

Gene expression related to aggressive behavior on rat model

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Motivation and Aim: Aim of this study was to study the mechanisms of hereditary-mediated aggressive behavior on laboratory animal models based on transcriptome profiling. To establish mechanisms of aggression at the molecular level, we used unique experimental model of grey rats (*Rattus norvegicus*) developed at the ICG SB RAS for more than 80 generations.

Methods and Algorithms: Rats have been subjected to selection in two directions – tolerant behavior towards human and aggressive behavior. We estimated the gene expression in rat brain areas based on RNA-seq data [1] and verification it by RT-PCR.

Results: We focused on genes presumably associated with the manifestation of aggressive behavior: *Gad2*, *Drd2*, *Cacna1b*, *Egr1*, *Gbrd*, *Pomc*, *Gria2*, *Mapk1*, *Syn1*, *Cacna2d3*, *Nos1*, *Oxt*. RNA-profiling experiments revealed the lists of differentially expressed genes in the brain samples.

Conclusion: A set of synapse associated genes have statistically significant deviation in splicing depending on brain regions and behavioral models (tolerant/aggressive) of rats. The genetic factors exert a strong influence to the phenotypic variation of aggressive behavior in populations.

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References

1. Babenko V.N. et al. (2016) Analysis of differential gene expression by RNA-seq data in brain areas of laboratory animals. *Journal of Integrative bioinformatics*. 13(4):292.