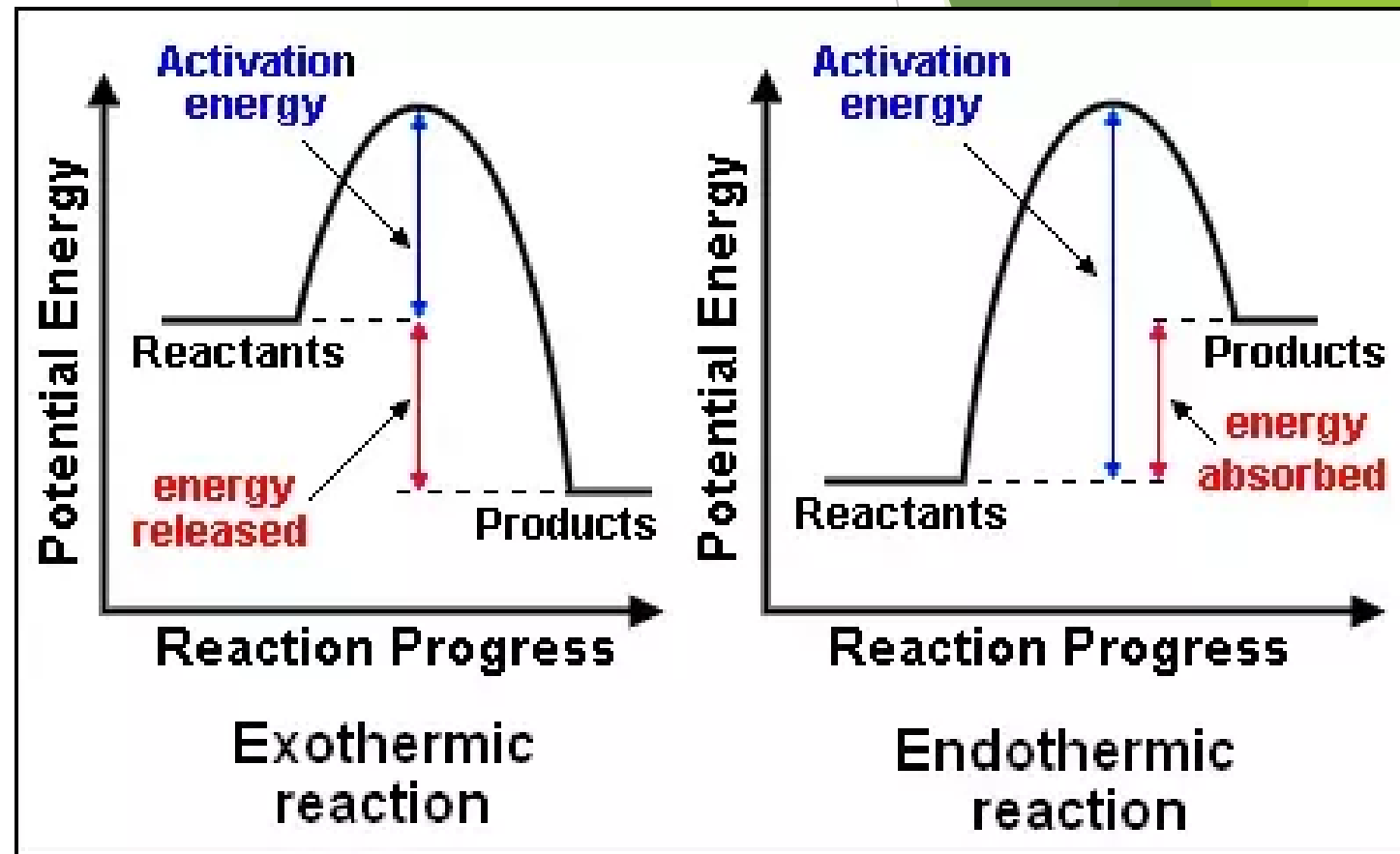


Metabolizem celice

Gregor Križ mag. prof. biol.; Gimnazija Bežigrad, Interna uporaba

Uvod v metabolizem

- ▶ Reaktanti / produkti
- ▶ Eksotermna / endotermna reakcija
- ▶ Aktivacijska energija
- ▶ Katalizator
- ▶ PRESNOVA = METABOLZEM

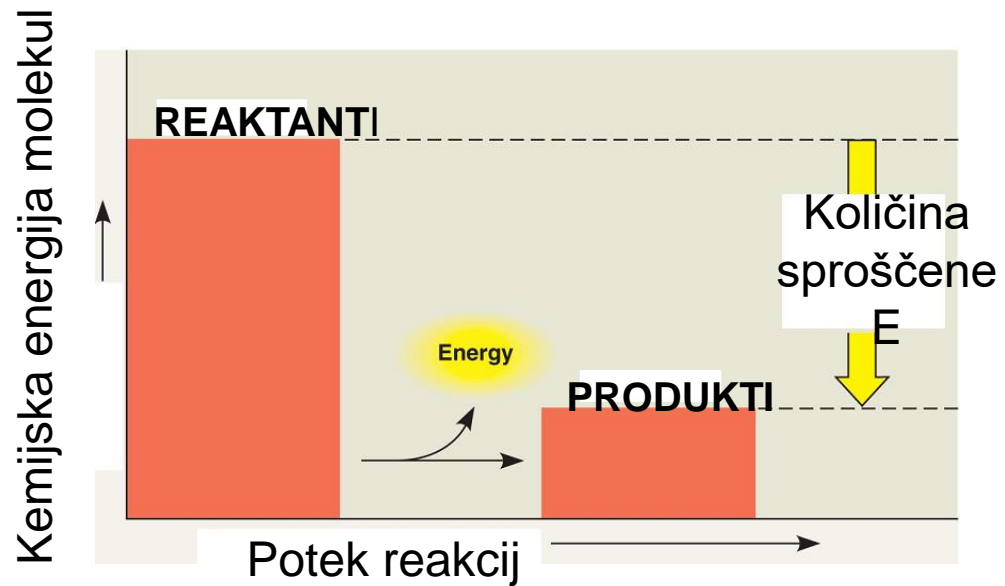


Source: Milton Beychok

Energy level diagrams of exothermic and endothermic reactions. [4][5][6]

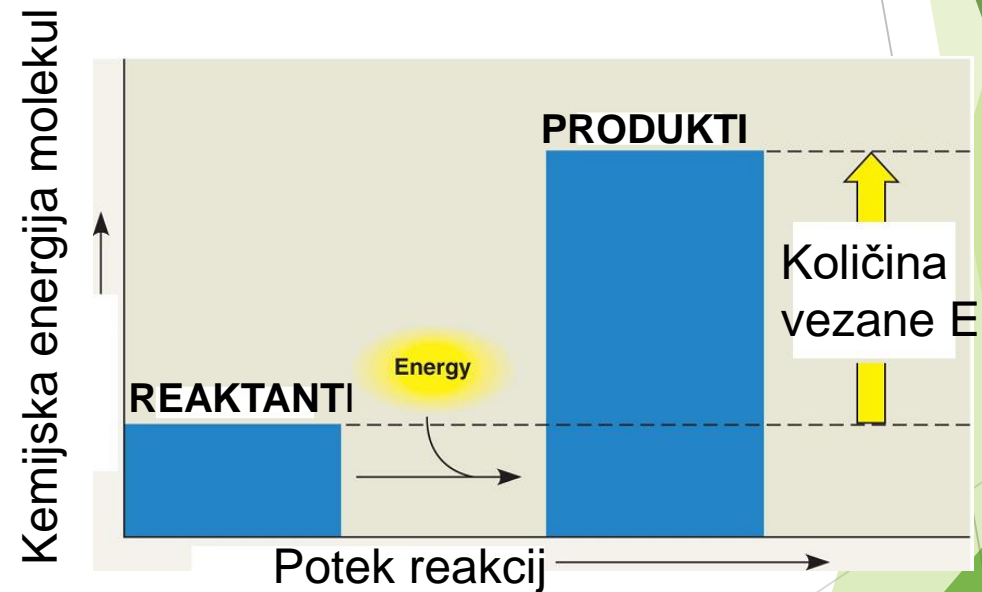
Energija pri kemijskih reakcijah

RAZGRADNJA



Kemijska energija se sprošča

IZGRADNJA



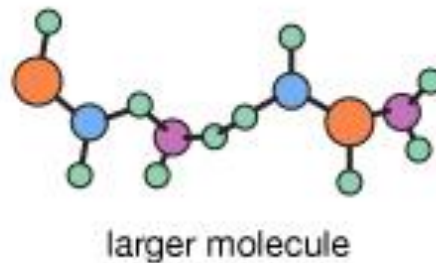
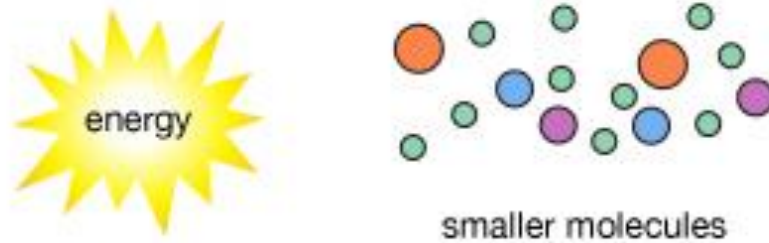
Kemijska energija se veže

Presnovna pot

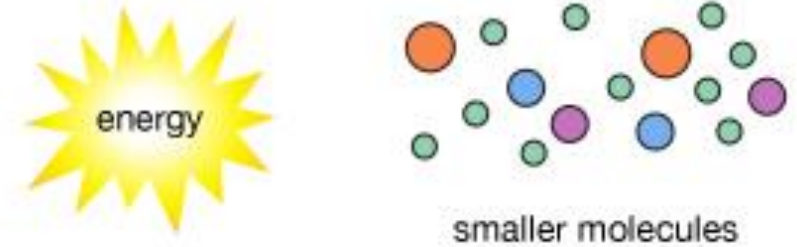
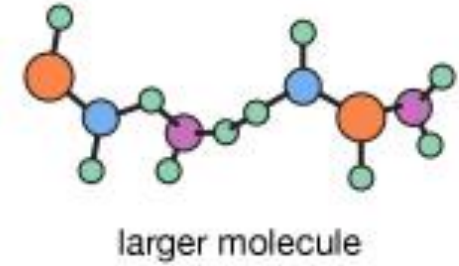
- ▶ Spreminjanje snovi
- ▶ Pretvarjanje E
- ▶ KROŽENJE SNOVI

