

Breakthrough to improve the reproductive capacity of gene bank material

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The aim of the WP 3 of IMAGE is to improve the efficiency of the reproductive cells to be stored in the cryobanks for the conservation of domestic animal genetic resources. Different cells and tissues are under study in major production species. Two tasks (3.1, 3.2) are focused on improving sperm fertilizing ability, the task 3.3 is turned on the study of gonad transfer, the task 3.4 on the study of Primordial Germ cells (PGCs) and the task 3.5 on pig embryo vitrification. Many advances were obtained in each Task. In the Tasks focused on semen (3.1, 3.2), different improvements of sperm freezing process were suggested in chickens and rams. New sperm quality criteria are in progress through the studies of DNA damages, proteic and mi RNA actors of fertility in chickens or bulls. Gonad transfer studies in the chicken (3.3) allowed to methodologic progress, to the identification of efficient breed couples of donor-recipient animals and to the production of healthy progeny after transfer. Improvements in PGCs biotechnologies (3.4) allowed to the production of a serum free standard medium for cryopreservation, to improvements in the knowledge and control of quality of cultured PGCs, and to the identification of interspecies chicken-guinea fowl sterile hybrids as recipient animals for donor PGCs. In the task 3.5 focused on pig embryo vitrification, a mathematic model simulating the osmotic events occurring during vitrification indicated adequate conditions reached in only seconds of embryos exposure to cryoprotectants. This is now used as a basis for experimental vitrification. All of these progresses allow enhancing the methodologies of conservation, characterization and evaluation of reproductive collections, and the quality of European ex situ collections. Funding: IMAGE project from the EU H 2020 Research and Innovation Program, agreement no. 677353.