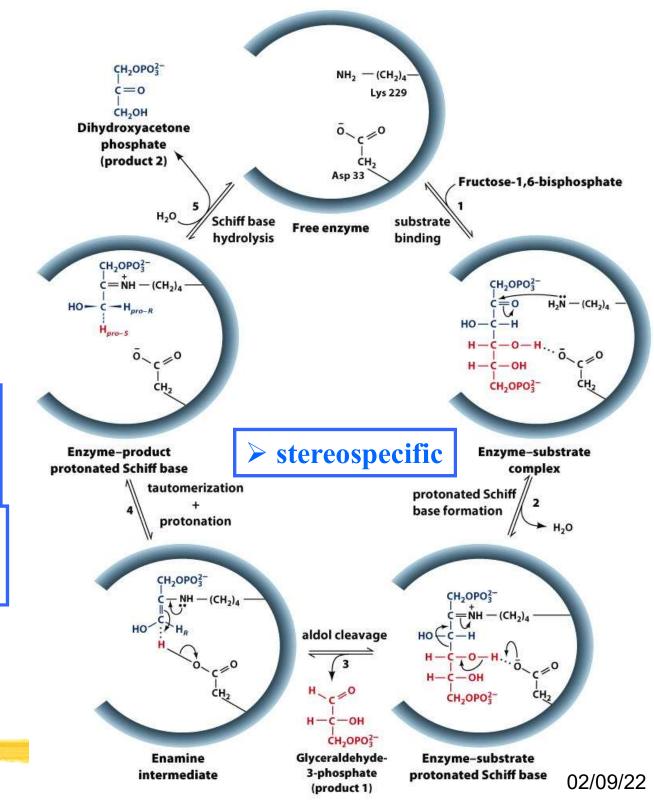
- >Starts the breakdown by aldol cleavage (= retro aldol condensation)
- ➤ Generates two isomeric (interconvertible) C3 compounds

Nils Walter: Chem 45

Class I aldolase: A Schiff base stabilizes the carbanion

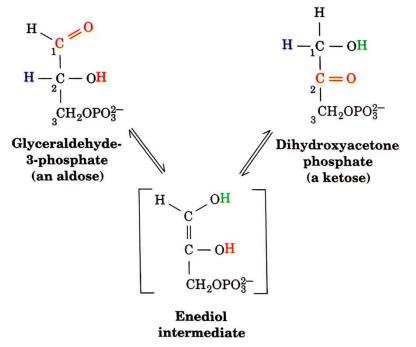
Class II aldolases (in fungi, algae and some bacteria) use Zn²⁺ or Fe²⁺ instead

$$CH_{\overline{z}}OPO_{\overline{z}}^{-} \longrightarrow CH_{\overline{z}}OPO_{\overline{z}}^{-} \longrightarrow CH_{\overline{z}}OPO_{\overline{$$



Step 5: Triose phosphate isomerase (TIM)

Goal:



Mechanism