Metabolism

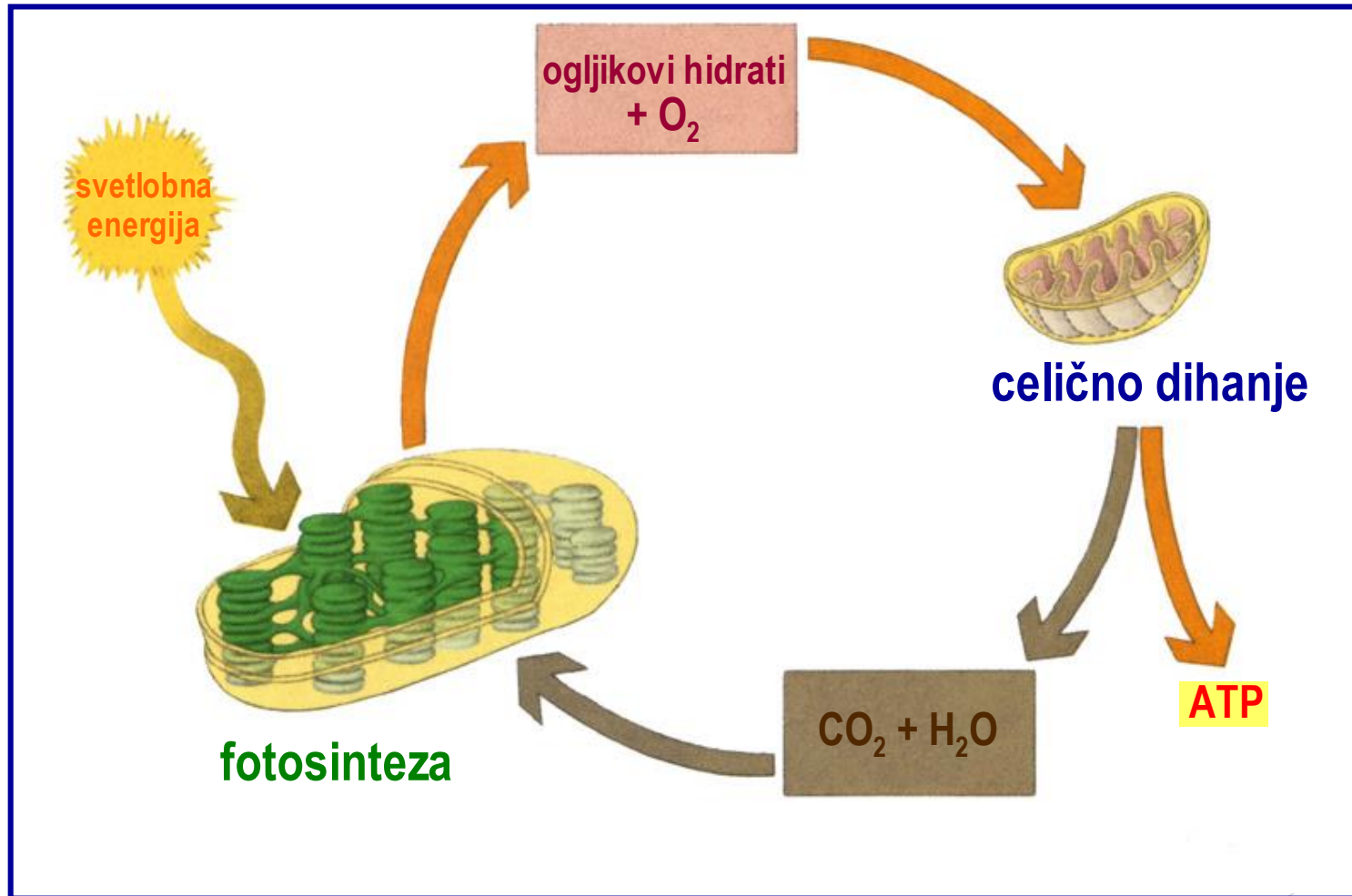
anabolic reaction



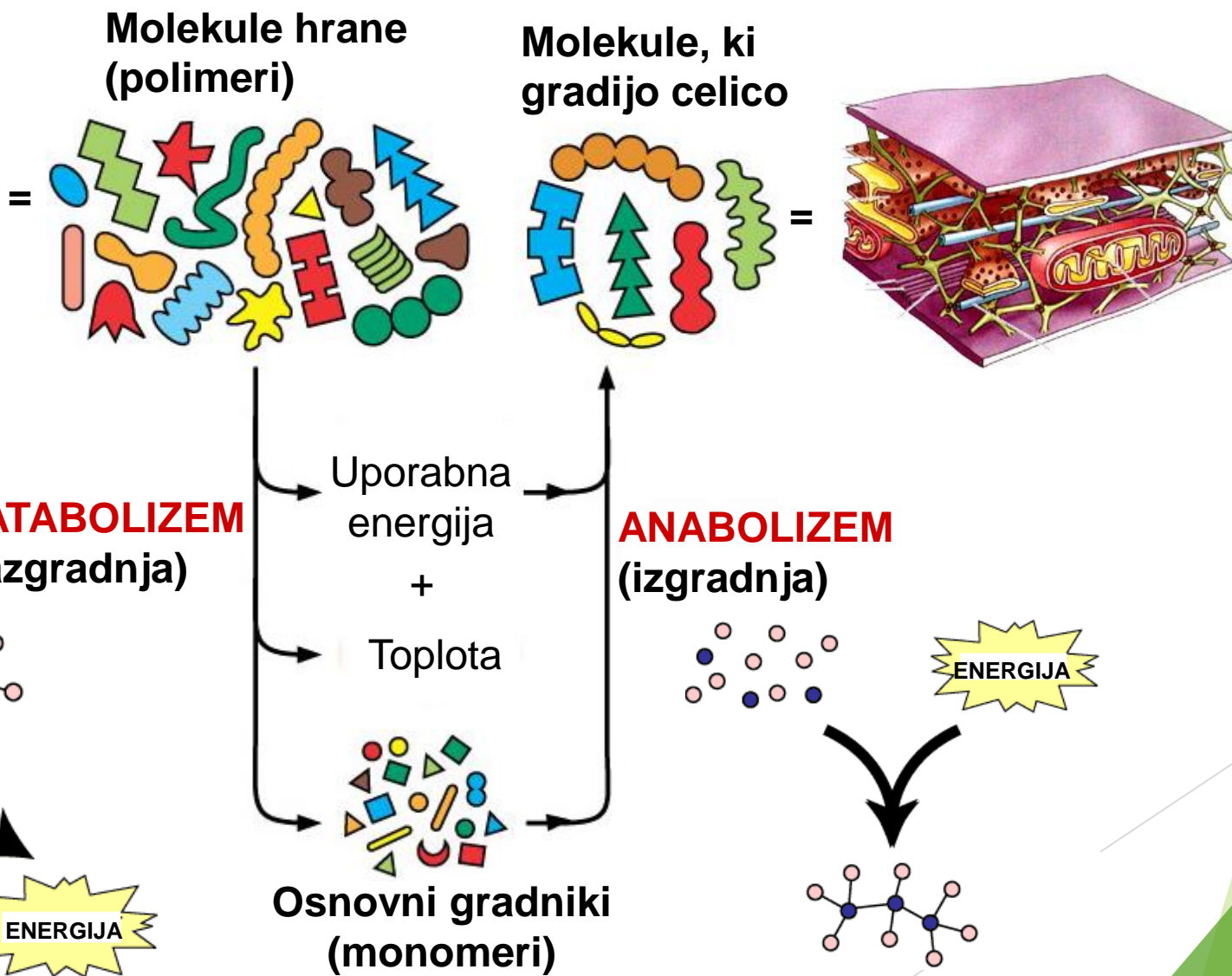
catabolic reaction



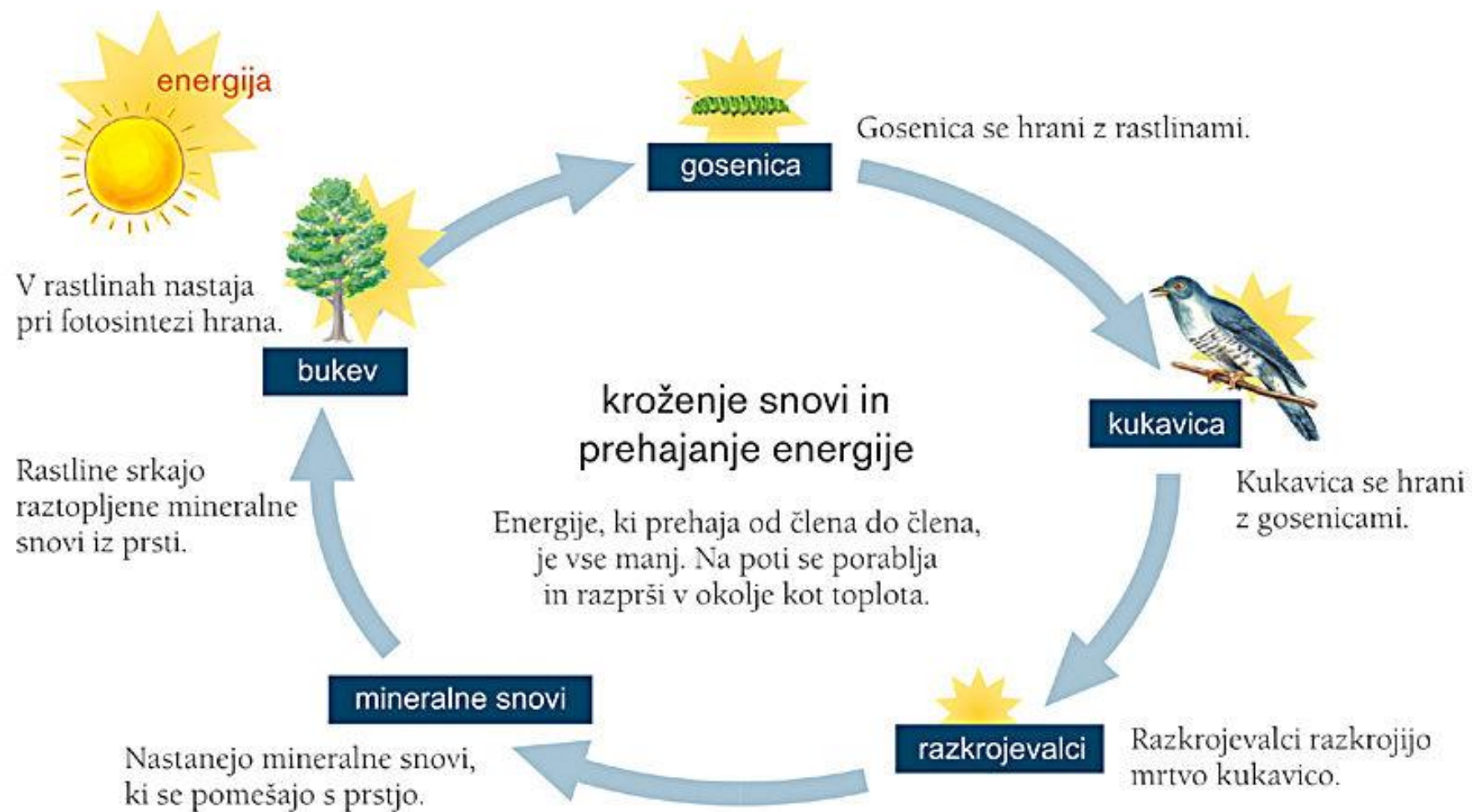
Glavni energijski pretvorbi v organizmih sta celično dihanje in fotosinteza



