

Female long-tailed macaques with scrotum-like structure

Suchinda Malaivijitnond^{1*}, Yuzuru Hamada², Bambang Suryobroto³, Osamu Takenaka^{2,1}

¹Primate Research Unit, Department of Biology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

²Primate Research Institute, Kyoto University, Inuyama, Japan

³Laboratory of Zoology, Bogor Agricultural University, Indonesia

email: Suchinda Malaivijitnond (suchinda.m@chula.ac.th)

*Correspondence to Suchinda Malaivijitnond, Primate Research Unit, Department of Biology, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand

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Abstract

Female long-tailed macaques (*Macaca fascicularis*) living in multimale and multifemale societies show a swelling and reddening of the sexual skin around the anogenital region when they approach ovulation. These swellings are limited to the base of the tail in many local populations. We recently observed another type of sexual swelling in long-tailed macaques inhabiting localities north of the Isthmus of Kra, Thailand. This swelling was located in the inguinal region in pubertal females. These swellings develop bilaterally into a globular structure, which so strongly resembles the male scrotum that it is difficult to reliably identify an individual's sex at a distance using only the standard phenotypic features of differential presence of clitoris or scrotum. The sex of the monkeys possessing the scrotum-like swelling was examined at the chromosomal and gonadal levels by determining the presence of two sex-related genes (the SRY and the AMEL), and sex-steroid hormone levels, respectively. For chromosomal sex, polymerase chain reaction (PCR)-based assays suggested the absence of the Y-linked SRY and AMEL loci but the presence of the X-linked AMEL locus in the scrotum-like monkeys, consistent with them being XX and not XY. Plasma testosterone levels of the monkeys possessing the inguinal sex skin swelling did not differ from those of ordinary females and was significantly lower than that of subadult and adult males. However, plasma estradiol levels were higher than those of both ordinary adult males and ordinary adult females. Together, the data strongly support the suggestion that these are XX females. Indeed, most of the tissue components of the scrotum-like swelling were in fact adipose cells. Upon our latest survey in Thailand, the

scrotum-like swellings were observed only in long-tailed macaques inhabiting the Indochinese region, above the Isthmus of Kra. To understand whether the scrotum-like swelling is related to geographical distribution, further study is necessary. *Am. J. Primatol.* 69:721-735, 2007. © 2007 Wiley-Liss, Inc.

Keywords

Macaca fascicularis • scrotum-like swelling • SRY gene • amelogenin gene • estradiol

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