

APPLICATION OF MATHEMATICAL MODELLING TO FIND NEW APPROACHES TO DRUG DEVELOPMENT

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Introduction. Creating innovative medicines is currently very challenging and risky area of investment. A significant proportion of such projects stops at different phases of clinical trials or does not pass the criteria to regulatory authorities for new drugs. One of the main causes of this negative trend, experts suppose the increase in the number of failures of clinical trials. In this regard, the increasingly debated issue of the productivity crisis in the pharmaceutical industry and search for new approaches to drug development. One of the most promising scientific techniques that can help in solving the problems posed above is mathematical modeling.

Aim. Conduct a theoretical analysis of the application of mathematical modelling to find new approaches to drug development.

Materials and methods. To solve this problem were used methods of theoretical research (the study and analysis of scientific literature to determine the state of development and the theoretical underpinnings of the study).

The results and discussion. As is known, mathematical modeling is one of the most promising research methods that can help to shed light on the search for more predictive biomarkers, clinical parameters and optimal dose, over-designed clinical trials, the use of new technologies for the analysis of their results, and integrate the maximum amount of information when making key decisions. In connection with the development and improvement of the existing software and develop mathematical models become more complex, which allowed to significantly expand the range of their application. Now we use such mathematical modeling as biological, pharmacological and statistical modeling. The use of mathematical modeling allows for the analysis of clinical data on a qualitatively new level and propose the optimal design for clinical trials. We should also mention the contribution of simulation to the register reading to the kids when the results of the simulation times were recorded as the main reasons for making regulatory decisions.

Conclusions. Thus, it is safe to say that mathematical modeling is one of the most promising methods to increase the efficiency of the process of creating new drugs. In fact, today, are developed a number of innovative mathematical methods to improve decision-making at the early stages of the research, thereby reducing the risk of failures of clinical programs within evidence-based phases of the research.