Snovi, ki jih celica sprejme iz okolja, se lahko uporabijo za sintezo celici lastnih snovi.



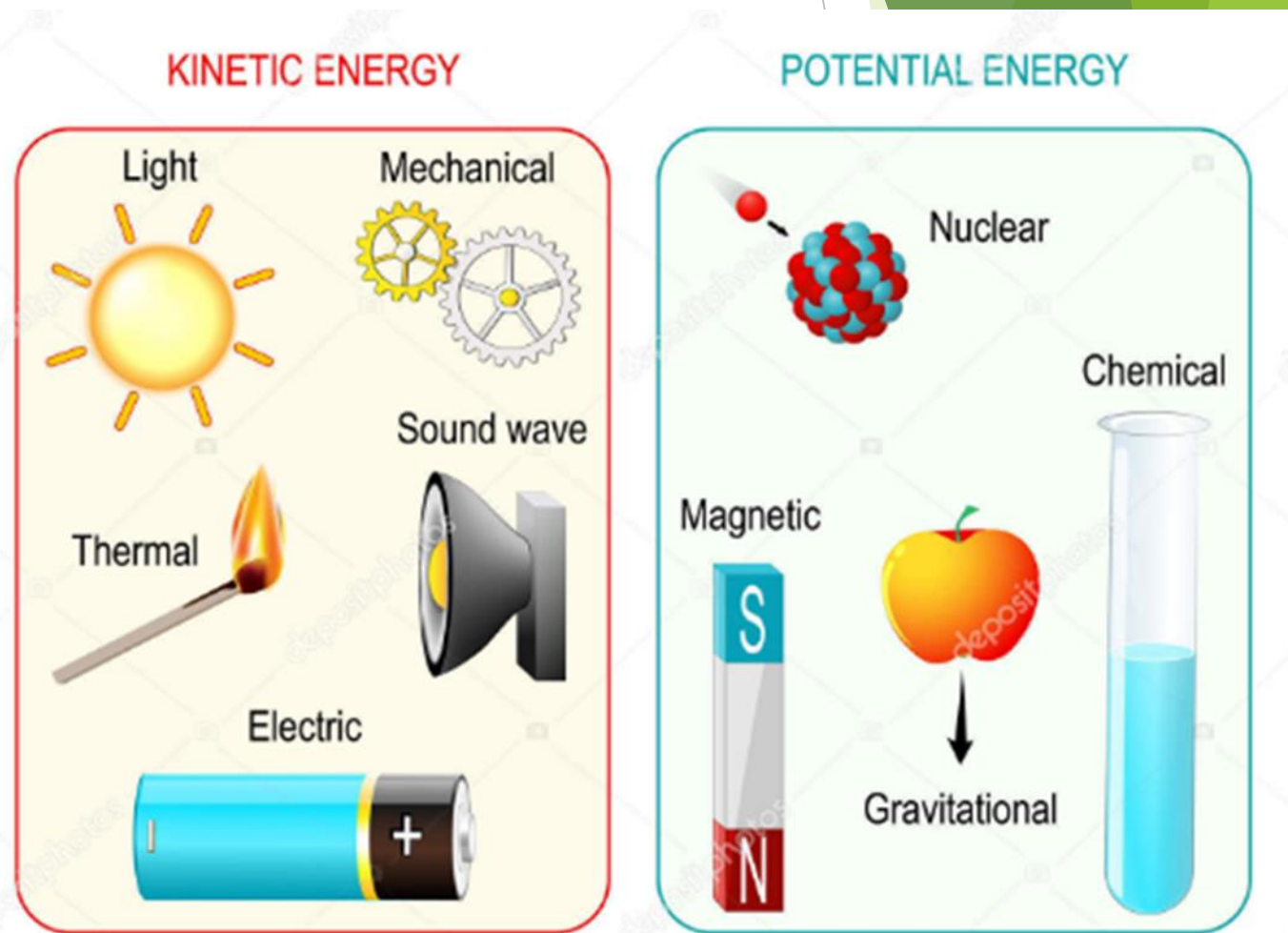
Kroženje snovi



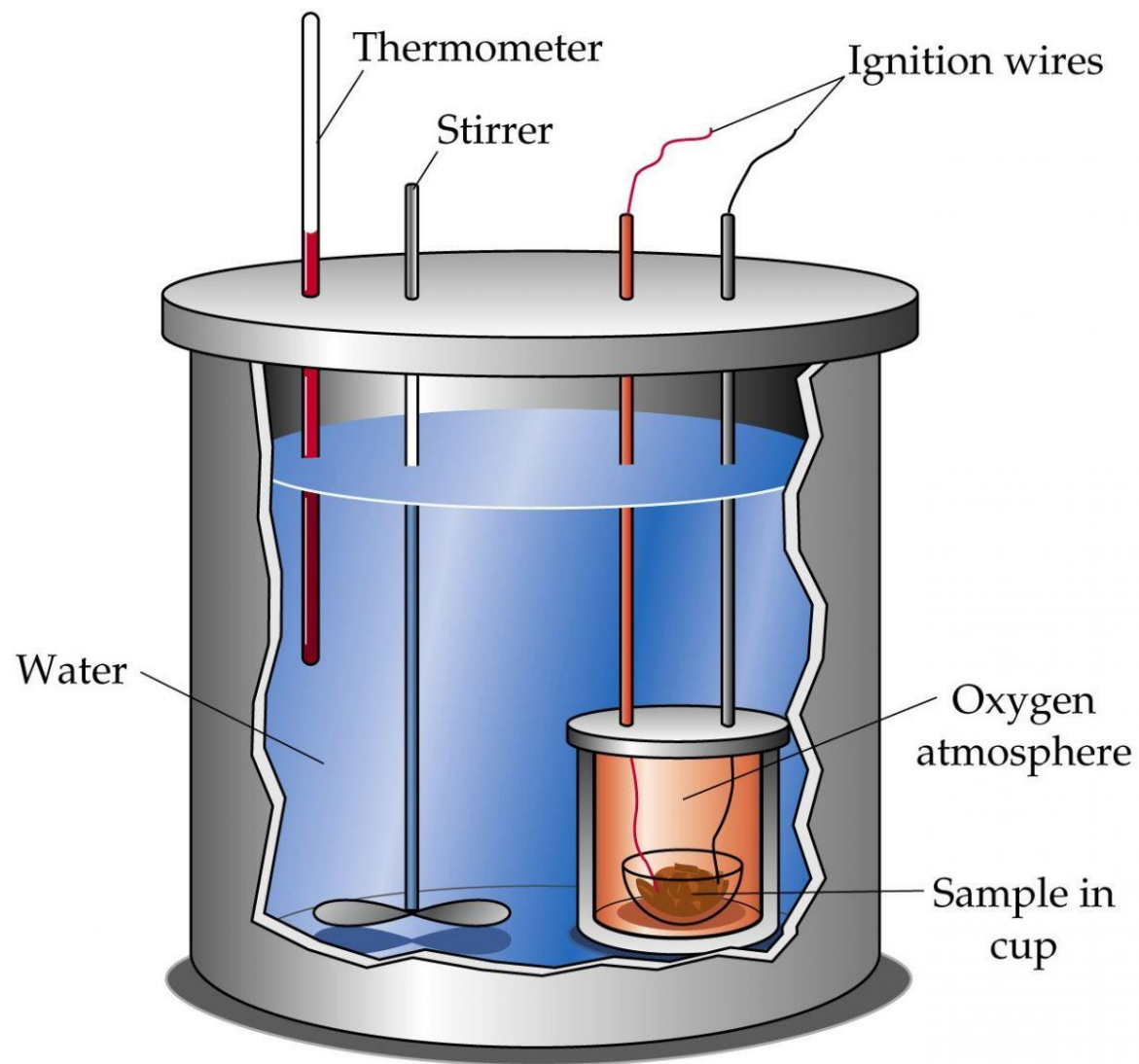
ENERGIJA

- ▶ Kinetična energija
- ▶ Potencialna energija




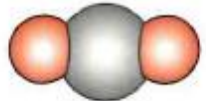

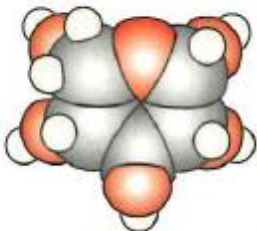


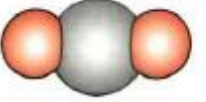

- ▶ Kemijska energija → uporabna za celično delo



Kalorimeter

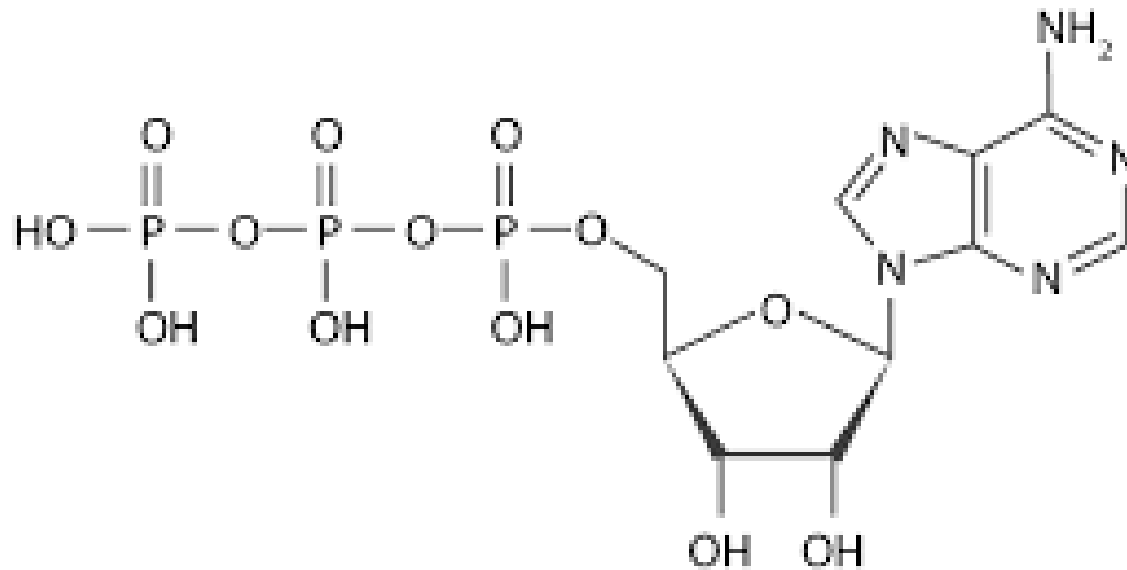


Količino proste energije ugotavljamo tako, da snov sežgemo v posebni posodi in sproščena toplota segreje znano količino vode.

Gorivo	Pretvorba energije	Produkti
