

# WP3 – Improved cryopreservation procedures

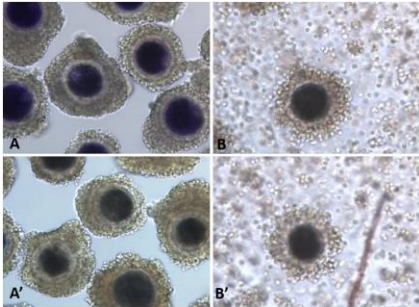
Annemieke Rattink



WP No.	Work Package Title	Lead Beneficiary No.	Start month	End month	Activity type	Lead Beneficiary Short Name	ESRs involvement
WP1	Project Management and Quality Control	1	1	48	Co-ordination	NMBU	2 elected ESRs
WP2	Advanced techniques for visualization and characterization of freeze-thaw damage	2	6	42	Research	LUH	ESR 3, 4
WP3	Improved cryopreservation procedures	5	6	42	Research	WUR	ESR 1, 2, 7, 8, 10
WP4	Epigenetic risks of cryopreservation procedures	3	6	42	Research	INRAE	ESR 5, 6, 9
WP5	Training Events (Scientific tech. & Transferable skills)	1	9	40	Training	NMBU	all ESRs
WP6	Dissemination, Outreach, and Exploitation activities (IPR)	1	1	48	Dissemination and outreach	NMBU	all ESRs

**Table 1.1 Work Package (WP) List**

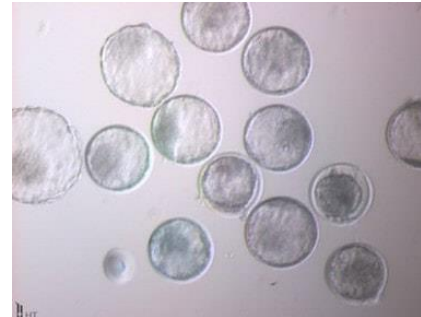
WP Number	3	Start Month M6 – End Month M42
WP Title	Improved cryopreservation procedures for animal germplasm	
Lead Beneficiary	WUR	
<b>Objectives:</b> As major technological difficulties still exist in the successful cryopreservation of animal germplasm this WP will develop improved procedures for the cryopreservation of germplasm, both for use in animal breeding and for the conservation of farm animal biodiversity (biobanking).		
<b>Description of Work:</b> The ability to cryopreserve animal germplasm not only varies between the different cell or tissue types, but also between the different animal groups.		
<b>Task 1</b> (WUR, IMV, Topigs Norsvin, SYSAAF): While the freezing of semen is well established, problems still persist in the cryopreservation of pig and poultry semen. Improved procedures will be developed for the cryopreservation of both porcine and avian semen.		
<b>Task 2</b> (NMBU, NordGen, INIAV, Geno AS): As bovine oocytes and embryos are particularly difficult to cryopreserve, improved protocols will be developed for the cryopreservation of both bovine oocytes and embryos.		
<b>Task 3</b> (NMBU, INIAV, JU, LLS Rowiak, SCBI): Freezing ovarian tissue offers an alternative to technologically difficult oocytes and embryos. The validity of using frozen ovarian tissue as a viable alternative to female gamete cryopreservation will be tested in both bovine and fish ovarian tissue.		
<b>Task 4:</b> (SYSAAF, C.Béchanne): The cryopreservation of PGCs represents a reliable alternative to the impossibility of embryo and egg cryopreservation in avian species. Cryopreserved PGCs of native breeds will be used to retrieve both male and female individuals after injection in sterile host embryos of a commercial breed		
<b>Description of Deliverables</b> (Lead Beneficiary shown)		
D3.1 (IMV; Month 36) Improved protocols for the cryopreservation of porcine and avian semen.		
D3.2 (NMBU; Month 36) Improved protocols for the cryopreservation of bovine oocytes and embryos.		
D3.3 (NMBU; Month 36) Validation of using cryopreserved ovarian tissue as a source of PGCs and oocytes in both mammalian and non-mammalian species.		
D3.4 (SYSAAF; Month 36) Improved protocol and proof of concept for chicken native breed retrieval from cryopreserved PGCs.		



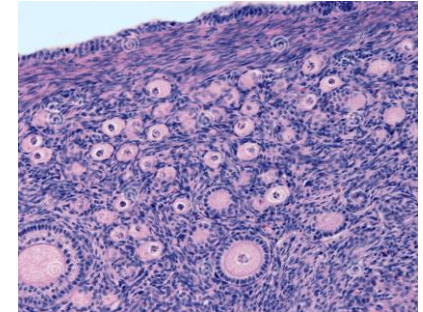
Oocytes



Sperm cells



Embryo



Ovarian tissue



Primordial germ cells

- Semen      ESR10 (IMV/INRAE)  
                 ESR7 (WUR)
- Oocytes and embryos  
                 ESR2 (NMBU)
- Gonadal tissue & PGCs  
                 ESR1 (NMBU)  
                 ESR8 (SYSAAF/INRAE)

