Modern Chemistry & Applications
ISSN: 2329-6798

Ponizovskiy, Mod Chem appl 2013, 1:1
DOI: 10.4172/2329-6798.1000e101

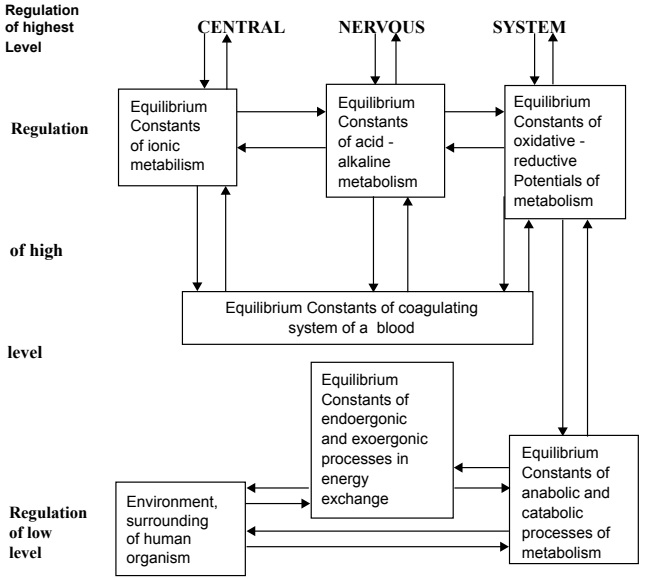
Editorial Open Access

The Central Regulation of all Biophysical and Biochemical Processes as the Mechanism of Maintenance Stability of Internal Energy and Internal Medium both in a Human Organism and in Cells of an Organism

Ponizovskiy M.R[1,2*]

[1]Head of Laboratory Biochemistry and Toxicology, Kiev Regional p/n Hospital, Kiev, Ukraine
[2]Herschelstr 33, 90443 Nurnberg, Germany

Remarkable discoveries have been made in studying of separate processes in an organism: So studying of the proliferation processes has led to discovery of interactions between pro-proliferative and anti-proliferative factors and their signals that has given the chance to explain mechanisms of growth processes in tissues of an organism. However fluctuating changes of these processes, which occur in cells and in tissues, are subjected to the central regulation of an organism promoting maintenance stability of the Internal Medium [constant concentration substances in blood and in neurolymph] and Internal Energy [stability temperature 36.0°C–36.9°C by which all enzymes operate; stable index pH=7.35 in blood and in neurolymph; the stable indices of osmotic pressure (285 ± 5 mil-osm/kg H_2O, corresponding to 0.14–0.15 M sodium chloride or the other univalent ions) and colloidal-oncotic pressure (18-25 mm Hg, corresponding to human serum albumin solution up to 300 grams per liter) etc.] both in an organism, and in each cell of an organism, according to the first law of thermodynamics. The common mechanism of maintenance stability of Internal Medium (constant concentration substances in blood and in neurolymph) and Internal Energy (stable temperature 36.0°C–36.9°C by which all enzymes operate etc.) both in an organism, and in each cell of an organism, causes the moderate fluctuating changes of the balance of anabolic endoergonic and catabolic exoergonic processes, both in an organism, and in each cell of an organism [1,2]. Thus both the energy exchanges, i.e. balance of exoergonic and endoergonic processes, and metabolism, i.e. balance of anabolic and catabolic processes, in the low level of regulation in an organism, as well in cells and organism tissues, affects on the regulation high level in an organism: Equilibrium Constants of ionic metabolism, of acid - alkaline metabolism, of oxidative - reduction Potentials of metabolism (Figure 1). Simultaneously the high level of regulation in an organism (Equilibrium Constants of ionic metabolism, of acid-alkaline metabolism, of oxidative – reduction Potentials of metabolism) affects mutually on the low level of regulation, i.e. on energy exchanges of exoergonic and endoergonic processes and metabolism-balance of anabolic and catabolic processes as in an organism as well as in cells and organism tissues (Figure 1). Such the mutual influences of the high and low levels of regulation maintains stability, as temperature 36.6°C–-37.3°C by which all enzymes operate in an organism, and constant concentrations of substances as in blood and in neurolymph of an organism as well as in cells of an organism (Figure 1). The Central Nervous System of highest level regulaion affects on high level of regulation and through this level of regulation affects on the low level of regulation (Figure 1). However the low level of regulation is subjected to influence of an environment (surroundings) and on the contrary low level of regulation affects on a surrounding medium, i.e. there are the mutual influences as an environment and organism as well as cells and their surrounding medium for maintenance stability of Internal Medium and an Internal Energy of an organism and cells (Figure 1). However maintenances stability of Internal Medium and Internal Energy of an organism and cells of an organism occur in the conditions of interaction between as environment and an organism as well as between cells and their surrounding medium which demand on supplemental balance of inflow and outflow of substances and energy for stability Stationary State via minimization of gain entropy,



Footnotes: Metabolic and Energy "Equilibrium Constants" regulate interactions of intracellular and extracellular chemical potentials (μint.↔ μext.) for maintenance stability of Internal Energy and Internal Medium an organism. The intracellular and extracellular chemical potentials (μint. and μext.) cause the formations of the positive/negative charges on internal and external membranes of cellular wall, promoting operation of remote cellular reactions via cellular capacitors operation.

