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VALERIY REVO

**Systemic and semantic features of two concepts:
“Systemic medicine” and “Systems medicine”**

Toronto - 2018

Systemic and semantic features of the concepts: “Systemic medicine” and “Systems medicine”

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2018. - 18 p.

The low efficiency of medicine over the past century does not correspond to the resources that society expends on this institutional sphere. Costs grow faster than medical thought develops. This situation against the backdrop of a growing pandemic of chronic diseases naturally led to the substitution of technological advances by semantic innovations. We see a growing number of different “medicines”, among which “systemic medicine” and “systems medicine” demonstrate the greatest activity. However, the fashionable epithet is not able to display the systemic content of the field of practice, the subject of which is of extremely high complexity. The author in this work offers a rational solution to this problem situation

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Electronic edition for free access

ISBN 978-1-7753800-2-3

Toronto - 2018

Contents

Systemic and semantic features of the concepts: “Systemic medicine” and “Systems medicine”

Preface	page 4
1. Researchers and approaches	5
Personalities and priorities	5
Term “Systems approach” as a spell	6
2. Systemic medicine	6
Term birth	6
Dictionaries errors	7
“Alternative medicine” and K. Malevich’s “Black Square”	8
Shadows of thermodynamics in the semantic space of the “Systemic medicine”	8
3. Systems medicine	9
Semantic exercises	9
"Systems medicine" as an epistemological and ontological error	10
Eclectic triumph	10
4. Prolegomena to Future Metamedicine	11
The phenomenon of syntropic clusters	11
Binary nomenclature of diseases and systemopathy	11
"Doctor-hacker"	12
Do not fight with Nature, but look for alternatives!	12
Entropic paradox	13
The problem of finding points of bifurcation	13
Conclusion	14
Bibliography	14
Footnotes	18
About the author	18

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Qui non proficit deficit.
Lat. Who does not move forward, will fall behind.

Preface

The biology of the diseases is the subject of study and practice of classical medicine. The biology of diseases is the subject of study and practice of classical medicine. This is an interdisciplinary field, elements of which demonstrate today three negative traits. First, we observe an excessive expansion of the nomenclature' row of various “Medicines”. Secondly, the divergence of the humanities and natural sciences continues to evolve. Thirdly, there is a growing atomization of the subject areas of medicine. This phenomenon indicates a serious ontological and gnoseologically crisis in medicine. Today two "medicine" are particularly active. These are “Systemic medicine” and “Systems medicine”. Both names, as well as the names of dozens of other “medicines” are only a semantic trap. They do not represent new entities, but only confuse their authors, as well as consumers of their services. According to William of Ockham, a well-known methodological maxim recommends: “Pluralitas non est ponenda sine necessitate” (Lat.), i.e. “The multitude should not be asserted without the need ...”. This provision is today known as "Occam's Razor".

These semantic traps cause turbulence in the head at doctor-practitioners. “Systemic medicine” and “Systems medicine” are only meaning, but they have no systemic content. For example, the levels of molecules, cells, genes, DNA, RNA, proteins, metabolites, organs, etc., are not systemically complementary elements of the whole. Such a set of elements does not constitute a systemic hierarchy, that is, these elements are not a subsystems of the systemic whole. The use of these designations has a negative epistemological effect on researchers. First, according to C. Shannon [31], the inconsistency of the term with its content increases the entropy in the information system, i.e., the degree of uncertainty in the results of any study. Secondly, the use of these epithets in working with complexes that lack the necessary attributes of the system hierarchy

makes the authors believe that by default the terms “systemic” and “systematic” are synonymous. However, the systems approach has a strictly defined algorithm of actions [21]. Only such an approach allows creating system-adequate models [26]. Thus, today the terms “systems medicine” and “systemic medicine” are used incorrectly. I will try to show it at examples.

1. Researchers and approaches

Personalities and priorities

It is believed that "The theory of systems was proposed in the 1940s by the biologist Ludwig von Bertalanffy <...> He is considered the founder and principal author of the general theory of systems" [2, 28], etc. However, in reality, the founder of the general system theory is the Russian thinker, doctor, economist Alexander A. Bogdanov (real name Malinovsky, 1873-1928). His main work [3] was reprinted several times during the life of the author, including in German in Germany (1926). This book presents all the basic principles of a systems approach that we find in the work of L. von Bertalanffy [1]. Bogdanov's priority in the development of fundamental principles not only of the general theory of systems, but also of cybernetics is undeniable [10, 12]. The problem of priority will remind about itself again in the section "Systemic Medicine".

