

Neuropsychology of fish behavior and cognition

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Comparative data reveals that every vertebrate group share highly sophisticated cognitive abilities, supported by a common, basic pattern of neuroanatomical and functional organization. In this talk I will focus on the behavioral and neurophysiological work done in our lab which reveals that different memory systems in teleost fish closely parallel those of mammals and other vertebrates, including humans. Thus, the teleost fish cerebellum, similar to the cerebellum of humans and other mammals, is involved in classical conditioning of simple motor responses, in spatial cognition and in emotional-fear memory. The lateral telencephalic pallium, considered homologous to the hippocampus of mammals and birds, also plays an essential role in spatial cognition, temporal processing, and trace conditioning. The medial telencephalic pallium, proposed as homologous to the mammalian pallial amygdala is similarly involved in different emotional memory processes as avoidance conditioning and taste aversion learning, whereas it is not necessary for spatial memory and temporal stimulus processing. These data show a remarkable likeness between mammals and teleost fish concerning the role of different brain centers in cognitive processes, suggesting that these separate memory systems appeared early during the evolution of vertebrates and were conserved through phylogenesis.