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THE CHIMPANZEE BRAIN

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Historically, research on chimpanzee cognition has typically focused on comparative behavioral and evolutionary perspectives. However, recent translation of advanced, noninvasive techniques typically used to study human brain anatomy and function, such as electroencephalography (EEG), positron emission tomography (PET), magnetic resonance imaging (MRI), diffusion tensor imaging (DTI), and ultrasound scanning have now enabled researchers to explore the neural correlates underlying perceptual, motor and cognitive processing in this species. The aim of this symposium is to present the most recent advances in our understanding of the chimpanzee brain in terms of both its structure (DTI, MRI, and ultrasonography) and function (PET and EEG). Each of these techniques has limitations and advantages in understanding comparative cognition. Structural studies using DTI have compared the connectivity of the mirror neuron system in monkeys, chimpanzees demonstrating interesting similarities and differences with humans. Functional studies using EEG have revealed the timing of neural processes when chimpanzees perceived auditory and visual social stimuli. Functional neuroimaging (PET) has localized regions of face-selective neural activity in chimpanzees and monkeys. Using both MRI and ultrasonography, researchers have investigated early brain development in chimpanzees and finally, combining MRI and PET, researchers have mapped the cortical representation of the hand and handedness in chimpanzees. Collectively, these studies show both similarities and differences in both the structure and function of the chimpanzee brain compared to other species and provide an exciting new trajectory for future studies on comparative cognition in apes.

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