Figure 1: The Mechanism of Maintenance Stability of Internal Energy & Internal Medium of an Organism

according to the Prigogine theorem [1], i.e. balance inflow and excretion of substance across an organism as well as balance endocytosis and exocytosis for maintenance stability Internal Energy and Internal Medium [1,2]. Therefore considering the central mechanism regulation of stability Internal Energy and Internal Medium of an organism, it is necessary to assess in what processes both pro-factors and anti-factors operate, i.e. they can operate either in catabolic exoergonic pathway or in anabolic endoergonic pathway, and on the contrary they can promote either inflow substances in an organism as well endocytosis

***Corresponding author:** M.R.Ponizovskiy, Herschelstr 33, 90443 Nurnberg, Germany, Tel: (49911)-653-78-11; E-mail: ponis@online.de

Received November 02, 2012; **Accepted** November 05, 2012; **Published** November 07, 2012

Citation: Ponizovskiy M.R (2013) The Central Regulation of all Biophysical and Biochemical Processes as the Mechanism of Maintenance Stability of Internal Energy and Internal Medium both in a Human Organism and in Cells of an Organism. Mod Chem appl 1: e101. doi: 10.4172/2329-6798.1000e101

or excretion substances from an organism as well endocytosis. In phase G1/S of cellular cycle anabolic processes operate. In phase G2/M of cellular cycle both anabolic processes and arising catabolic processes operate. Thus studying processes of tissues growth, it is necessary to consider, that both pro-proliferative factors and anti-proliferative factors can operate as in phase G1/S of cellular cycle as well as in phase G2/M of cellular cycle. However as pro-apoptotic factors (pro-apoptotic proteins assemblage of BH3 proteins, Bak, Bax, caspase 3 and caspase 7) as well as pro-autophagy factors (Beclin 1 and regulators of autophagy phosphoinositide 3-kinases (PI3Ks) class I and class III etc.) operate in catabolic exoergonic pathway, although complex AKt/PI3K reacts both in a catabolic pathway and in an anabolic pathway. After all catabolic processes of glycolysis carry out peculiar functions, unlike catabolic processes after "Nodal point of bifurcation of anabolic and catabolic processes in Acetyl-CoA" [NPBac] [3]. Just catabolic processes of glycolysis generate energy. This energy is divided into anabolic and catabolic processes in NPBac, but the part of this energy is cumulated into Lactic acids for anabolic processes [3]. Thus glycolysis is the primer for both catabolic and anabolic processes. Stimulating glycolysis, AKt pathway is also the primer for both catabolic and anabolic processes. Unlike catabolic processes of glycolysis, the catabolic processes, which are formed as the result bifurcation of anabolic and catabolic processes in NPBac, dissipate energy into environment for maintenance stability of Internal Energy an organism (stable temperature 36.6°C–37.0°C by which all enzymes operate) [1-4]. Moreover it is necessary to consider, that biochemical processes in the cells occur after remote reaction of cellular capacitors on the changes of chemical potentials (μ) in surrounding medium due to strange processes in the medium, which break the chemical potential (μ) in surrounding medium. Such remote cellular reactions induce attraction cells to strange substances and create the contact biochemical cellular reactions [1].

The significance of such approach in the investigations as pathologic processes as well as normal processes will help to study mechanisms of these processes and also to substantiate new approaches for treatment of pathological processes [3,4].

References

1. Ponisovskiy MR (2011) Driving mechanisms of passive and active transport across cellular membranes as the mechanisms of cell metabolism and development as well as the mechanisms of cellular distance reaction on hormonal expression and the immune response. Crit Rev Eukaryot Gene Expr 21: 267-290.
2. Ponizovskiy MR (2012) Biophysical and biochemical models of cellular development mechanisms via cellular cycle as in normal tissue and as well as in cancer tissue and in inflammatory processes, Crit Rev Eukaryot Gene Expr.
3. Ponisovskiy MR (2010) Cancer metabolism and the Warburg effect as anabolic process outcomes of oncogene operation. Crit Rev Eukaryot Gene Expr 20: 325-339.
4. Ponisovskiy MR (2011) Warburg effect mechanism as the target for theoretical substantiation of a new potential cancer treatment. Crit Rev Eukaryot Gene Expr 21: 13-28.