

The environment in which we live (and in which animals now live) have been transformed by man and is far from what is commonly known as the natural environment. Organisms (including humans) have had to adapt to such different conditions, and this adaptation, apart from the biological changes, led to numerous modifications in the field of behavior. In general, these changes are called the domestication syndrome. However, individuals differ in the level of adaptation to the transformed environment, and thus they differ in ways to cope with the challenges it poses. One of such challenges, faced by humans and animals, is a contact with novelty (an unfamiliar object or situation). The reaction to such an event can be active exploration of a new place or object, but can also be fear, avoidance, escape, etc. It seems that the response to novelty is associated, to a large extent, with mechanisms involved in behavior control. These mechanisms are developed in the course of evolution, but also during the development of individuals.

Because studying evolutionary changes in humans is methodologically difficult, it is very useful to conduct research on animals. An excellent model to study changes in behavior (as well as the biological changes) occurring in different environments (with varying degrees of human intervention in evolutionary processes) is comparison of wild and domesticated animals. The process of domestication involves placing the animal in the specific breeding conditions and reproducing it in a controlled and purposeful way. Impoverished breeding environment (life in a pen is by far less challenging, than life in the nature) and control over when and with which partner an animal should have offspring, after many generations, lead to produce animals very different from their wild counterparts. For instance, internal organs change their size (brain becomes smaller), but also behavior is altered. Biological and psychological modifications that have occurred in the process of domestication are very important, because, to a large extent, also apply to humans. The researchers say that environment transformed by human caused domestication syndrome, not only in animals but also affected the last stage of human evolution.

A frequent subject of research on the behavior is the rat (*Rattus norvegicus*). The rats have been domesticated into a lab rat, but still very many wild animals of this species live in the wild and are easily accessible for comparative research. A colony of the wild rat (WWCPS rats) is currently breeding in our laboratory at Institute of Psychology PAS. These animals are at a very early stage of domestication (up to the third generation in the laboratory). They are the perfect subject for study of behavior and its mechanisms, especially in the context of changes taking place in the process of evolution, such as domestication.

In the project, in addition to the comparison of wild and laboratory animals in terms of the reaction to novelty, a manipulation involving breeding rats in two different conditions will be introduced. Half of the rats will be bred under standard conditions (typical for laboratory animals), while the other half will be bred in enriched environment (larger living space, more objects in the environment, more individuals in the group etc.). After a period of breeding a series of tests will be conducted. The first test will be to examine the differences in the exploratory behavior between experimental groups. For this purpose, the purpose-built box used in previous studies, will be employed. The second test (Open field) will be used for a qualitative and quantitative measure of general locomotory activity, willingness to explore, and emotionality in rodents. The modified version with refuge allows to assess space learning ability as well. The third task (Morris water maze) will provide information about spatial learning ability as well as about procedural and working memory in animals.

The presented project combines analysis of significant and complex issue such as the process of domestication with research on the response to novelty and exploratory behavior. Comparison of the two groups of rats, wild and laboratory, subjected to enriched environment, allows the reference of the results to evolutionary processes occurring during domestication, and also to processes occurring during last stages of the humane evolution.

The data obtained on the basis of the analysis of the behavior of wild rats, may to some extent be extrapolated to other mammals including humans. Particularly important to investigate is the role of the enriched environment in the development and regulation of behavior. The widely accepted and popularized notion of the positive role of environmental enrichment on the development of behavior, though legitimate, seems to be too general. There are grounds to believe that environmental enrichment can affect differently organisms with different histories of individual and species development. Knowing the specifics of the impact of environmental enrichment on tested animals may become the basis for the formulation of interesting hypotheses relating to human development.