

General properties of living systems

System theory: (3 components):

- **substances,**
- **energy,**
- **informative.**

Living systems are dynamic structures, that's why we talk about the flow of substances, the flow of energy and the flow of information.

Substance flow

- Chemical composition of living matter,
- chemical transformations = metabolism,
- structure of living matter = spatial arrangement of macromolecules.

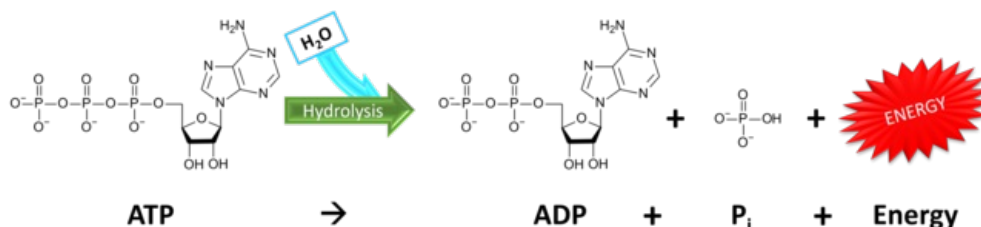
Meaning of substances:

- *Water*: basic solvent (enables dynamics, transport and metabolism).
- *Ions*: activation of individual chemical components.
- *nucleic acids*: store information material.
- *Proteins*: products of genetic information.
 - enzymes: they specifically catalyze metabolic reactions.
 - signal receptors (from the external and internal environment).
- *lipids*: structural division of matter (external and internal membranes), or energy reserve.
- *carbohydrates*: the main source of energy.

The general structure is a cell with its mutual interactions between individual components. The internal environment of the cell has a semi-liquid (fluid) character, which enables all dynamic changes.

Energy flow

A living organism is an energetically **open system**. Energie se tvoří enzymatickou přeměnou substrátů. Energy is created by enzymatic conversion of substrates. Energy is subsequently stored in macroergic phosphate bonds of universal carriers (e.g. **adenosine triphosphate, ATP**). The least variable proteins are histones (maintain the stability of genetic information) and redox enzymes (to release energy).



Hydrolysis of ATP

Information flow

Transfer of genetic information, transformation into phenotypic traits.

Links

related articles

- Energy system of the cell
- Cell
- Ions in drinking water
- Lipoproteins

Source

- OTOVÁ, Berta. *Lékařská biologie a genetika : 1st part*. Prague 2008 edition. Nakladatelství Karolinum, 2008. ISBN 978-80-246-1594-3.