 <p>organske snovi v bencinu</p> <p>+</p>  <p>kisik</p>	<p>Pretvorba energije v avtu</p>  <p>toplota</p> <p>kinetična energija za gibanje</p> <p>izgorevanje</p>	 <p>ogljikov dioksid</p> <p>+</p>  <p>voda</p>
 <p>glukoza (ali druge organske snovi)</p> <p>+</p>  <p>kisik</p>	<p>Pretvorba energije v celici</p>  <p>toplota</p> <p>energija za celično delo</p> <p>ATP</p> <p>ATP</p> <p>postopna razgradnja organskih snovi</p>	 <p>ogljikov dioksid</p> <p>+</p>  <p>voda</p>

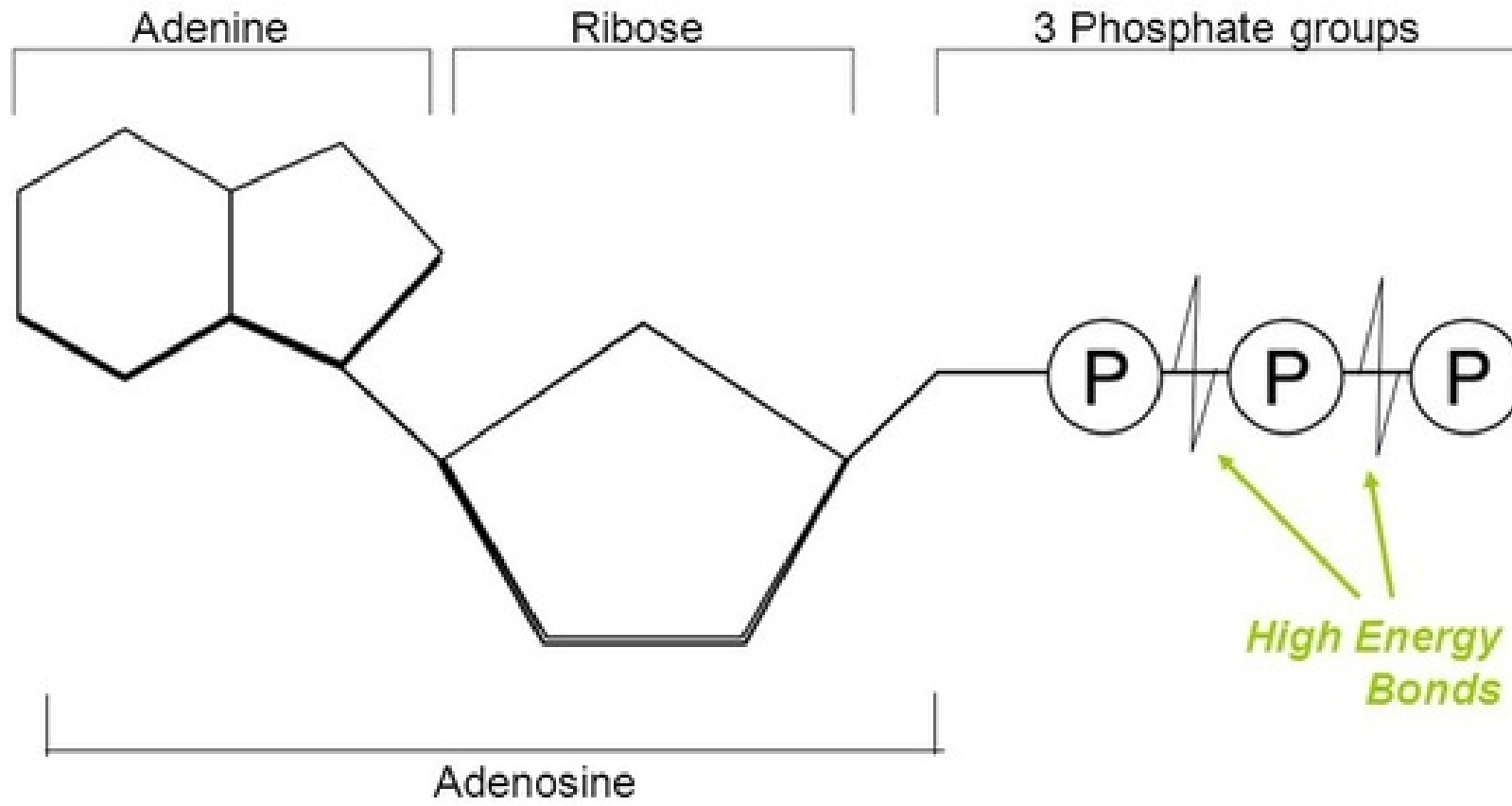
ATP molekula

- ▶ Vnos hrane → E
- ▶ E iz vezi org. snovi, se prenese na vezi molekule ATP
- ▶ ADENOZINTRIFOSFAT



