

2. Abstract

Avian brain has traditionally been looked upon as a small, simple and almost entirely composed of basal ganglia and subserving exclusively instinctive behavior. In stark contrast to these obsolete notions, recent evidence demonstrates that, despite a lack of layered neocortex, extensive regions of the avian cerebrum are homologous to pallial components of the mammalian brain, conform to the same organizational principles and play similar roles in higher cognitive functions. Indeed, behavioural studies have shown that some birds have cognitive abilities that match or surpass those of mammals, most notably corvids and parrots rivalling the great apes in many cognitive domains. While these highly encephalized birds are often utilized as models in behavioural studies addressing avian cognitive capacities, less encephalized birds receive only scant attention. The gallinaceous birds (Galliformes), which together with the anseriform birds (Anseriformes) represent a sister group of Neoaves and the most basal clade of Neognathae, possess relatively small brains. Their cerebrotypes is characterized by small forebrain, small nidopallium and large brain stem. Brain of gallinaceous birds is significantly lateralized. Brains of domesticated galliforms are significantly reduced in comparison to brain of their wild relatives. Behavioral studies have demonstrated that chicken are capable to count up to three, learn to avoid distasteful food by observation of aversive reactions of their conspecifics, perceive and recognize partly occluded objects (shape completion) and reach 4th level Piagetian scale of object permanence. Because most cognitive tests utilized domestic chicken as a model and because many domains (e.g., delayed gratification, future planning, meta-cognition) remain untested in galliforms, future experiments exploring the cognitive abilities in adults of wild gallinaceous birds are needed to assess reliably their cognitive capacities.

Key words

Gallinaceous birds, domestic chicken, avian brain, functional columns, cognitive abilities, object permanence, numerical competence, aversion learning, amodal perception.