Wild genius - domestic fool?
Spatial learning abilities of *Cavia aperea* and *Cavia aperea* f. *porcellus*

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Domestic animals and their wild relatives differ in a wide variety of aspects. The process of domestication of guinea pigs (*Cavia aperea* f. *porcellus*), starting 3000 to 6000 years ago, led to many changes in anatomy, physiology and behaviour of the animals compared to their wild ancestor *Cavia aperea*. Apart from the obvious changes in body size, fur colour or vocalization, one characteristic domestic trait is a reduction in brain size, which in guinea pigs accounts for about 13% in relation to body size. This might lead to lower learning abilities in domestic species compared to their wild relatives.

This study explored potential differences in learning abilities of wild and domestic guinea pigs. Therefore, animals of both forms and sexes were tested in the Morris water maze. For the wild guinea pigs, this was the first time that this spatial learning paradigm was applied. Thus, a second aim of this study was to establish this behavioural test for this species.

The maze consisted of a pool of 160 centimetres in diameter and a platform of 20 centimetres in diameter made of hyaline acrylic glass. The platform was invisible reaching two centimetres below the water surface. In the test version used, each animal was subjected to ten swimming trials within five consecutive days. In each trial of this acquisition phase the animal had a maximum time of 45 seconds to reach the hidden platform. If it did not find the platform to escape from the water, the guinea pig was put manually on it and had to stay there for 15 seconds. Between the two trials of each day the guinea pig had a recovery time of five minutes in their home cages so that their fur could dry.

Learning curves concerning distance swum as well as latency to reach the platform were analyzed. In addition, the integrals below the learning curves were compared between wild and domestic form. Subsequently, in a probe trial of 60 seconds duration without the platform present, the time the animals stayed in the correct quadrant served as an additional measure of learning success.

Significant differences in spatial learning were found between domestic and wild guinea pigs. Although all animals showed spatial learning in the Morris water maze, male and female domestic guinea pigs proved to be better learners than their wild relatives: On average, they swam a shorter distance and had also a shorter latency to reach the hidden platform. Furthermore, in the probe trial, they also spent significantly more time in the correct quadrant of the water basin.

These results demonstrate that the applied test version of the Morris water maze is a useful tool to assess spatial learning in domestic guinea pigs, and in wild guinea pigs as well. The comparatively lower learning success of the wild species might also be a result of a reduced ability to cope with the man-made environment and handling procedure. Contrary to expectations derived from the lower brain size, this study shows that the domestic form of the guinea pig does not at all perform worse than its wild ancestor. Hence, artificial selection and breeding did not lead to degenerated domestic animals with impaired cognitive abilities.