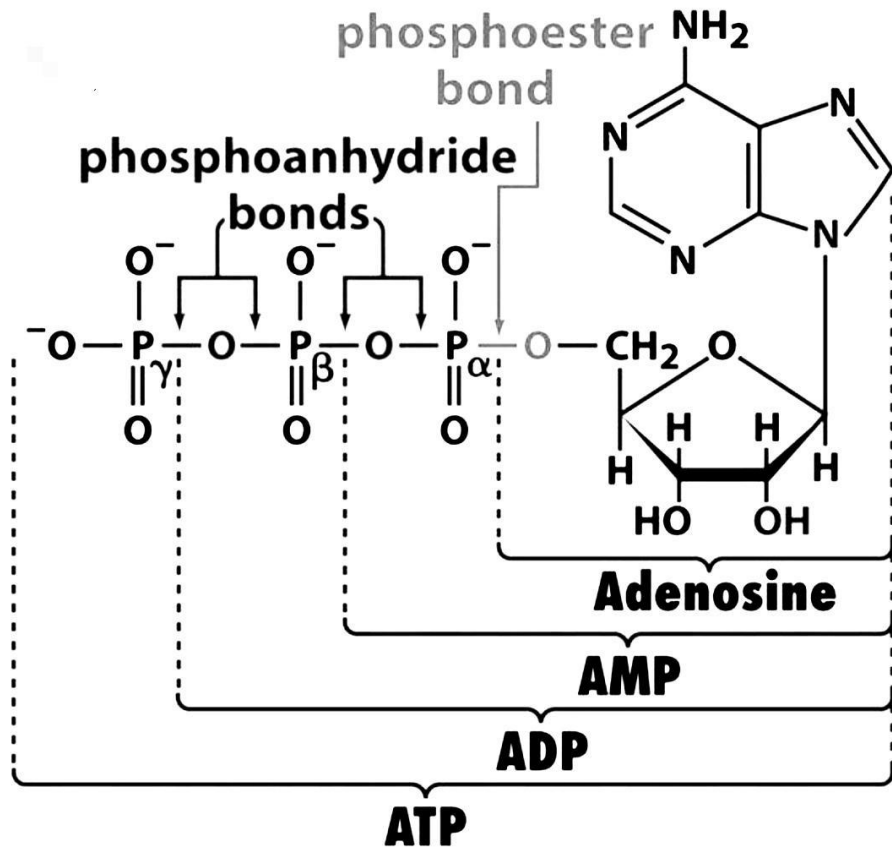
ATP Structure

ATP = Adenosine TriPhosphate

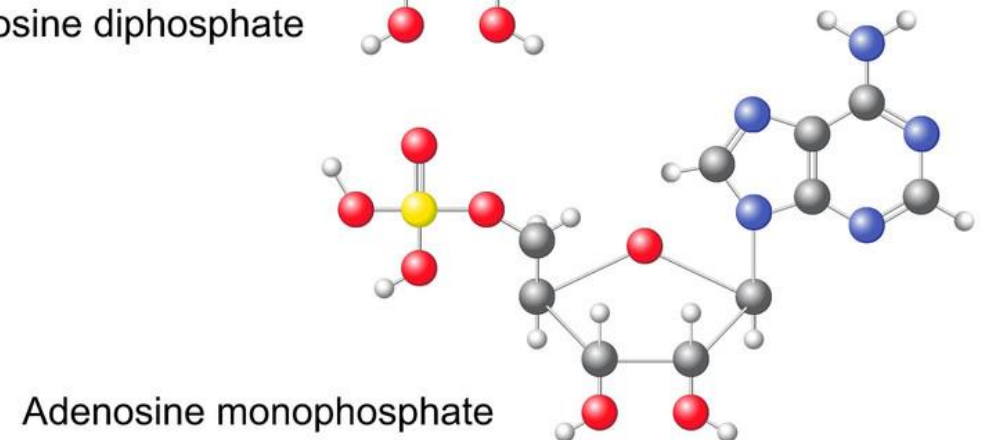
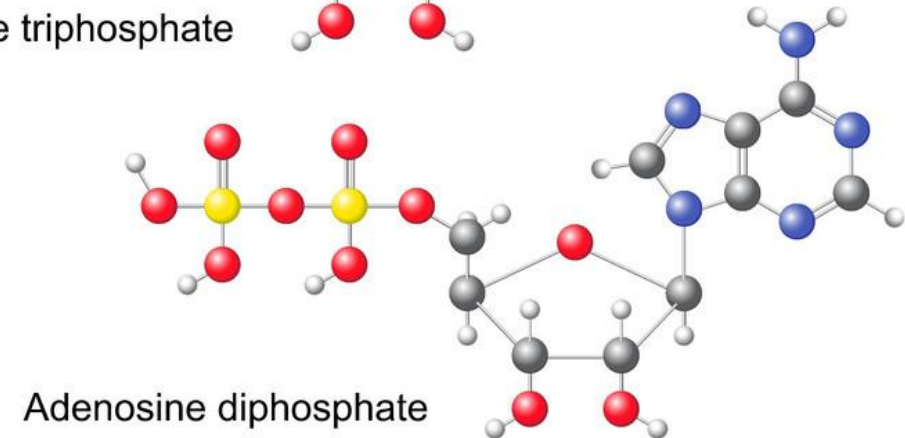
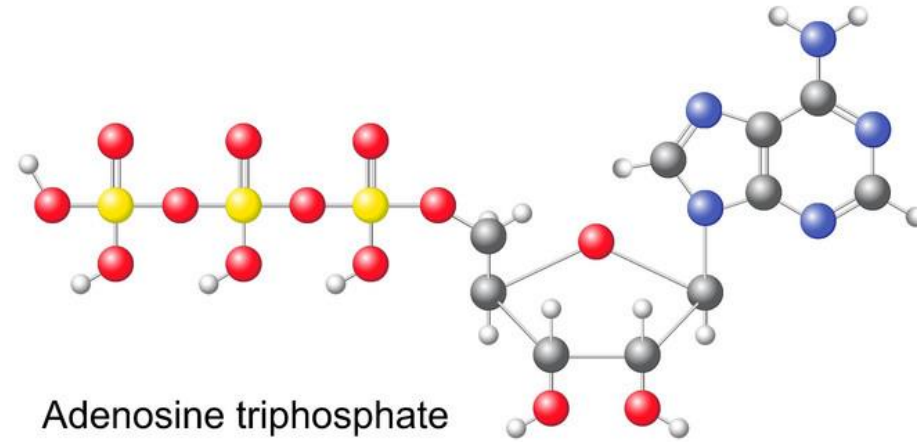


Adenozin fosfat

- ▶ ATP
- ▶ ADP
- ▶ AMP



Adenosine phosphates



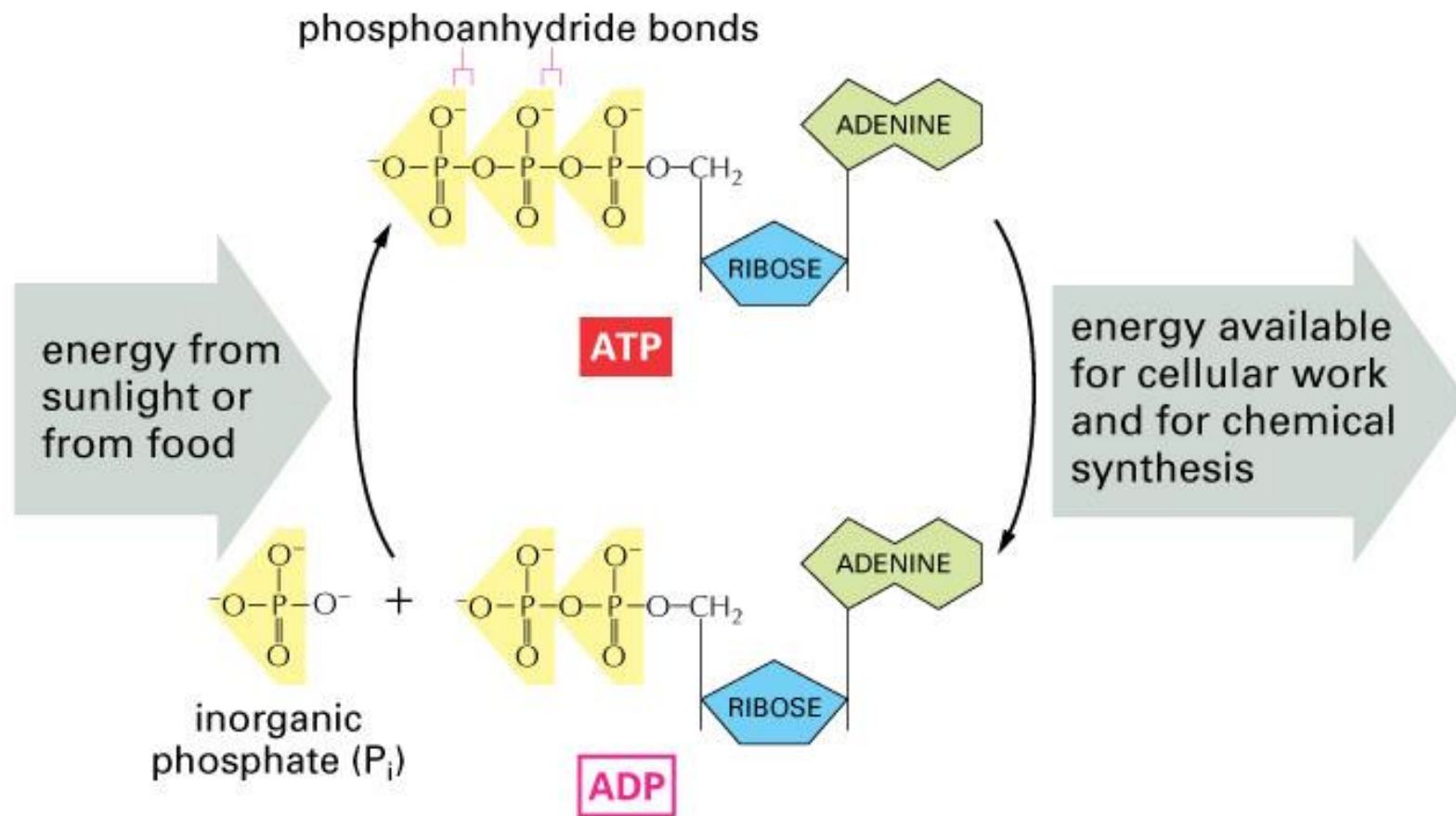
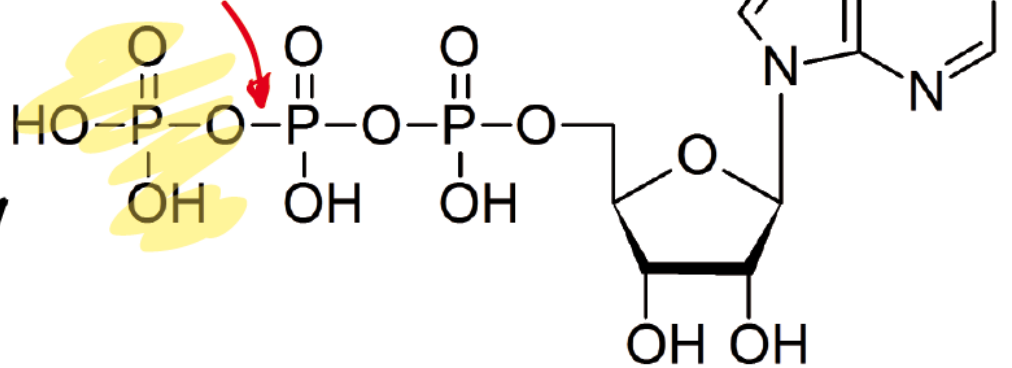


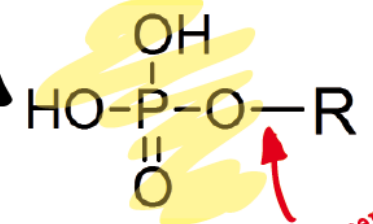
Figure 3-32 Essential Cell Biology, 2/e. (© 2004 Garland Science)

