

Genes of urbanization in the brain of aggressive and domesticated rats and mice under agonistic interactions

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Motivation and Aim: The trend of the city development is the fragmentation of natural biotopes by divergent boundaries, i.e. without border effect or ecotone: roads, industrial and residential zone etc. Any biotope transformed first into a "continent with islands", then to the archipelago with growing "channels" (divergent boundaries) and unpredictably changing "islands". Therefore urbophobes – the species with high sensitivity to the environmental (wildlife disturbance, neophobia, etc.) and social (intrapopulation, density-dependent, etc. interaction) stressors (ES and SS) – can survive in the city only permanently retreating to the "continent", i.e. the urban periphery. ES forbids them to cross "channels" and use the urban abundance of resources and SS blocks reproduction on the "islands" [1]. Urbanization – the loss of sensitivity to ES and SS – allows species to survive by the migration/quest of the "islands". According to studies on birds, an urbanization is a very rapid evolutionary process that occurs as a parallelism in different species and areas. Its candidate genes are *SERT*, *DRD4*, *ADCYAP1* [2] whose expression in the brains of rats selected by aggressive and domesticated behavior [3] and mice with repeated experience of aggression or social defeats as a result of intermale aggression [4] we have studied.

Methods and Algorithms: We utilized previously obtained RNA-seq data [3, 4].

Results: Only for *SERT* increased expression was found in the ventral tegmental region of the brain for mice of both groups (that agrees with [4]), but not for any rats.

Conclusion: The model of domesticated rats is adequate to ES-tolerant natural population and model of intermale aggression to SS-sensitive one. But urbophiles are SS- but not ES-tolerant. They are neophobic, but this neophobia quickly fades without reinforcement and/or varies depending on the population structure in the formation/maintenance of which in any density they invest [1, 2]. It remains to be assumed that the nonspecific stress-restriction by serotonin, the marker of which is *SERT*, is important for urbanization, but both models are too simple for it.

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