

Spermatogenic Cycle Length and Spermatogenic Efficiency in the Gerbil (*Meriones unguiculatus*)

TÂNIA M. SEGATELLI^{*}, LUIZ R. FRANÇA[†], PATRICA F. F. PINHEIRO[‡],
CAMILA C. D. ALEMIDA[‡], MARCELO MARTINEZ[§] AND FRANCISCO E. MARTINEZ[‡]

From the ^{*} Department of Morphofisiological Science, DCM-Bloco H-79, University of State of Paraná (UEM), Paraná, Brazil; [†] Laboratory of Cellular Biology, Department of Morphology, Institute of Biological Science, Federal University of Minas Gerais, Belo Horizonte, MG, Brazil; [‡] Department of Anatomy, Institute of Bioscience, State University of São Paulo, Botucatu, SP, Brazil; [§] Department of Morphology and Pathology, Laboratory of Anatomy, UFSCAR, São Carlos, SP, Brazil.

Correspondence to: Tânia Mara Segatelli, Department of Morphofisiological Science, DCM-Bloco H-79, University of State of Paraná (UEM), Av Colombo, 5790, Maringá, Paraná, Brazil (e-mail: tmsegatelli@uem.br).

The gerbil (*Meriones unguiculatus*) is a rodent native of the arid regions of Mongolia and China. Because the gerbil can be easily bred in laboratory conditions, this species has been largely used as an experimental model in biomedical research. However, there is still little information concerning the testis structure and function in the gerbil. In this regard, we performed a detailed morpho-functional analysis of the gerbil testis and estimated the spermatogenic cycle length utilizing ³H-thymidine as a marker for germ cell progression during their evolution through the spermatogenic process. The stage frequencies of the XII stages characterized according to the acrosome formation and development were (I–XII) 13.8, 10.1, 8.1, 7.8, 4.0, 11.2, 7.5, 7.1, 5.9, 7.6, 8.1, and 8.9. The mean duration of each seminiferous epithelium cycle was determined to be 10.6 ± 1.0 days and the total duration of spermatogenesis, based on 4.5 cycles, was approximately 47.5 days. The volume density of tubular and interstitial compartments was approximately 92% and 8%, respectively. Based on the volume occupied by seminiferous tubules in the testis and the tubular diameter, about 9 and 18 m of seminiferous tubules were found per testis and per gram of testis, respectively. Twelve primary spermatocytes were formed from each type A1 spermatogonia. The meiotic index was 2.8, indicating that 30% of cell loss occurs during meiosis. The number of Leydig and Sertoli cells per gram of the testis was 28 million and each Sertoli cell was able to support approximately 13 spermatids. The daily sperm production per gram of testis (spermatogenic efficiency) was 33 million. Taken together, these data indicate that, mainly due to the high seminiferous tubule volume density and Sertoli cell support capacity for germ cells, the gerbil presents high spermatogenic efficiency compared with other mammalian species already investigated. The data obtained in the present study might provide the basis for future research involving the reproductive biology in this species.

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