*'High-energy'
phosphoanhydride
bond*

ATP

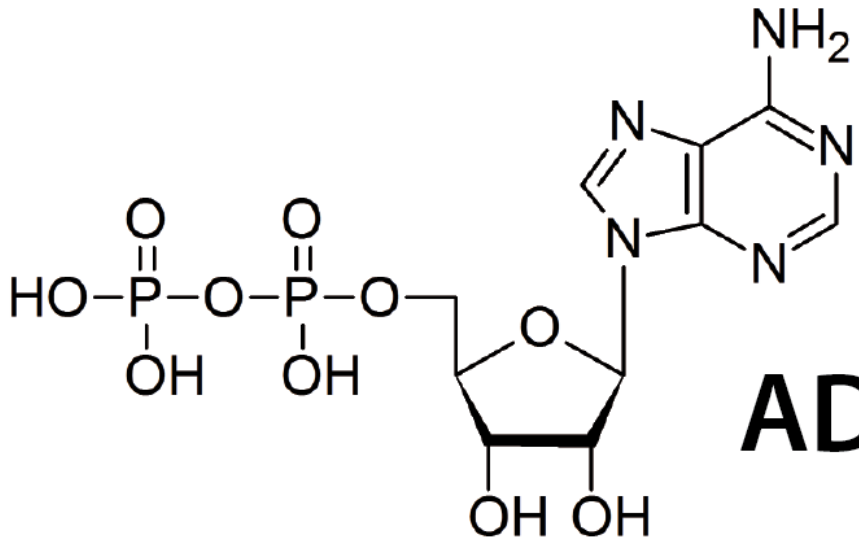


Phosphate transfer

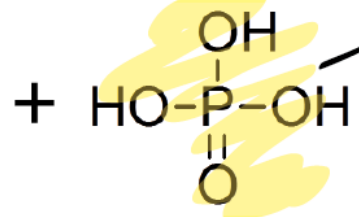


*'High-energy'
phosphoester
bond*

ADP



*Condensation
reaction*

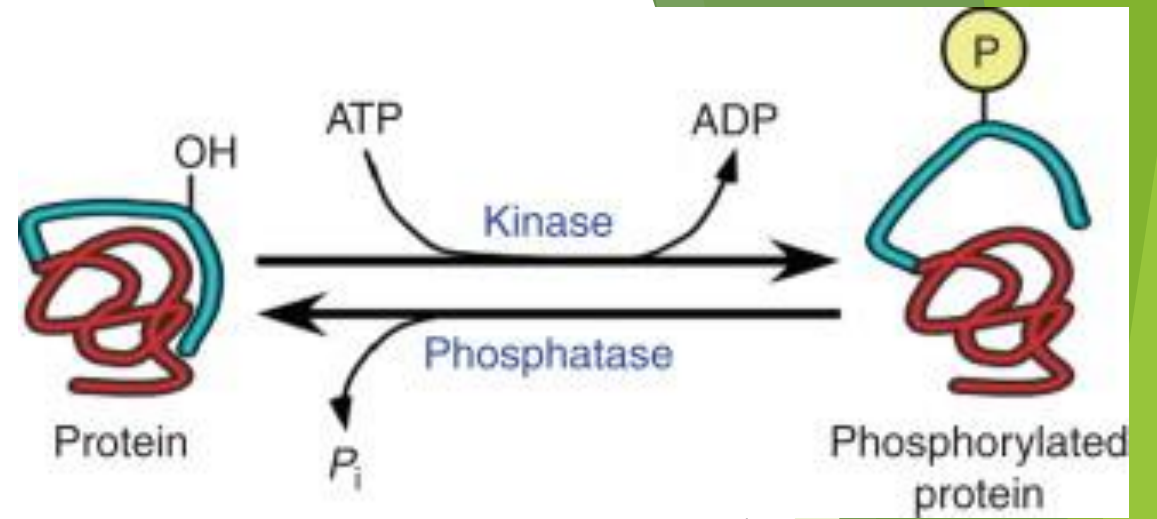


+ ΔG^0
Glycolysis, TCA cycle,
oxidative phosphorylation,
photosynthesis

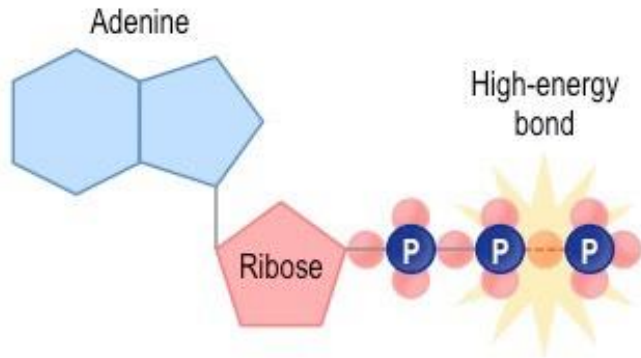
- ΔG^0
Cellular work,
biosynthesis

FOSFORILACIJA

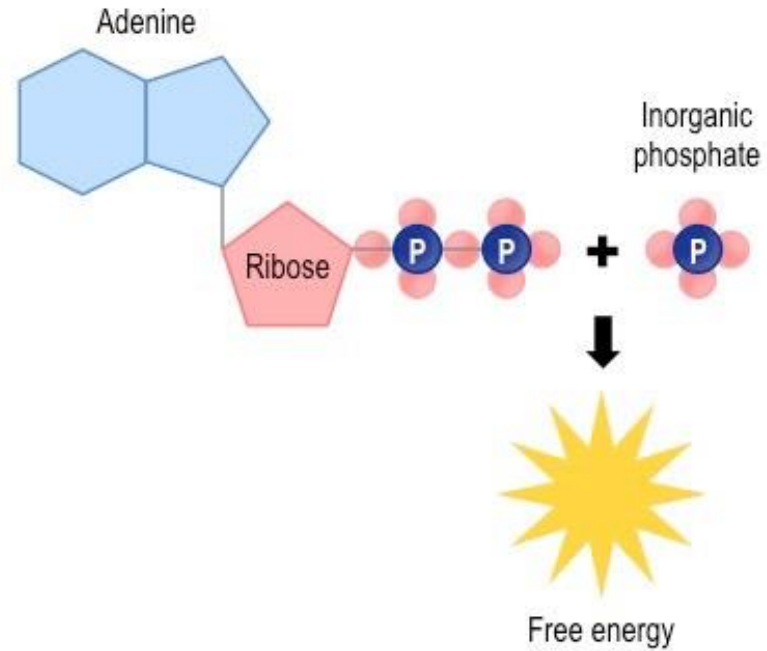
- ▶ Prenos fosfata iz ATP na drugo molekulo
- ▶ ATP → ADP



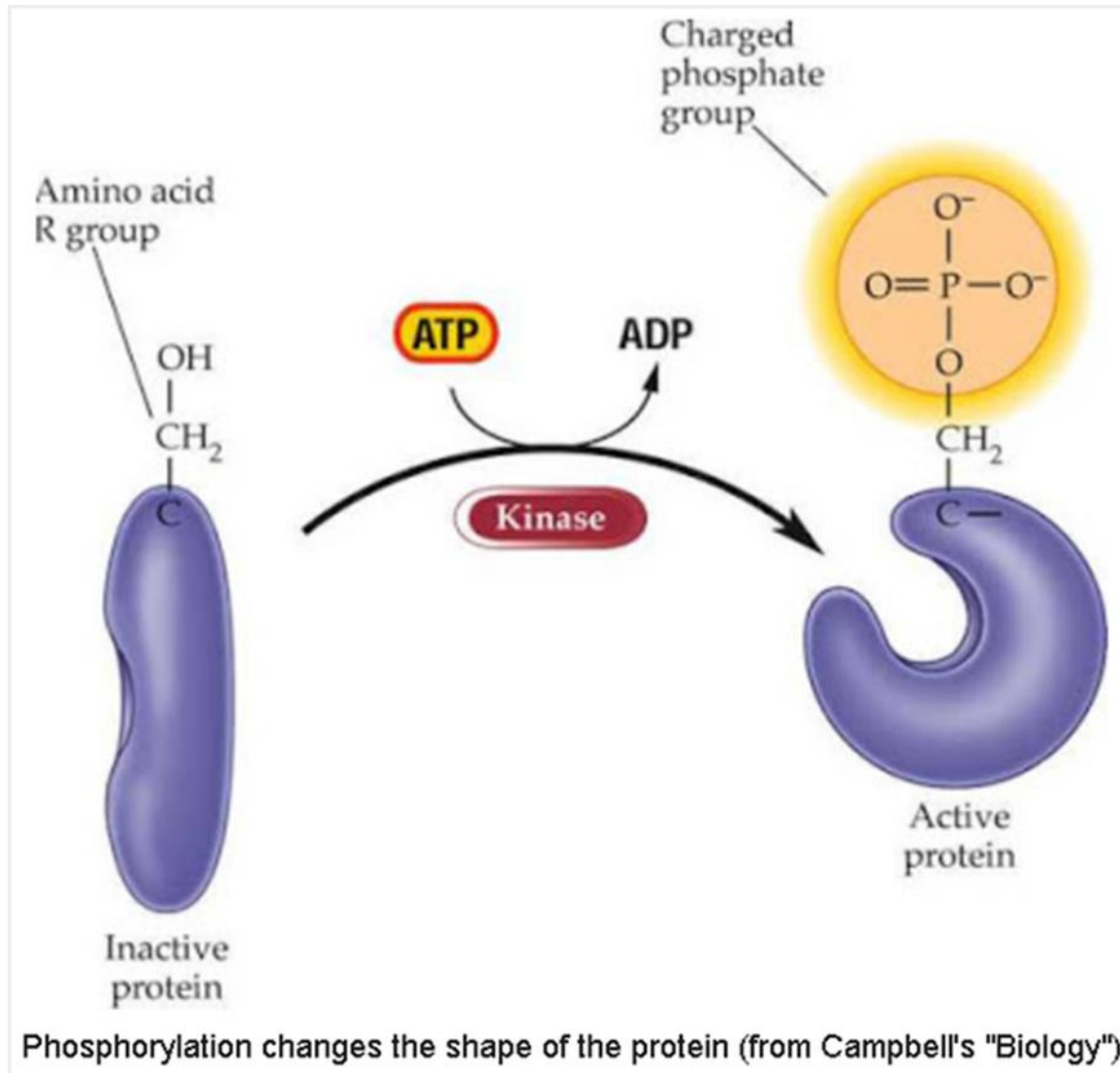
Adenosine Triphosphate – 



Adenosine Diphosphate – 



Fosforilacija



Fosforilacija

- ▶ ATP omogoča celično delo
- ▶ Kemijsko delo
- ▶ Mehansko delo (Motorični protein)
- ▶ Prenašalno delo (beljakovina v membrani)