Term “Systems approach” as a spell

Today, researchers include in their publications the fashionable phrase “Systems approach”, as a spell, automatically, but this phrase remains only a declaration if it does not represent the content of this powerful scientific tool. The systemic complexity of biological objects and phenomena makes researchers increasingly disperse the subject of their research, go deeper into the infinity of analysis. I.V. Davydovsky wrote about this: “... modern medicine has gone almost entirely into analysis, synthesis is lagging behind, generalizing ideas are lagging behind, on which only a more

or less harmonious teaching about diseases can be built” [5]. H. Selye also convincingly showed (1964) the harm of such a provision for science [30]. Indeed, this situation does not allow creating holistic and system-consistent models of biological objects, which are complex systems with fuzzy properties with an extremely high level of uncertainty [22f]. Only the classical systems approach allows us to understand the principles and mechanisms of systemic coordination between the systemic and subsystem elements of the human body, with the program content of existing diseases of different phylogenetic origin [22, 23]. It was these circumstances that determined the author’s attitude to the term “Systemic medicine” [27a, 28].

2. Systemic medicine

Term birth

Systemic medicine – is a term proposed (1991) by V.V. Revo [17] for initiating attention to the systemic synthesis of the main traditional and modern directions medicine within the framework of the systemic information paradigm [15]. It was promptly picked up, various organizational structures appeared under this name, however, without any hints of systemic nature, so the author disavowed it. The following year (2002), term “systemic medicine” has been presented by Zeng B.J. [35] as an interdisciplinary research area in which a person is viewed as an integrated whole built on biochemical, physiological and ecological interactions according to the principles of genomics, behavior and the patient's environment. Here we see only an eclectic set of heterogeneous criteria, but not a systemically organized hierarchy that is linked to a single structural and functional integrity. Even A. Vesalius (1543) represented Man as an organomorphological whole [34]. But such an approach represents only the anatomical and morphological hierarchy, but not the systemic [19].

Dictionaries errors

The definition of “systemic” as applied to the living is used today mainly in two meanings. Traditionally, according to A. Vesalius (XVI century), it denotes an organism as anatomical and morphological whole, for example: Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing, and Allied Health, Seventh Edition, 2003; Farlex Partner Medical Dictionary, 2012; Dorland's Medical Dictionary for Health Consumers, 2007; Mosby's Medical Dictionary, 9th edition, 2009; Medical Dictionary for the Health Professions and Nursing, Farlex 2012; Dictionary of Podiatry and Foot Science by Jean Mooney, 2009, etc. Others dictionaries, for example, Collins Dictionary of Biology, 3rd ed. W.G. Hale, V.A. Saunders, J.P. Margham, 2005 and Gale Encyclopedia of Medicine, 2008 interpret the definition of “systemic” as the ability of medicines to spread throughout the body. Moreover, Gale Encyclopedia of Medicine states that “most medicines are systemic drugs”. In other dictionaries, for example, in the Collins Dictionary of Medicine (Robert M. Youngson 2004, 2005), the definition of “systemic” completely lost its specificity, even in an archaic sense. This dictionary offers the following meanings for this definition: “1. Pertaining to something that affects the whole body rather than one part of it. 2. Of the blood circulation supplying all parts of the body except the lungs. 3. Of a drug taken by mouth or given by injection, as distinct from a drug applied externally”. As we have seen, in all these definitions there is not even a trace of systemic attribution.

“Alternative medicine” and K. Malevich’s “Black Square”

Another area of use of the term "systemic" is the so-called "alternative medicine", which represents different directions and meanings, but has no systemic content. In this group we find dozens of “medicines”, for example: “Traditional Chinese medicine” (Chen C.F., Shum Y.C., Yang S.P., 2004); “Kampo medicine” – (this is a variation of naturopathy, note V. Revo) (Terasawa K., 2004); “Natural medicines; Complementary and Alternative Approaches to Biomedicine” (Yamada H., 2004); “Ayurvedic medicine” (Naik Gh., Priyadarsini K.I., Satav J.G., Banavalikar M.M., Sohoni D.P., Biyani M.K., Mohan H., 2003); “Traditional Chumash healing” (Adams J.D., Garcia C., 2005); “Nahuatl medicine. Synthesis of Mesoamerican and pre-Columbian medicine” (Pena

J.C., 2002); “A traditional healer's medicinal plant of the Bolivian Andes and Amazon” (Vandenbroek I., Van Damme P., Van Puyvelde L., Arrazola S., De Kimpe N., 2004); “Evid Based Complement Alternative Medicine” (Takeda K., Okomura K., 2004; Cooper E.L., 2005), et al. The term “alternative medicine” is the same semantic misunderstanding for medicine as K. Malevich’s “Black Square” for classical painting. Any model of "alternative medicine" does not even have a trace of a systems approach. In the same row is such a semantic miscarriage as valeology. The absurdity of this non-objective concept is discussed in detail in my articles and books, for example [22e].

