ABSTRACTS

ISCFR 2012

July 26-29, Whistler, Canada

7th International Symposium on
Canine and Feline Reproduction

In a joint meeting with

EVSSAR 2012

15th Congress of the
European Veterinary Society for Small Animal Reproduction

Editors: Gary England, Michelle Kutzler, Pierre Comizzoli, Wojciech Nizanski, Tom Rijsselaere and Patrick Concannon

Reprinted in IVIS with the permission of the ISCFR Organizers
Comparative fertility of freshly-collected versus frozen-thawed semen with laparoscopic oviductal artificial insemination in domestic cats

Lambo, CA 1; Grahn RA 2; Lyons, LA 2; Bateman, HL 1; Newsom, J 3 and Swanson WF 1

1Center for Conservation and Research of Endangered Wildlife, Cincinnati Zoo and Botanical Gardens, Cincinnati, OH, USA 45220, and 2Center for Companion Animal Health, Department of Population Health and Reproduction, University of California, Davis, CA, USA 95616.

bjectives AND METHODS: Of the world’s 36 wild cat species, most are threatened or endangered in the wild. Although zoos manage several cat species within structured breeding programs, sustainability is compromised by breeding incompatibilities, insufficient exhibit space, and animal transport challenges. Artificial insemination (AI) using cryopreserved spermatozoa represents a potentially invaluable tool to assist with cat population management (5). However, before AI can be applied routinely, its efficiency for offspring production must be substantially improved across species, especially for using frozen semen. In domestic cats, AI success with frozen spermatozoa has been limited, usually requiring high sperm numbers (1, 4). Our recent advances in using laparoscopic oviductal AI (LO-AI) with low numbers of non-frozen spermatozoa in domestic cats suggest that this approach also might improve pregnancy outcomes with frozen-thawed spermatozoa (2, 6). In this study, our objectives were to: 1) assess the effect of two gonadotropin dosages on ovarian response in domestic cats and 2) compare the relative fertility of freshly-collected vs. frozen-thawed spermatozoa for LO-AI.

Semen was collected from male domestic cats (n=2) using an artificial vagina and estrual teaser females, and assessed for ejaculate volume, sperm concentration, motility, and morphology. For LO-AI with fresh spermatozoa, semen was centrifuged and the sperm pellet resuspended in Feline Optimized Culture Medium (FOCM). For sperm cryopreservation, washed spermatozoa were extended in TES-Tris buffer with 1% soy-lecithin (SOY), with 4% glycerol added after cooling to 5°C (6). Semen straws were frozen over liquid nitrogen vapor and stored until needed. For LO-AI, adult female domestic cats (n=16) were treated with either 100 IU eCG (n=8) or 150 IU eCG (n=8), followed 84 hrs later with 1000 IU pLH. Queens were anesthetized ~32 hrs following pLH and inseminated laparoscopically. Freshly-collected spermatozoa (1 x 10^6 motile sperm) was deposited in one oviduct and frozen-thawed spermatozoa (~2 x 10^6 motile sperm; frozen in SOY cryoprotectant) from a second male was deposited in the contralateral oviduct. Pregnancy status was assessed ~20 days post-AI with ultrasonography and resulting pregnancies monitored to term. Blood or tissue samples from dams, sires and kittens were collected for paternity determination using polymorphic short tandem repeat (STR) marker analysis (3). All research procedures were reviewed and approved by the Cincinnati Zoo’s IACUC.

RESULTS: All females ovulated after gonadotropin treatment and, following LO-AI, half (8/16) conceived. Similar (p ≥ 0.05) percentages of females became pregnant following 100 IU eCG (50%, 4/8) vs. 150 IU eCG (50%, 4/8). Mean (± SEM) number of CL at time of AI did not differ (p ≥ 0.05) between regimens (14.7 ± 2.1, 100 IU eCG; 13.4 ± 2.3, 150 IU eCG), but follicle number increased with higher eCG dose (9.7 ± 2.5, 100 IU eCG; 15.8 ± 3.5, 150 IU eCG). Seven queens gave birth to a total of 36 kittens (32 viable, 4 stillborn), averaging 5.1± 1.1 kittens per litter. Paternity analysis showed that more (p < 0.05) kittens resulted from LO-AI with fresh (28/36, 78%) than frozen thawed (8/36, 22%) semen. Three litters contained kittens produced from both freshly-collected and frozen-thawed spermatozoa whereas the four remaining litters had kittens produced from fresh semen only.

CONCLUSION: Our results indicate that low numbers of spermatozoa, frozen in a chemically-defined, soy lecithin-based cryoprotectant, may be used for LO-AI in domestic cats to produce viable kittens. However, pregnancy success and offspring production appear compromised relative to that of non-frozen semen. Further, treatment with higher eCG dosages does not improve CL number nor pregnancy percentages following LO-AI. Insemination with greater numbers of frozen-thawed spermatozoa, combined with further refinement of cat sperm cryopreservation methods, may be necessary to optimize pregnancy success with LO-AI in domestic and nondomestic cats.