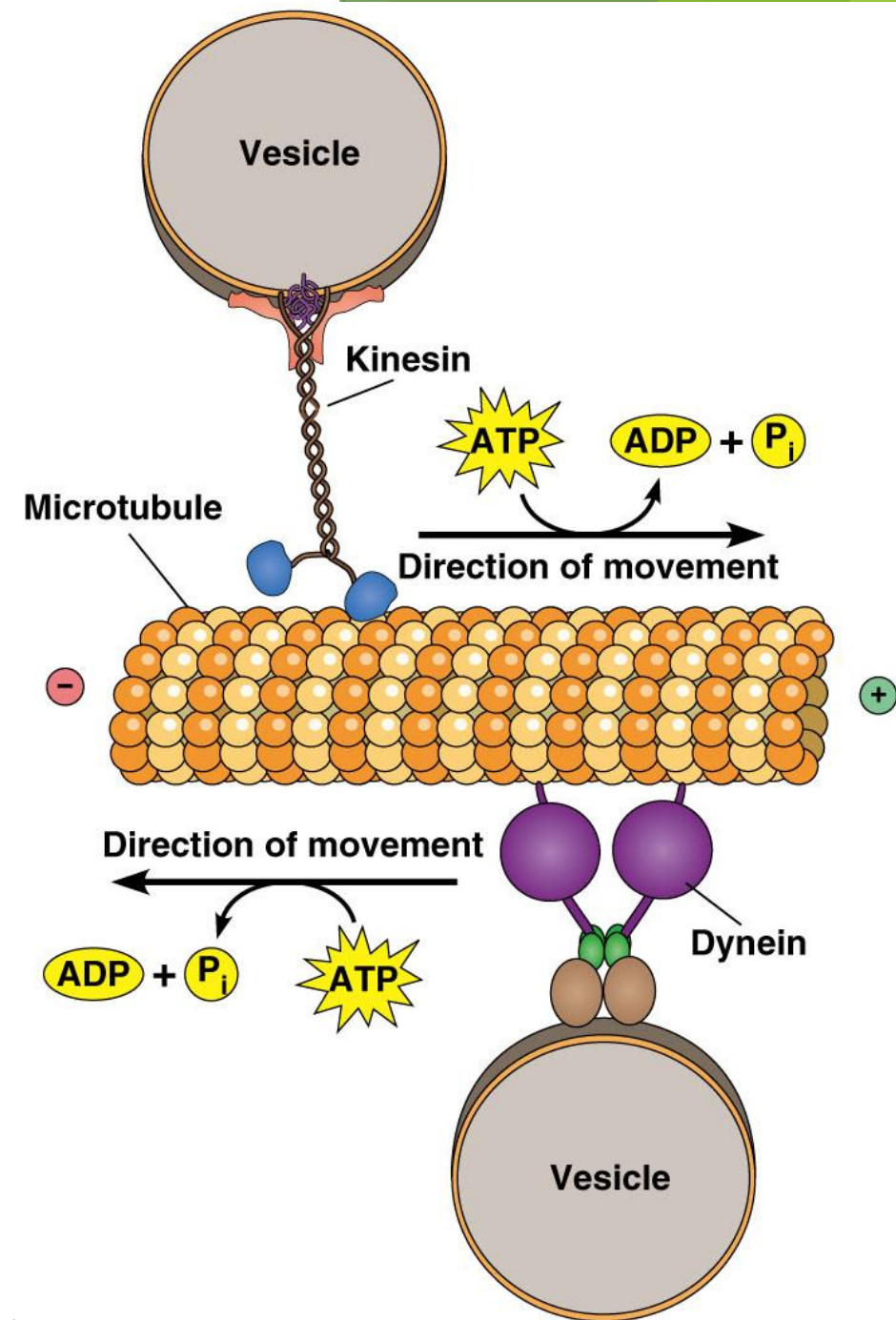
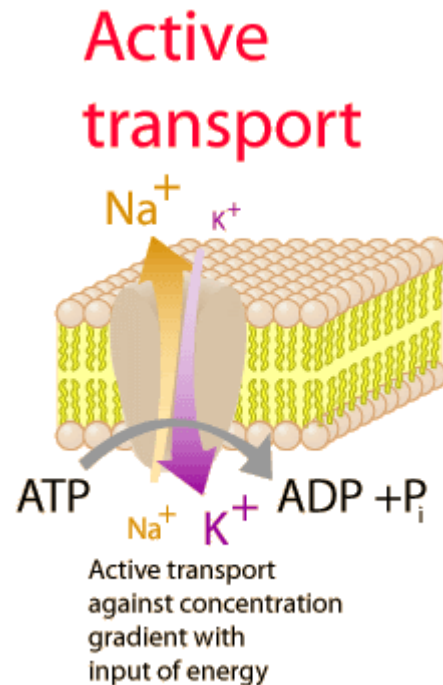
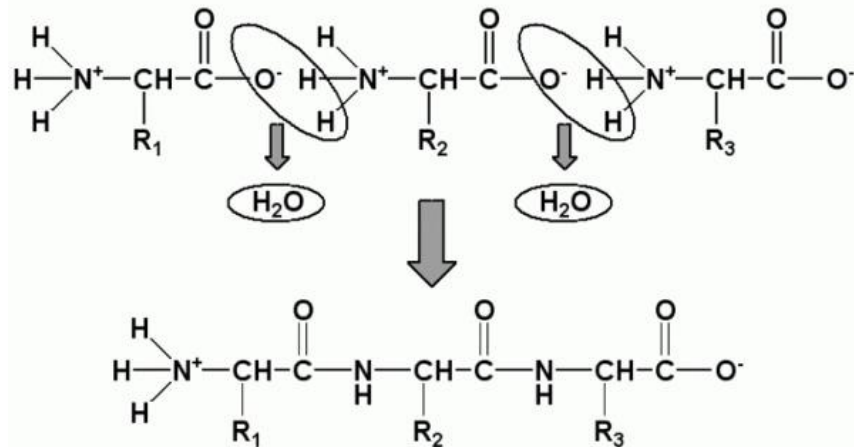
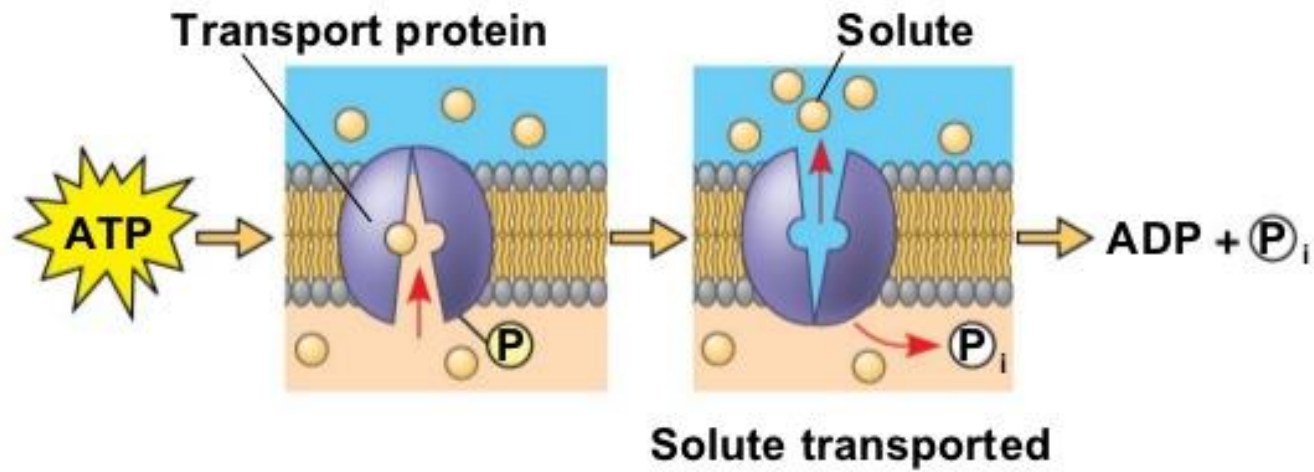
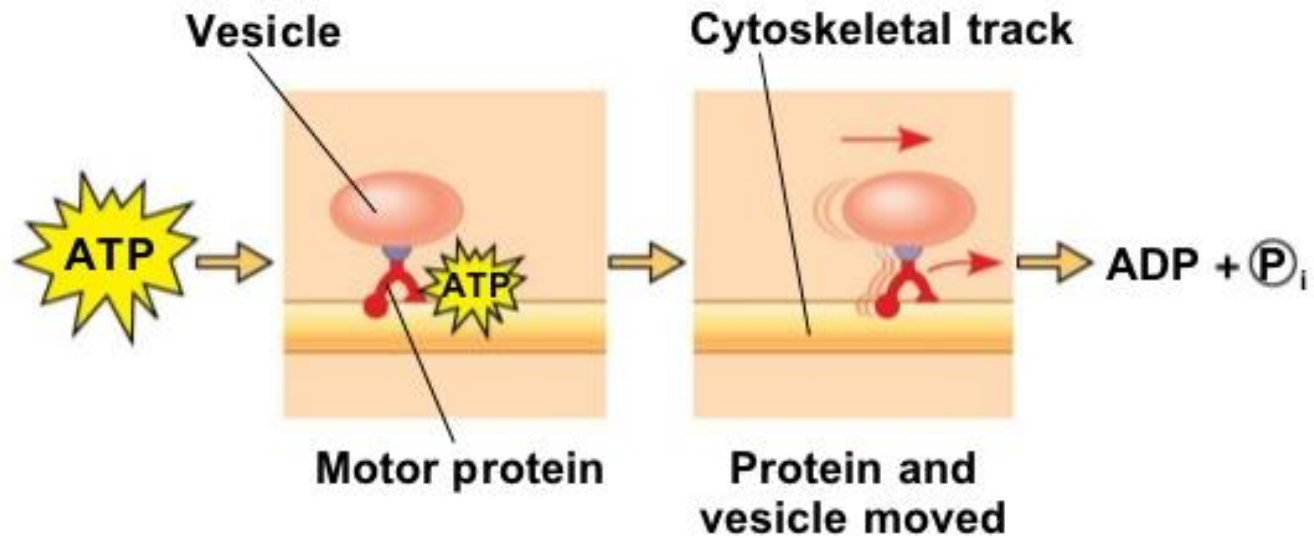


