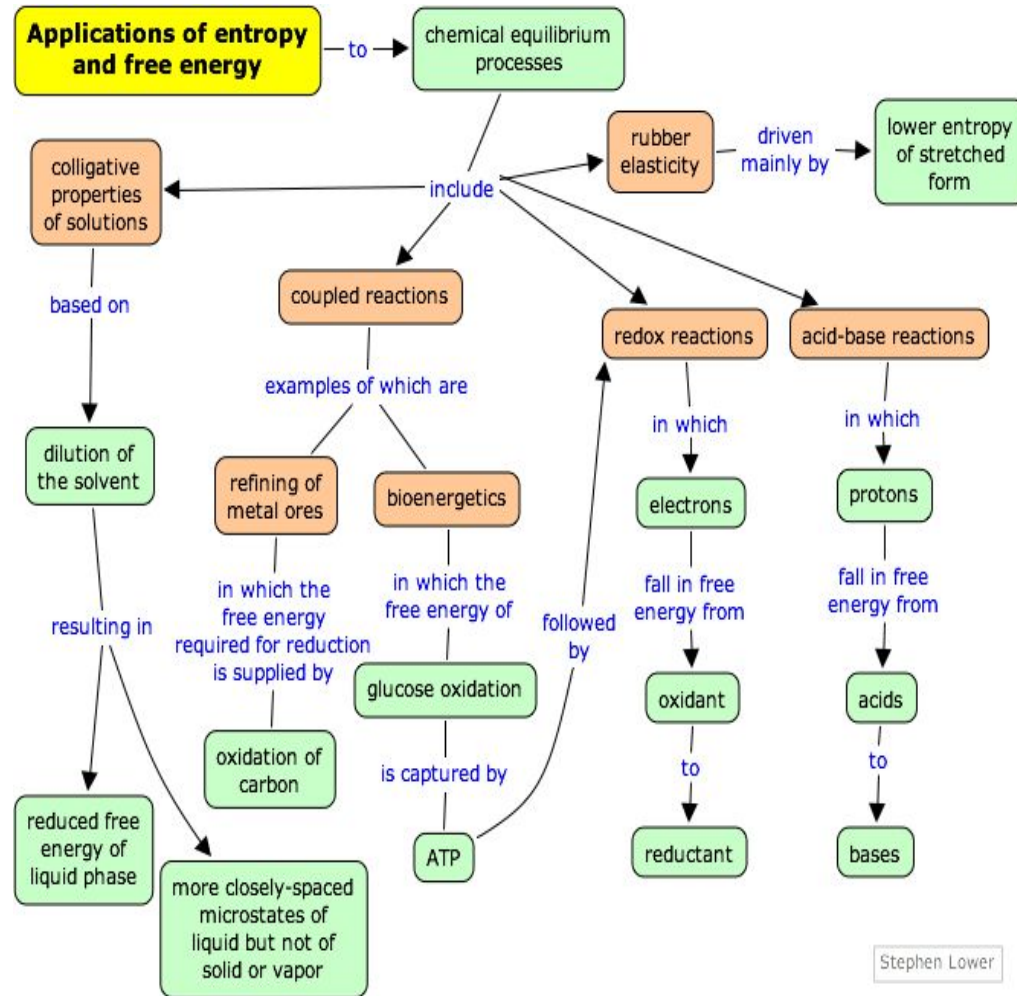


# BIOENERGETICS

## Concept of free energy



Stephen Lower

## Endergonic and exergonic reaction

Exergonic reaction	Endergonic reaction
1) The Exergonic reaction is a type of reaction in which free energy is released	1) The endergonic reaction are the type of reaction in which free energy is absorbed
2) Here Gibbs free energy is negative	2) Here Gibbs free energy is positive
3) Exergonic reactions do not require energy to begin	3) Endergonic reactions always require energy to begin
4) It is downhill reaction	4) It is uphill reaction
5) Fatty acid catabolism, glycolysis, cellular respiration	5) DNA/RNA synthesis, protein synthesis, fatty acid synthesis