Shadows of thermodynamics in the semantic space of the “Systemic medicine”

In some papers, for example, [11], the authors even turn to certain concepts of thermodynamics. They write: “Systemic Theory also establishes a common denominator to all sickness ...and ascertains the cause of all disease to be an entropy increase: ‘disorder augmenting within the biologically open system, stemming from ergo-informational and organizational impacts, either of external or internal nature’.... Therapeutics should then include a negentropy supply to enhance the system's energy–work capacity (E), its informational potential (I) intelligence, and finally structure and functional organization (O)”. Appeal to thermodynamics is commendable, but it must be, firstly, competent, and secondly, it is necessary to substantiate its assumptions about the negentropic action of naturopathy. Calculations of the negentropic action of drugs of naturopathy in the available literature could not be found. The authors mention a kind of “Systemic Theory “, which asserts unreasonable speculative assumptions. Where is the name of the author of this “theory”, where is the link to the material about her? These answers are not available in paper. The following statement by the authors is puzzling: “Systemic Theory postulates that Health (H) is directly proportional to the integrity of a living system's Energy (E), Bio-Intelligence (I) and Organization (O)”. This statement is unsubstantiated, because the authors do not provide confirmation. If the authors really identified such a proportion, then a number of fundamental questions are valid. First, in what form is the energy represented (quantum values, chemical bonds, etc.), in what units are they given, and in what dimensions they represented? The have authors do not give an answer to these questions. Secondly, an appeal to the category “information” also requires precise definitions from the authors. They must indicate what, in what forms, and in what

dimension this information is expressed, since the organism *Homo sapiens* L. has five levels of the systemic organization of the living beings [14]. Thirdly, the authors use the term “Organization”, but nowhere explain their understanding of this fundamental characteristic of being. Finally, it is necessary to answer the question of what “provides” the organism with this chimera and what is the biological significance (for a species, individual, etc.) of this “provision”? There is also no pithy answer to these fundamental questions in the materials of these authors. “Systemic medicine” of these authors represents another attempt to replace the scientific approach with semantics. In work [22d], several dozen of this kind of “medicine” are described. I showed that "the absence of systemically organized a signified in the listed medicines cannot be compensated for by any form representing of the signifier, most of which is expressed through science-like eclecticism." These are all only exercises in semantics that are not related to the biology of diseases, to medicine.

3. Systems medicine

Semantic exercises

Today, “systems medicine” this regular product of semantic exercises. It is represented as “an interdisciplinary field of study that looks at the systems of the human body as part of an integrated whole, incorporating biochemical, physiological, and environment interactions. Systems medicine draws on systems science and systems biology, and considers complex interactions within the human body in light of a patient's genomics, behavior and environment” [8]. Particular attention is paid here to the use of computational tools. According to the modern paradigm, it is believed: “Maintenance of health and the development of diseases are the result of complex dynamic interactions. Systems medicine is the application of systems biology approaches to medical research and medical practice. Its objective is to integrate a variety of biological/medical data at all relevant levels of organization using the power of computational and mathematical modelling, from the level of inter- and intracellular molecular networks of the cell to the levels of the interdependence of humans and their environments” [33]. In this definition of the “Systems medicine” we again see epistemological and ontological errors.

"Systems medicine" as an epistemological and ontological error

The apologists of “Systems medicine” consider it a part of “systems biology”, therefore it has the same epistemological errors, since it is built on phenomenological, but not on systemic principles. In addition, the subject of “systems medicine” believes health. But health is a conditional concept, because every organism has in its phylogenetic memory programs of diseases that reflect its phylogenetic level, i.e. the level of its systemic organization [16]. Disease is a concrete natural process. In addition, there is an obvious attempt to replace the technology of the systems approach at the use of modern technical tools and the mathematical apparatus. However, they cannot replace systems analysis by definition. Mathematics is, of course, a special language, but to describe the dynamic interactions of complex hierarchical systems, a corresponding ingression apparatus is needed (by A. Bogdanov), which is not present today.

