Abstract

The process of domestication of the grey wolf (*Canis lupus*) resulted in more than 350 dog breeds attesting for an immense phenotypic plasticity of this species, reflected in the enormous variation of sizes, shapes and behavioural profiles of today´s dogs. The differences in body size can be 50-fold, which exceeds the body size variation of all recent canids. The differences in brain size are significantly smaller, only about 2.5-fold. It is also well known that, compared to their wolf ancestor, dogs, and especially small breeds, have reduced brain size. However, up till now, no comparative data about neuron numbers in different dog breeds are available. In this thesis, I use the isotropic fractionator to assess number of neurons and glial cells in eight dog breeds and three species of wild canids. When compared across dog breeds analysed, the differences in neuron numbers are lower than the differences in brain size – it seems that small breeds compensate for smaller brains with higher neuronal density. Interestingly, miniaturization of dog breeds is associated with brain size reduction that is smaller than expected from brain-body scaling reported for wild canids and seems to be accompanied by compensatory increase of neuronal density. Thus, brains of small dogs are bigger and harbour more neurons than brains of equivalently sized wild canids. These results challenge the traditional view that domestication have a strong negative effect on brain size and processing capacity.

Keywords: number of neurons, brain size, domestication, evolution, miniaturization, canids.