GREAT PERSONALITIES IN CLASSIC AND MODERN GENETICS AND TOOLS FOR PROCESSING GENETIC DATA

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Introduction. Genetics is a rather young science, but it plays a major role in modern biology. Many persons contributed to this field during the last decades. These great scientists are known by their prominent findings, which are the base of many modern medical applications. Except this one should mention about scientific base of all genetic data processing, namely mathematics and its role in calculating risks etc.

Aim. The aim of the study was the search of information about historical personalities, which left prints in genetics.

Materials and methods. Scientific literature and publications of last years were used for analysis.

Results and discussion. Gregor Mendel is considered to be a father of genetics. By both his professors at University and his colleagues at the monastery, Mendel was inspired to study variance in plants. Mendel often wondered how plants obtained atypical characteristics. He grew their progeny side by side to see if there would be any approximation of the traits passed on to the next generation. He found that the plants' respective offspring retained the essential traits of the parents, and therefore were not influenced by the environment. He saw that the traits were inherited in certain numerical ratios. He then came up with the idea of dominance and segregation of genes and set out to test it in peas. It took seven years to cross and score the plants to the thousand to prove the laws of inheritance!

Charles Darwin was another great scientist in theory of evolution which is related to genetics. He explained the theory of evolution by natural selection. He believed that all of life on earth had descended from a common ancestor. Darwin’s Evidence were similarity of related species, Darwin noticed variations in related species living in different locations.

Erwin Chargaff is always very famous molecular geneticist. He is known for Chargaff’s rules regarding DNA structure. Chargaff is known mainly for discovering two rules related to the DNA structure and its double helix formation. He found that certain substances within the DNA structure are equal to other substances. He also found that the DNA composition varies from one species to another.

Mathematical and theoretical biology is an interdisciplinary scientific research field with a range of applications in biology, biotechnology, and medicine. The field is also called mathematical biology or biomathematics to stress the mathematical side, or theoretical biology to stress the biological side.

Mathematical biology aims at the mathematical representation, treatment and modeling of biological processes, using a variety of applied mathematical techniques and tools. It has both theoretical and practical applications in biological, biomedical and biotechnology research.

For example, in cell biology, protein interactions are often represented as "cartoon" models, which, although easy to visualize, do not accurately describe the systems studied. This requires precise mathematical models. Describing systems in a quantitative manner means their behavior can be better simulated, and hence properties can be predicted that might not be evident to the experimenter.

Applying mathematics to biology has a long history, but only recently has there been an explosion of interest in the field. Some reasons for this include ; The explosion of data-rich information sets, due to the genomics revolution, which are difficult to understand without the use of analytical tools.

Recent development of mathematical tools such as chaos theory to help understand complex, non-linear mechanisms in biology.An increase in computing power, which facilitates calculations and simulations not previously possible. An increasing interest in in silico experimentation due to ethical considerations, risk, unreliability and other complications involved in human and animal research.

Mathematics can probably continue to help Biology (even at an increasing pace) by focusing, above all, on modelling, computing power and statistical validation. In this way, outstanding scientific results can be obtained, that would eventually contribute to Biology achievements.

This is what happened with what is usually considered as the most significant biological achievement of the XX Century, identifying the structure of DNA. This work was essentially done by Physicists, Chemists and Crystallographers, using the techniques with which they were familiar.

Conclusions. Based on our search about great scientists we traced some steps of genetics evolution itself, and we understood that existence and progression of genetics is impossible without supporting by other interdisciplinary areas.