## Enthalpy and entropy:

Enthalpy	Entropy
1) Measurement of energy	1) Measurement of randomness or disorders of molecules
2) It represented by H	2) It represented by s
3) $H=U+PV$	3) $dS=dq/ T$
4) Unit is kilojoules/ mole	4) Unit is joule /Kelvin.mole
5) Related to Frist law of thermodynamics	5) Related to second law of thermodynamics
6) Can use to measure the change in energy of the system after the reaction	6) Can use to measure to egree of disorder of reaction
7) The process favour minimum enthalpy	7) The process favour maximum entropy
8) Enthalpy is negative for exothermic reaction	8) Entropy is negative for non spontaneous process
9) Enthalpy is positive for endothermic reaction	9) Entropy is positive for spontaneous process

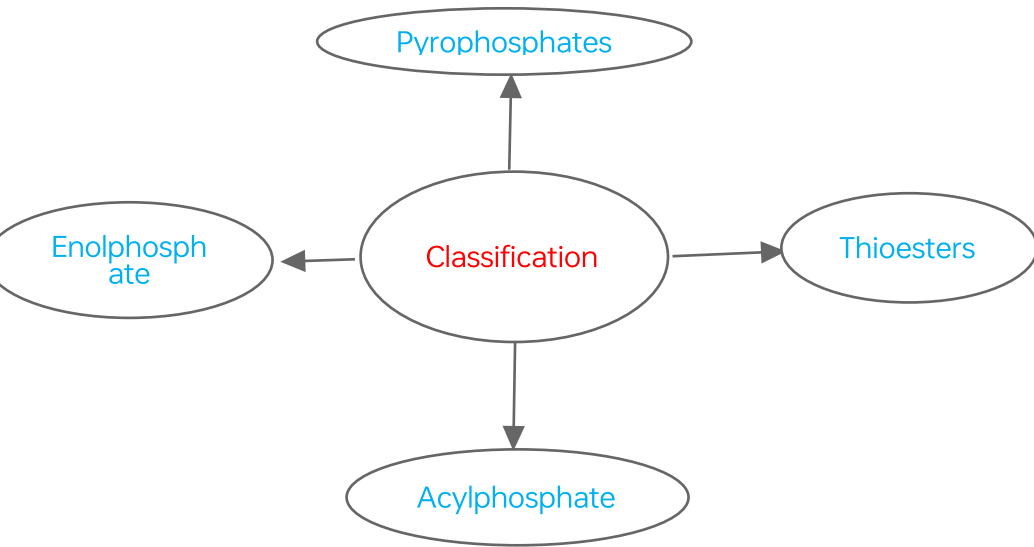
## Energy rich compounds:

It is dinoted by symbol ( - ) Guiggles

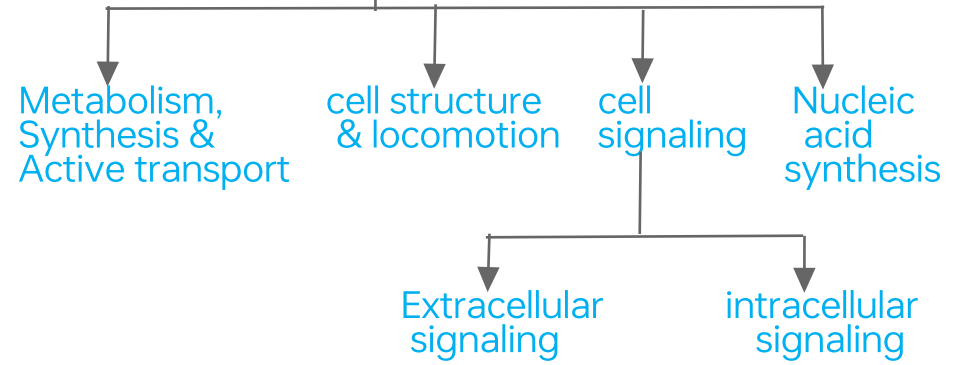
- 1) Low energy bonds, $\Delta G$  value is -1 to 5 cal / mole
- 2) High energy bonds, $\Delta G$  value is -7 to 15 cal/mole

Some energy rich compounds	$\Delta G$ (k cal/ mole)
1) Phosphoenol pyruvate	-14.8
2) Carbonyl phosphate	-12.3
3) 1,3 Biophosphoglycerate to creatine phosphate	-10.3
4) ATP to ADP + Pi	-7.3
5) ADP to AMP + Pi	-6.6
6) Pyrophosphate	-6.6
7) Glucose-1-phosphate	-5.0
8) Fructose-6-phosphate	-3.8
9) AMP	-3.4
10) Glucose-6-phosphate	-3.3
11) Glycerol-3-phosphate	-2.2

