

11. SPERM TRANSPORT, OVULATION AND AI IN THE TAMMAR WALLABY

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In marsupials, fertilization occurs in a narrow time window because the oocyte is transported through the oviduct in less than 24 h (1) during which it acquires a mucoid coat that entraps and inhibits sperm penetration (2,3). To improve our artificial insemination (AI) success, the distribution of sperm in the reproductive tract, and the timing of ovulation were characterized in naturally mated female tamar wallabies (*Macropus eugenii*). Females were watched for the first post-partum (p.p.) mating then isolated. Reproductive tracts were dissected at 0.5 h ($n = 5$), 6 h ($n = 4$), 18 h ($n = 5$), 36 h ($n = 5$) and 40h ($n = 5$) post coitum (p.c.), ligated into 13 major anatomical sections, and sperm & embryos were recovered by flushing. A further 13 females were isolated from males for AI and checked for births every 12 h. Semen ($\geq 10^6$ sperm) was deposited into the uterus via laparotomy at different times between 21.7-42.6 h p.p. In 4 females, ovaries were examined and tracts flushed for embryos at 6 h post AI; 9 others were left in order to check for births resulting from AI. First mating occurred 14.7 ± 2.5 h ($n = 20$) after birth was first detected and lasted 7.2 ± 0.8 min. Within 0.5 h after a single mating the tract contained $26 \pm 11 \times 10^6$ sperm ($n = 5$) and 22 ± 10 g ($n = 5$) of seminal plug, much of which is lost within 18 h p.c. Sperm reach the uterus ipsilateral to the follicle within 0.5 h and the upper oviduct within 18 h p.c. Graafian follicles were observed in 3 females dissected at 36.0 h and embryos were seen 36 h ($n = 2$) and 40 h ($n = 5$) p.c. Thus ovulation occurred in roughly half of the animals at 36 h p.c. (50.7 h p.p.). A fertilized embryo was recovered 6.4 h post AI (49 h p.p.) and one AI offspring was born after insemination 34 h p.p. This confirms that anaesthesia and laparotomy do not prevent ovulation, successful fertilization can occur after intrauterine AI between 34.0 and 42.6 h after birth, and that embryos formed by AI can develop normally.

(1) Tyndale-Biscoe, C.H. and Rodger, J.C. (1978) *J. Reprod. Fertil.* **52**: 37-43. (2) Renfree, M.B. and Lewis, A.M. (1996) *Reprod. Fertil. Dev.* **8**: 725-42. (3) Roberts, C.T., Breed, W.G. and Mayrhofer, G. (1994) *J. Exp. Zool.* **270**: 321-31.