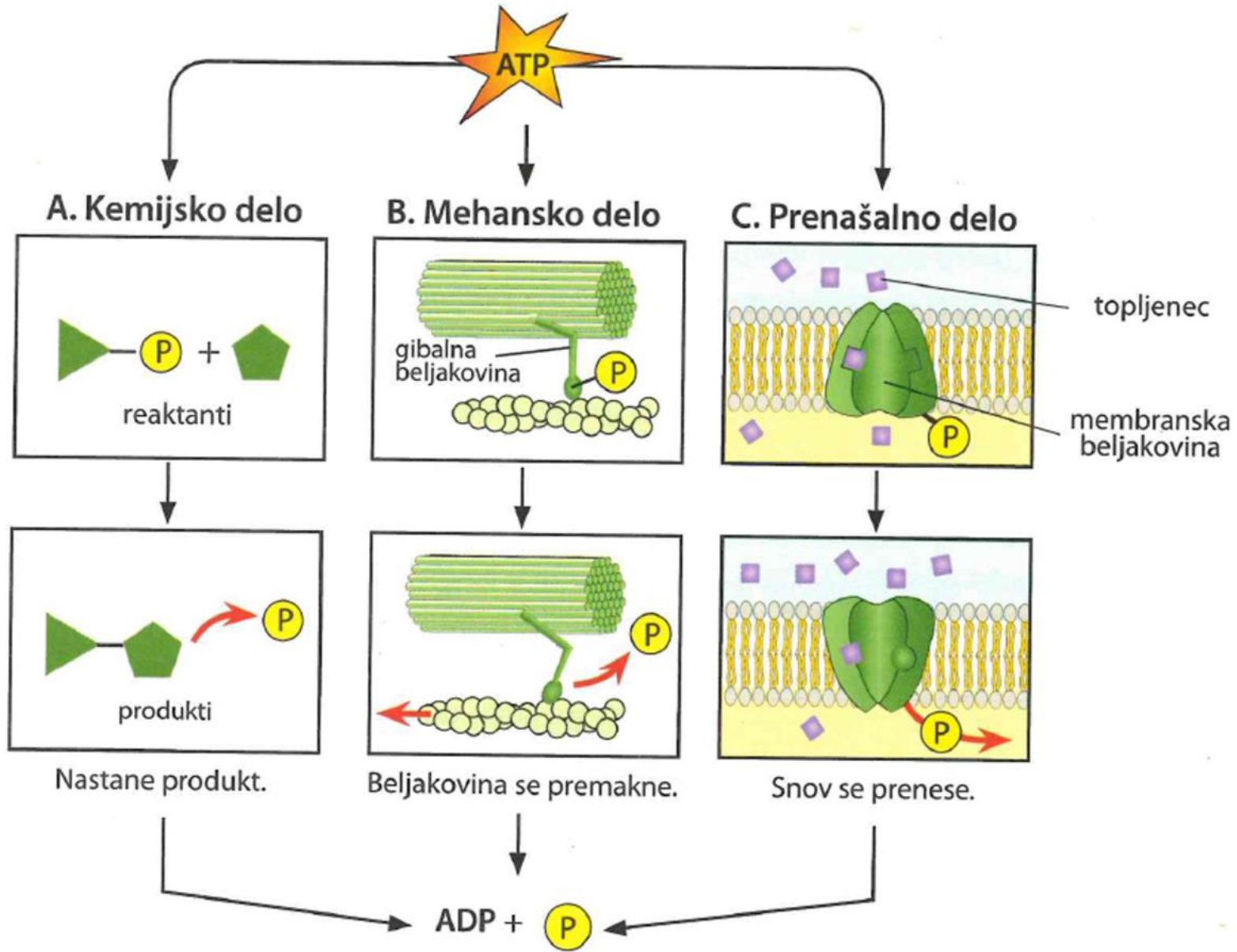
Figure 8.10



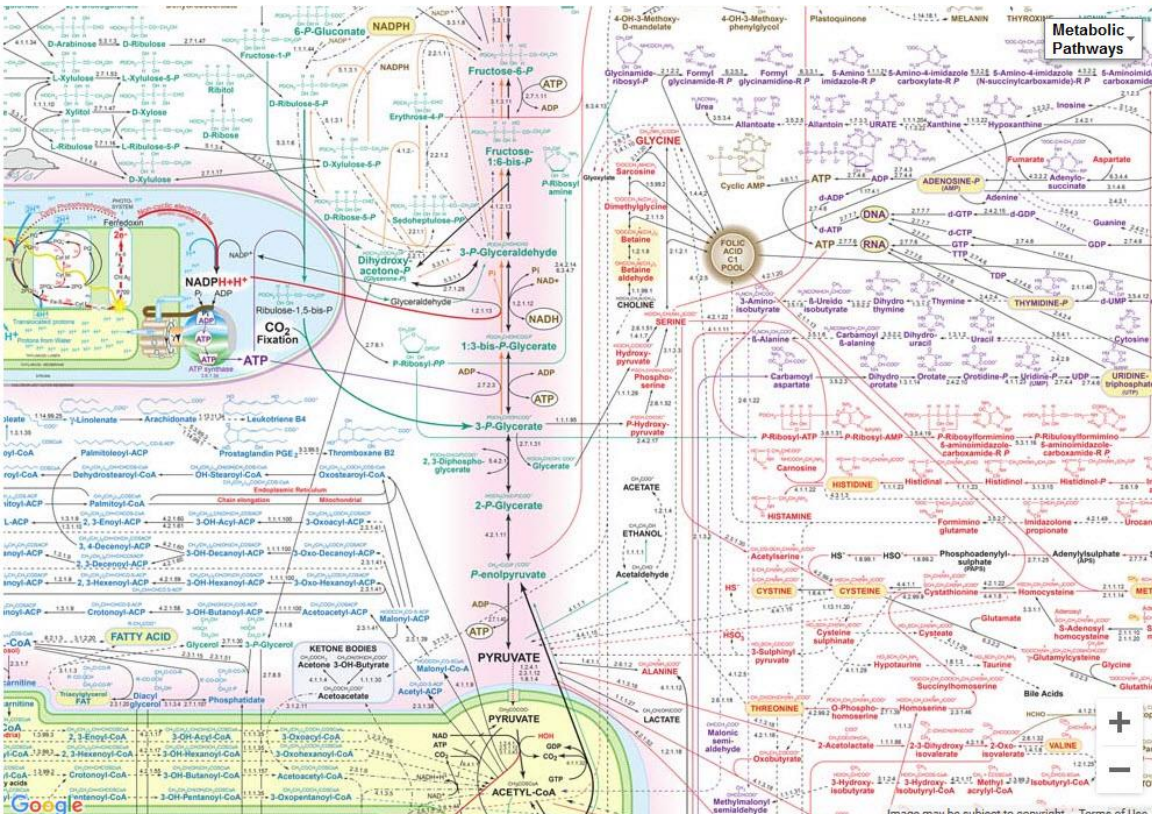
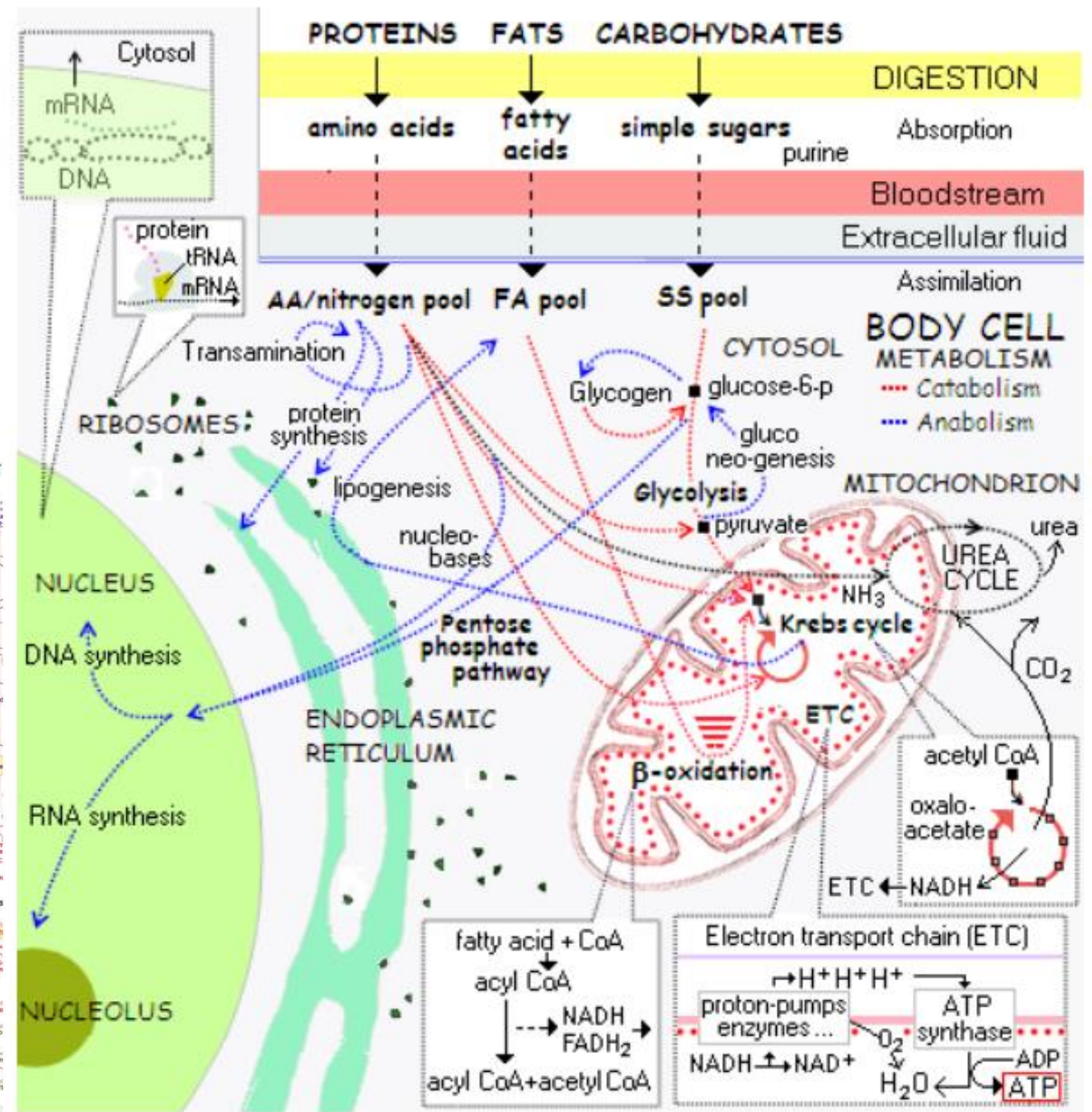
(a) Transport work: ATP phosphorylates transport proteins.



(b) Mechanical work: ATP binds noncovalently to motor proteins and then is hydrolyzed.



- Metabolizem je kompleksen in zapleten preplet mnogih reakcij!

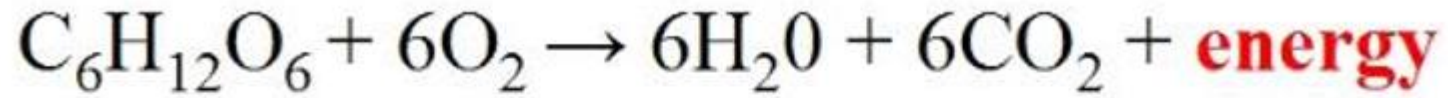


FDV

- ▶ **F**otosinteza
- ▶ celično **D**ihanje
- ▶ **V**renje

Trije bistveni procesi v celici!

Cellular Respiration



(glucose + oxygen → water + carbon dioxide + energy)

VS

Photosynthesis

