Immunolocalization of steroidogenic enzymes and inhibin/activin subunits in the testis of adult male African elephant (Loxodonta africana)

Lu Lu¹, Qinglin Li¹, Qiang Weng¹, Tatsuya Yamamoto², Shigehisa Kawakami², Eriko Saitou², Yuki Yamamoto³, Kentaro Nagaoka⁴,⁵, Gen Watanabe⁴,⁵, Kazuyoshi Taya⁶
¹College of Biological Science and Technology, Beijing Forestry University, ²Gunma Safari Park, ³Graduate School of Environmental and Life Science, Okayama University, ⁴Laboratory of Veterinary Physiology, Tokyo University of Agriculture and Technology, ⁵Department of Basic Science, United Graduate School of Veterinary Science, Gifu University, ⁶Shadai Corporation

Background: P450scc, 3βHSD, P450c17 and P450arom are responsible for steroid biosynthesis, which are mainly produced in Leydig cells in testes. Testes are also the source of many cell growth factors, including inhibins and activins. In mammalian species, apart from their action on FSH secretion, inhibins and activins have been shown to exert paracrine/autocrine effects within the gonads. The purpose of this study was to investigate the cellular immunolocalization of P450scc, 3βHSD, P450c17, P450arom and inhibin/activin subunits in the adult male African elephant testis.

Materials and Methods: Hematoxylin-eosin (HE) staining was used to observe testicular tissues of the African elephant. The sections of testis were immunostained using polyclonal antisera raised against bovine adrenal P450scc, human placental 3βHSD, porcine testicular P450c17, human placental P450arom, porcine inhibin a, porcine inhibin/activin βA and βB. Results: Histologically, all types of spermatogenic cells including mature-phase spermatozoa in seminiferous tubules were found in African elephant testis. P450scc, 3βHSD, P450c17 and P450arom were all detected in cytoplasm of Leydig cells. In addition, positive immunostaining for inhibin a and inhibin/activin (βA and βB) subunits was also observed in Sertoli and Leydig cells in the African elephant testis. Conclusions: These results suggest that Leydig cells of adult African elephant testis have the ability to synthesize progestin, androgen, estrogen, and Sertoli and Leydig cells are the major source of inhibin secretion in male African elephants.