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PRENATAL HORMONES AND SEX DIFFERENCES IN SPATIAL COGNITION IN RHESUS MONKEYS

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Spatial cognition is among the largest cognitive sex differences in humans. Data from humans and other species show that performance on spatial cognition tasks is affected by prenatal exposure to androgens and concurrent androgen levels. One spatial task which varies between the sexes in humans is the use of landmarks or spatial position for navigation. We investigated rhesus monkey performance in finding baited containers using either markers or spatial position in relation to prenatal exposure to androgen. Some females were treated with exogenous androgen early and late in gestation, and some males were treated with the antiandrogen, flutamide early and late in gestation. Females were only tested during the breeding season when ovarian hormones were elevated, but males were tested then and during the nonbreeding season when testosterone (T) levels were low. There was no sex difference when both markers and spatial cues were present, but females showed significantly less decrement in performance than did males when they went from two cues to spatial cues only. Both sexes performed more poorly when only markers were available, but females recovered performance more rapidly than did males. Male performance was better when T levels were elevated. Early gestation flutamide treatment produced more female-like performance in males on the marker task whereas both late androgen or flutamide treatment resulted in even better performance in females. These results show that spatial cognition in rhesus monkeys is enhanced by testosterone exposure both prenatally and in adulthood, but unlike in humans, this does not result in a consistent male advantage.

Keywords: rhesus monkey, hormones, cognition, sex differences