Eclectic triumph

Publication, in which more than 60 authors [4], presents "Systems medicine" as: “An innovative integrated health system built around systems medicine and strategic partnerships is proposed to combat NCDs¹. It includes (i) understanding the social, economic, environmental, genetic determinants, as well as the molecular and cellular mechanisms underlying NCDs; (ii) primary care and practice-based interprofessional collaboration; (iii) carefully phenotyped patients; (iv) development of unbiased and accurate biomarkers for comorbidities, severity and follow up of patients; (v) socio-economic science; (vi) development of guidelines; (vii) training; and (viii) policy decisions”. We can agree that a certain systematic approach is assumed here, but there is not even a trace of the classical systems approach, which is presented in detail in the available literature [6, 13, 24]. This maxim cannot be accepted. Firstly, the integration that the authors represent is not productive, because it is unsystemically. Secondly, “the molecular and cellular mechanisms” do not underlie NCDs. They only reflect some phenomena at process deploying a disease program, but do not form the basis of the disease. Thirdly, any disease is “an attribute of the quality of life” [18], since it represents an immanent element of being.

4. Prolegomena to Future Metamedicine

¹ NCD – is an abbreviation of Non-Communicable – or chronic diseases.

The phenomenon of syntropic clusters

The situation is complicated by the multiplicity of simultaneously ongoing diseases, which today are represented as “comorbidity”. But this is a generalized term, while the multiplicity of diseases in each person represents the phenomenon of “syntropic clusters”. Revo V.V. suggested (2009) this name for “a regular sustainable group combination of symptoms (in symptom complexes, syndromes) and (or) nosological forms”. He showed that by the age of 40-50, each person has 5 or more simultaneously developing chronic diseases that are at different stages of the development process. At the same time, it is necessary to consider the different phylogenetic origin of the diseases programs in these syntropic clusters [15, 25, 25a, 25b].

Binary nomenclature of diseases and systemopathy

V. Revo divided (1986) the systemic metamorphosis of the living things, i.e., phylogenesis into five stages [14]. Each stage has its own basic information mechanism, which determines the systemic feature of the disease programs of this stage. The author proposed to call the diseases of each stage of phylogenesis the general term "systemopathies" [22a]. He developed a binary nomenclature of diseases in which the first word represents systemopathy, respectively, proteosis, genesis, etc., and the second word is the traditional name for the nosological form [18, 23]. Syndromes and symptom complexes are absent in this classification, since they are out-systemic semantic constructions. The current nomenclature of diseases has many critical flaws. I will note only three of them. First, it is based on the archaic organo-morphological classification, which does not consider the programmatic nature of chronic diseases. Secondly, it is extremely cumbersome, especially for practice, because it divides the disease into almost 20 classes and more than 500 rubrics. Third, it implies a multiplicity of assessments, which is unacceptable for any science.

"Doctor-hacker"

Each stage has its own basic information mechanism, which determines the systemic feature of the disease programs of this stage. Disease programs that appeared at the first stage of systemic metamorphosis [27b] (phylogenesis) were built on the basis of polypeptides. According to the isomorphism principle of various organizational structures (A.A. Bogdanov, 1913-1922), the programs of diseases that appeared at the next stages of phylogenesis also had a protein basis, but they also received their own specific code. The codes of programs of diseases of the second stage of phylogenesis is a language of genetics. The codes of programs of diseases of the third stage of phylogenesis represent the language of interneuron communication, etc. These circumstances will force medicine to prepare doctors of a new formation who will be able to understand and manage the codes of programs of diseases. The author suggested (2004) to call of such doctors a “doctor-hacker” [22c]. The codes of the programs of diseases of the fifth, that is, the modern stage of phylogenesis, are of a social nature. Therefore, according to the principle of adequate modeling of A. Turing, as well as K. Gödel's incompleteness theorems, these codes must have a transcendental character.

Do not fight with Nature, but look for alternatives!

