

Editor's Letter

Dear Authors, Readers,

In recent years, researchers have discovered many complex physical, biological and social systems for the formation, functioning and development of characteristics and principles that are important in almost all areas. Chaos and Complexity studies are a new science that looks holistic to the world. In many universities and research institutes, there is a need to develop new research methods and technologies allowing both a wider and deeper integral look at our complex world. We can see the efforts of scientists for understanding the complexity of many phenomena around us, and we need to use adequate tools and develop new applications.

Perhaps, we all agree that one of the most complex creatures of our world is a human being with his/her existence and social problems (education, health, etc.). So the necessity of a new look at the medical sciences is obvious; when we want to heal a simple disease, it is not enough only to use statistical methods in medicine or a detailed genetic research. One of the most important properties of complex systems is evolution, which runs only in case of a positive interaction between the system elements. The human organism is a complex system or, more accurately, it is a complex system of complex systems. Biological systems are complex systems; specifically, they are systems that are spatially and temporally complex, built from a dynamic web of interconnected feedback loops marked by interdependence, pleiotropy and redundancy. Complex systems have properties that cannot be wholly understood by understanding the parts of the system. The properties of the system are distinct from the properties of the parts, and they depend on the integrity of the whole; the systemic properties vanish when the system breaks apart, whereas the properties of the parts are maintained. Illness, which presents with varying severity, stability and duration, represents a systemic functional alteration in the human organism. Current evidence suggests that the assessment of the complexity of cardiovascular regulation could provide important information about the underlying regulatory mechanisms. In particular, it has been shown that a modification of complexity indices, resulting from a depressed organ function, a loss of interaction among subsystems, an overwhelming action of a subsystem over others and an impairment of regulatory mechanisms, are clear hallmarks of a pathological situation. In summary, the classical methods of research provide the opportunity to record changes in physiological parameters, but the amount of information received, and its significance greatly depend on data analysis methods. New methods for analyzing the research results, i.e. a new research methodology, extends the ability of physiologists to understand the new features of the body function not disclosed so far.

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