Abstract

Vertebrates show dramatic interspecific variation in the size of their brains. The complexity of brains is considered to be the key factor of evolutionary success in Vertebrates, and therefore an evolutionary trend towards increasing brain size and coplexity is assumed. Large and complex brains evolved independently in birds and mammals. Birds have brains that are comparable in their relative size to the brains of mammals. However, in stark contrast to mammals, there is no general trend towards increase of brain size in birds. Relatively large brains have evolved independently in many avian lineages. Highly encephalised orders are parrots (Psittaciformes), woodpeckers and relatives (Piciformes), hornbills, hoopoe and wood hoopoes (Bucerotiformes), owls (Strigiformes), storks (Ciconiiformes) and several families of songbirds (Passeriformes), mainly bowerbirds (Ptilorhynchidae) and corvids (Corvidae). Other highly encephalized groups are non-parasitic cuckoos (genus *Centropus*, *Phaenicophaeus* and *Coua)* and family Diomeidea and genus *Pelecanus* belonging to the clade water birds. Less encephalized groups include the basal lineages such as paleognaths and fowl (Galloanserae), and also pigeons (Columbiformes) and swifts, treeswifts and hummingbirds (Apodiformes). We suggest that this mosaic evolution is result of simultaneous acting of selective pressures on cognitive enhancement and constraints on brain size, which may stem from the constraints on body size imposed by active flight. In this context, it will be most interesting to learn whether increased encephalization goes hand in hand with increased neuronal densities.

Keywords: Brain size, encephalization, body size, phylogenetic analysis, ancestral states