Finally, it should be noted that the struggle with the disease is ignorance, since it is a struggle with the natural process, with Nature itself. The suppression of symptoms on the background of polypragmasy naturally leads to the further development of the pandemic of chronic diseases, as the disease programs continue to unfold. Here one should use a systemically adequate alternative, as it was done by (1750-1752) B. Franklin. How Franklin was thinking, who had a systems mind thinking? Lightning is a phenomenon of Nature, and the phenomenon of the physical level, because it is atmospheric electricity. He proposed an economical solution to the problem. It was an alternative of the same physical nature in the form of a lightning rod or (lightning rod) [7]. Nature spends less energy, and the thunderstorm now has ceased to be fatally dangerous.

Entropic paradox

Paradoxically, chronic diseases have a negentropic effect [22b]. V. Revo showed (2004) that the deploy of the program of any chronic disease increases the diversity in the body [26]. This

circumstance reduces the entropy in it, which follows from the second law of thermodynamics. Therefore, the activation of a chronic disease program is a good thing for it. However, the disease can cause exhaustion of adaptive possibilities. In this case, the disorder increases dramatically. This can increase the entropy to the maximum level. According to E. Schrödinger (1944), "... dangerous state of maximum entropy, which is of death" [32]. This is how the dialectic nature of chronic diseases manifests itself. Ontologically, they are an obvious evil, but epistemologically – they can be useful because they have a negentropic effect.

The problem of finding points of bifurcation

Any chronic disease can have several bifurcation points, of which there can be only two exits. These can be remissions at any stage of the development of a disease program, or death will occur when the maximum entropy level is reached. A chronic disease cannot end with a healing by definition. An acute disease has only one bifurcation point, from which there can also be two outcomes. This may be a healing, but there may be death at the maximum value of entropy in the organism. The physician should be able to control the level of entropy of each organism. Like stress, the process of unfolding a chronic disease program has a dialectical character. Thus, the activation of the disease program increases the diversity in the body. However, the development of the disease can lead to a depletion of adaptive resources. Therefore, a total "struggle" with symptoms can lead to a dramatical outcome, since many of them provide a negentropic effect [22b]. The formulary principle of the organization of the medical process does not consider this circumstance. Increased body temperature, pain and some other nonspecific symptoms exhibit a negentropic effect. Therefore, the level of mediators that cause these symptoms may indicate their negentropic power. For example, the level of endogenous pyrogens, which include the mediator of inflammation and immunity - interleukin-1, the level of algogenic mediators: histamine, kinins, etc. The physiological mechanism of similar symptoms G. Selye presented (1936) as the "general adaptation syndrome" [29]. A new level of development of medical thought is expressed in the concept of systemic metamorphosis of living beings [14, 22, 28]. It postulates the disease software content and explains the entropy effects that accompany their manifestations.

Conclusion

In the context of the presented material, medicine is a field of science and practice of managing programs of diseases and their manifestations at all levels of the systemic organization of the living things, including man. Therefore, the epithets "systemic" and "systems" from the name of medicine should be excluded as redundant, since it is an interdisciplinary field of activity which systemic by definition. At the same time, forecasting, diagnosis, treatment, prevention and modeling of diseases should be performed using the principles and systems analysis tools. The subject matter with which medicine deals is a specific disease in the systemic structure of a given synthropic cluster. The multiplicity of disease programs that develop simultaneously in the body, having a different phylogenetic, is a serious problem for medicine. She is still far from her decision. In addition, the man himself is a system with fuzzy properties with an extremely high level of uncertainty [20]. As wrote J.W. von Goethe (1749-1832): "... a limited living being is a part, ... of infinity, or rather, there is something infinite in it. It is best to say that we cannot fully embrace the notion of existence and perfection of the most limited living being and must therefore declare it infinite, like that colossal whole that encompasses all of being" [9]. This systemic complexity of the subject requires physicians to use system analysis tools. But such an approach requires a change in the archaic paradigm. However, modern medical education does not provide this.

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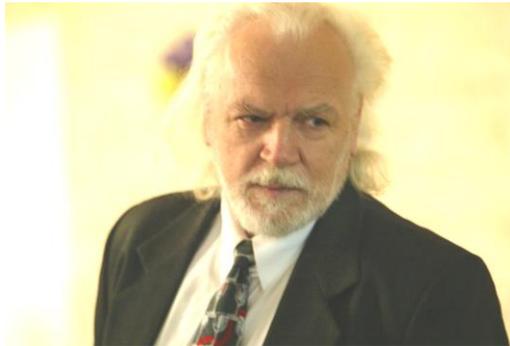
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Footnotes:

The author has declared that no competing interests exist.

The author received no something funding for this book.

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