
LONG-TERM IMPACT OF A SEMI-NATURALISTIC LIVING ENVIRONMENT ON RODENT ANXIETY AND COGNITIVE ABILITIES

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Résumé

Physical and social features of our living environment have been known for a long time to influence brain function. Yet, preclinical neuroscience studies are almost exclusively done in rodents raised in standard laboratory conditions with impoverished environment, limited social interactions, unlimited food access, and reduced living space. Recently, the need for a more naturalistic approach has emerged in the field of cognitive neuroscience. Rather than trying to reduce inter-individual variability it appears essential to identify and understand its source and how it relates to experimental outcomes. This requires a housing environment that allows animals to express most of their behavioral repertoire.

As a first step toward this goal, we developed a new complex living environment composed of many interconnected modules in 3 dimensions. This particularly vast living environment preserves the wide range of exploratory and territory appropriation behaviors, the active foraging, and the social hierarchy specific to this species. A first study compared a group of ten rats raised two by two in standard cages to a group of ten rats housed together in this new semi naturalistic environment. A set of physiological (food intake, weight, stress) and behavioral (social interactions and hierarchy) markers was monitored over several months. In parallel, cognitive abilities have been assessed using a variety of novel object recognition paradigms (objects, odors, in place or in context). Spatial memory performances were also evaluated using the Morris water maze and double-H maze tests. This study was first performed on a group of males and then replicated on females. First data showed that animals raised in the semi-naturalistic environment exhibited a lower level of anxiety and better cognitive performances, especially in spatial memory tests. They also exhibited more efficient exploration strategies in novel object recognition. Individual analyses are still in progress. Our future goal is to characterize individual traits based on physiological and behavioral longitudinal measurements and to study the extent to which they are predictive of individual cognitive strategies and capacities.

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