

# ADAPTIVE RADIATION OF THE BRAIN OF THE CANINAE (CARNIVORA: CANIDAE)

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The increase in size of the frontal pole of the Canine brain is characterized by the development of the preoreal gyrus on the prefrontal cortex and the expansion of the sigmoid gyri on the sensory motor region (Radinsky, 1973). This increase took mainly place during the Pliocene, a time during which the Caninae entered a rapid phase of cladogenesis (Wang *et al.*, 1999).

As the fossil record reveals, the development of the preoreal gyrus took place in the Lower Pliocene. This is why the *Vulpes* spp. by definition have a small preoreal gyrus, as the *Vulpes* lineage branched off already earlier (in the Miocene).

The expansion of the sigmoid gyri continued during the entire Pliocene, also after the branching of the South American and the *Eucyon-Canis* lineages. In this way, during the continuing radiation of the Caninae, different sulcal patterns developed on the sensory motor region. By the Middle Pleistocene, the Caninae brain attained its present condition.

The different sulcal patterns found on the brains of the living wild Caninae can be explained by the fact that they developed during different phases of the above described radiation, based on adaptations to new environments. The different Caninae brain morphologies clearly are a result of this adaptive radiation.

Radinsky, L.B. (1973). *Evolution of the Canid Brain. Brain, Behaviour Evolution*. 7:169-202.  
Wang, X., R.H. Tedford & B.E. Taylor (1999) *Phylogenetic systematics of the Borophaginae (Carnivora: Canidae)*. *Bulletin of the American Museum of Natural History* 243: 1-391.