

Cryopreservation of domestic animal sperm cells

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Abstract Sperm cells are the endpoint of male spermatogenesis and have particular anatomic and metabolic features. Sperm cryopreservation and storage currently require liquid nitrogen or ultralow refrigeration methods for long or short term storage, which requires routine maintenance and extensive space requirements. Conserving sperms have several purposes such as artificial reproductive technologies (ART), species conservation and clinical medicine. The combinations of storage temperature, cooling rate, chemical composition of the extender, cryoprotectant concentration, reactive oxygen species (ROS), seminal plasma composition and hygienic control are the key factors that affect the life-span of spermatozoa. Sperm preservation protocols vary among animal species owing to their inherent particularities that change extenders used for refrigeration and freezing. Extenders for freezing sperm cells contain buffers, carbohydrates (glucose, lactose, raffinose, saccharose and trehalose), salts (sodium citrate, citric

acid), egg yolk and antibiotics. The use of different cryoprotectants, like trehalose or glycerol, as well as different concentrations of egg yolk and other constituents in semen extenders are being studied in our laboratory. Several cooling rates have been tested to freeze sperm cells. The use of faster rates (15–60°C/min) gives rise to best sperm survivals after freezing–thawing, but more studies are needed to find the adequate cooling rates for each animal species. Sheep and goat males of some native breeds are being used in studies performed in EZN. Semen from those males has been frozen and stored as part of the Portuguese Animal Germplasm Bank. In small ruminants, individual variations in the quality of frozen semen have been observed, suggesting specific differences in sperm susceptibility to freezing methods, particularly obvious in goat males. Best quality frozen semen from small ruminants is being used in cervical artificial insemination studies aiming to increase productive parameters in selected flocks.

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