

## CARDIOPHYSICS AS A REVISION OF BIOPHYSICS OF THE HEART

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As it has been noted previously [1, 2], after replacing the old notion of the special “living substance”, the physiological language has entirely dominated among biologists and medical professionals for the whole 20th century, but all modern physiology is per se a manifestation of the mechanistic approach in biology.

The branch of biology that is denoted in the scientific literature as “biophysics of the heart” was actively developed since the mid 20th century, and in much it was created by "the 1st wave" of physicists, who tried to consider biological objects as relatively simple systems. It resulted in many erroneous conclusions, and some of those had fatal consequences. For example, it concerns the class I antiarrhythmic agents (sodium channel blockers), inasmuch as it was found in more recent studies that their use increases mortality among patients. Such an oversimplification was criticized by a number of scientists (see [3] and references in [2]).

In addition, it has been demonstrated in many studies at the beginning of the 21st century, that the biological objects belong to the complex systems — that is, their behavior is chaotic and not determinate in the Newtonian sense. Those who worked in the “biophysics of the heart” paradigm rarely took this into account.

Now the cardiovascular physics (cardiophysics) must carefully revise all the results previously obtained by the 1st wave of physicists who have been developing the “biophysics of the heart.”

There is a very wide range of scientific problems that require such a revision. For example, a more detailed study of the parameter space of a number of widely used models of myocardium is required. As part of this vast task, it is necessary to investigate in detail the phenomena of bifurcation memory, which were discovered lately [4, 1].

The importance of the systematic approach was recently discussed in [1, 2], where the conception of “auto-wave function of the heart” was introduced as well as the fundamental differences between the terms “cardiac activity” and “the action of the heart” were discussed.

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### References:

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