

CORTICAL REPRESENTATION OF LATERALIZED GRASPING IN CHIMPANZEES (PAN TROGLODYTES): A COMBINED MRI AND PET STUDY

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Studies in the human brain have identified a region of the precentral gyrus where the hand is located in the motor strip referred to as the KNOB. The KNOB can be identified in all great apes but is not evident in Old or New World monkeys. Asymmetries in the volume of the KNOB are associated with handedness in humans and chimpanzees. However, whether the KNOB represents the “hand” region in the motor cortex is not clear from extant studies. Here, we report on finding in which we PET imaged chimpanzees engaging in unilateral reach-and-grasp movements. We found that the KNOB region is active in the hemisphere contralateral to the hand the chimpanzees used for grasping. We also computed a probabilistic map of the KNOB region in a sample of 65 3T MRI scans of chimpanzees. This analysis revealed that the regions of greatest anatomical overlap in the KNOB region correspond quite well to the region active during the PET scans. From this data, we conclude that the KNOB represents the “hand” region of the chimpanzee brain.

Keywords: chimpanzee, PET, MRI, handedness