Proceedings of the 8th International Symposium on Canine and Feline Reproduction
ISCFR

June 22-25, 2016
Paris, France

In a joint meeting with the XIX EVSSAR Congress

Reprinted in IVIS with the permission of the ISCFR Organizers
Epididymal spermatozoa: a hidden treasure with great potential
Gaia Cecilia Luvoni, Maria Giorgia Morselli
Dipartimento di Scienze Veterinarie per la Salute, la Produzione Animale e la Sicurezza Alimentare; Università degli Studi di Milano, Italy. cecilia.luvoni@unimi.it

An azoospermic ejaculate or a “dry ejaculate”, as it is called in case of aspermia, might not be the end of the hopes of procreation. When a donor male accidentally dies or undergoes orchiectomy for medical reasons can still generate offspring. In both cases, the precious germplasm can be hidden in the epididymides as a treasure with great potential. Epididymal spermatozoa can be retrieved from ex vivo or in vivo testicles, can be cryopreserved and used in assisted reproductive technologies (ARTs). This review intends to shed light on these topics providing a critical analysis on recent results obtained in carnivores. From ex vivo testicles, spermatozoa can be collected by mincing the epididymal cauda in a Petri dish containing medium, or by flushing or squeezing epididymides and deferential ducts. Different techniques have been tested in humans to retrieve epididymal spermatozoa from in vivo testicles. We previously investigated the feasibility in dogs of one of these methods: the percutaneous epididymal sperm aspiration (PESA). The quality of gametes was similar to that of those collected from ex vivo testicles, although a wide variation in concentration amongst animals was observed. During epididymal transit, functional and structural modifications leading to full maturation enable male gametes to reach, recognize and fertilize the oocytes. An extensive analysis has been conducted in cats and characteristics of the spermatozoa collected from six different epididymal regions have been described in detail. We demonstrated that DNA integrity of feline epididymal spermatozoa seems to be independent from all the measured variables of sperm head morphology and morphometry. In dogs, we showed that an acrosomal reshaping occurs during maturation from the proximal to the distal epididymal tract and that the migration of the cytoplasmic droplet occurs in the epididymal corpus. Thus, the highest sperm motility, acrosomal integrity and normal morphology is found in the cauda. The fertilizing ability of fresh and frozen epididymal spermatozoa has been demonstrated in several mammalian species including carnivores. In vitro embryo production in cats have been successfully obtained with epididymal spermatozoa. In dogs, intravaginal and intrauterine artificial insemination with fresh and frozen epididymal spermatozoa resulted in pregnancies and in viable puppies. We found that DNA fragmentation is not affected by the freezing procedure further demonstrating that epididymal spermatozoa can be successfully cryopreserved. The hidden treasure represented by epididymal spermatozoa deserves special attention and serious consideration for its potential use in the current reproductive technologies.