

Reconstruction of the gene networks of human neurotransmitter systems

Ivanov R.A.^{1,2*}, Klimenko A.I.^{1,2}, Savostyanov A.N.^{1,2,3}, Lashin S.A.^{1,2}

¹ *Institute of Cytology and Genetics, SB RAS, Novosibirsk, Russia*

² *Novosibirsk State University, Novosibirsk, Russia*

³ *Institute of Physiology and Basic Medicine, Novosibirsk, Russia*

* *e-mail: ivanovromanart@bionet.nsc.ru*

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Motivation and Aim: The main interest of a modern neuroscience is aimed at studying the biological bases of individual differences in human behavior. The medical relevance of this topic is due to the fact that development of a number of neurological and psychiatric diseases, as well as the characteristics of their occurrence, are directly related to the psychological characteristics of individuals [1]. Many papers on the mechanisms of regulation of individual behavior indicate the important role of neurotransmitter systems in the mechanisms of its regulation [2]. Today gene network approaches are powerful tools for studying genes associated with human traits.

Methods and Algorithms: In our research we focused on studying the genetics factors of anxiety behavior and depression. Selection of gene sets was formed based on an analysis of literature data, as well as a number of databases. Gene networks were reconstructed using Cytoscape based on interaction data extracted from GeneMANIA and StringDB.

Results: Using the methods mentioned earlier, we compiled a set of genes associated with anxiety behavior and set of genes associated with mental disorders for which the difference in phenotype manifestation among different human populations was shown. Based on this sets of genes, the gene networks were reconstructed.

Conclusion: Analysis of the gene networks is an effective tool for a comprehensive theoretical study of mechanisms of regulation of human behavior and it can be used to search for and prioritize genes associated with diseases.

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References

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