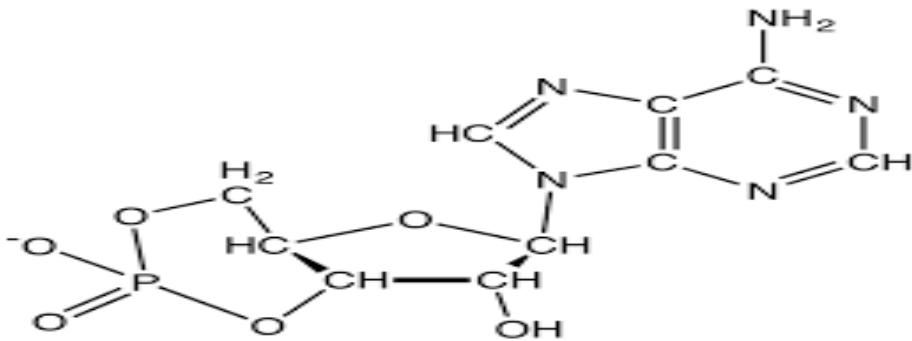
## Classification of energy rich compounds:



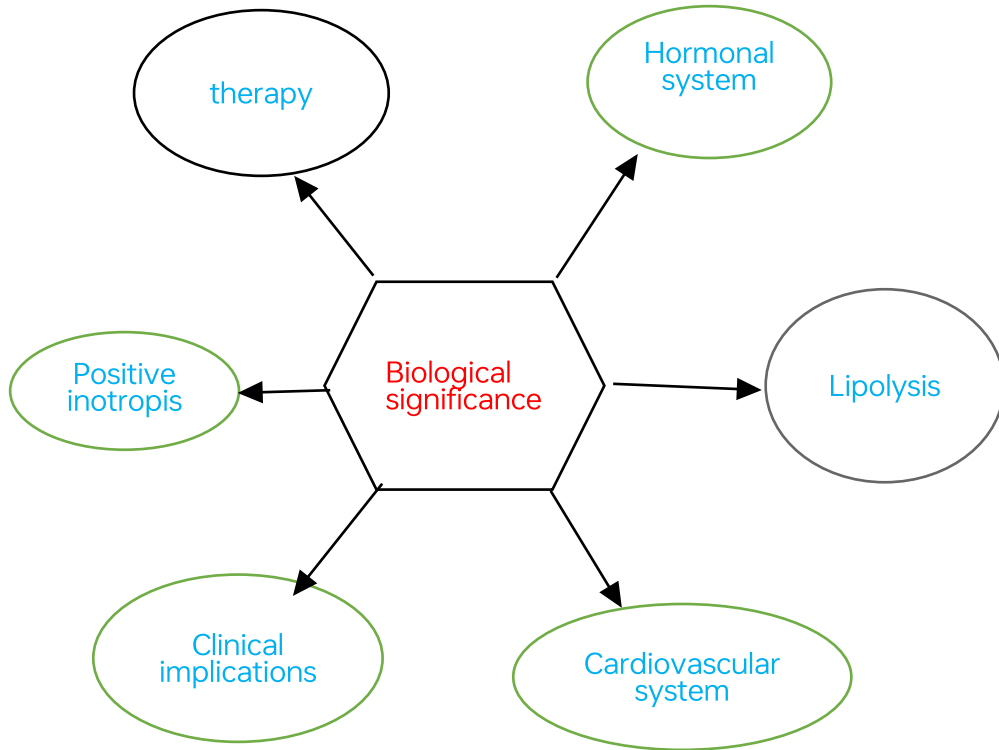
## Biological significance of ATP



## Cyclic adenosine monophosphate :



## Biological significance of cyclic AMP :



## Reference:

- 1) Textbook of biochemistry by thakur publication page no 47
- 2) By Google:
  - 1) Concept map [www.pinterest.com](http://www.pinterest.com)
  - 2) [www.psiberg.com](http://www.psiberg.com)

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