Overcome existing difficulties in farm animal species, for more effective and efficient use of cryoconserved germplasm in farm animal breeding and for conservation of animal genetic resources

## Semen

- ESR10 – *Technology transfer of boar sperm cryoconservation to the sperm production in swine industry*
- ESR7 – *Improved procedures for the successful cryobanking of avian and porcine semen*

Major limitations in pig and poultry species

## Oocytes and embryos

- ESR2 – *Improved protocols for the vitrification of bovine oocytes and embryos*

### Embryos:

- *Ensure the conservation of the breed's entire genome*
- *Reduce the number of accessions in the genebank*
- *Reduce the efforts to reconstruct a breed*
- *Banking of unique female genomics*

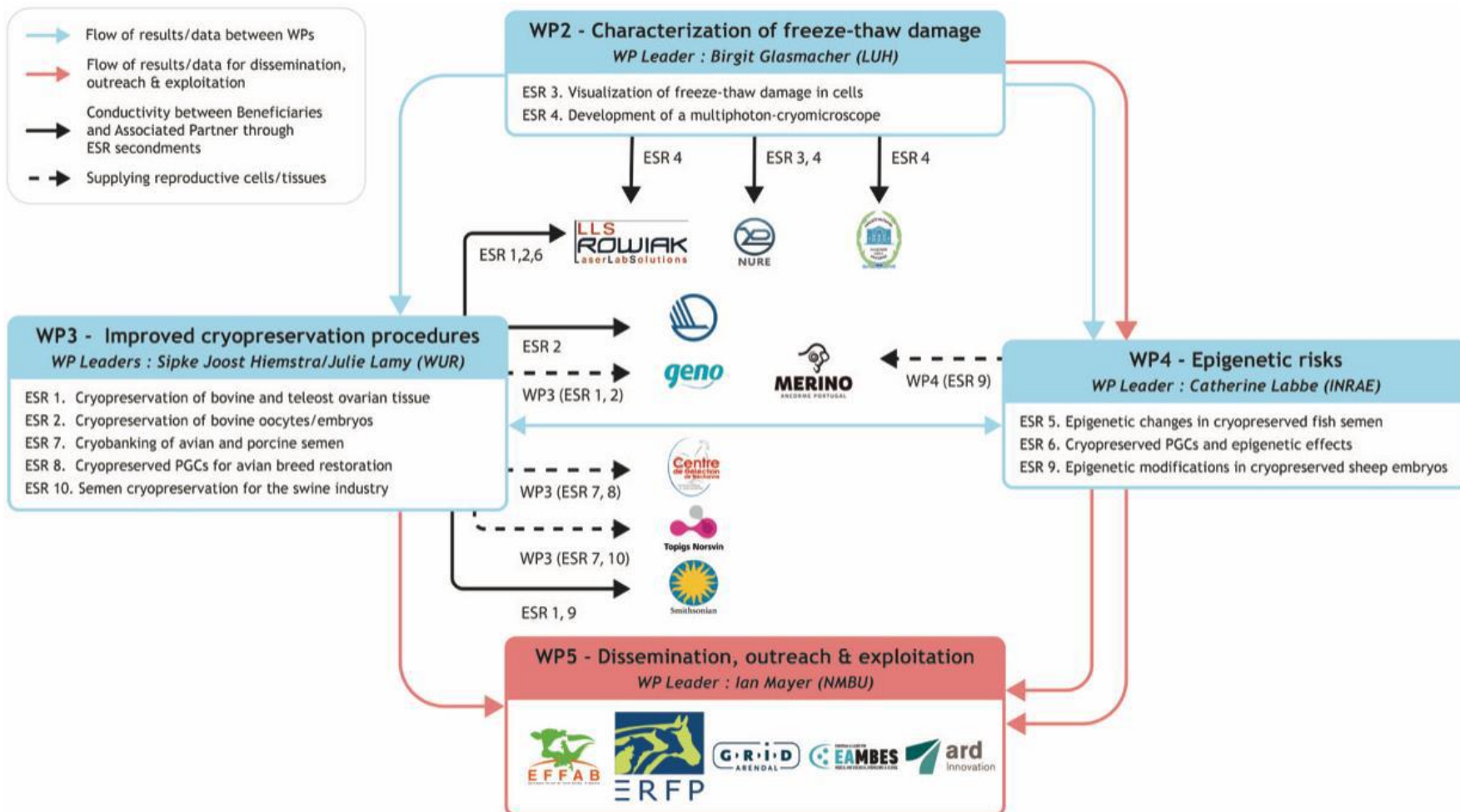


## Gonadal tissue & PGCs

- ESR1 – *Validation of improved protocols for the vitrification of bovine and teleost ovarian tissue*
- ESR8 – *Use of cryoconserved PGCs for the restoration of the complete genetic heritage of a poultry breed: validation, cost and transfer to the industry*

Significant promise for conservation and breeding: harvesting in culture to generate embryo's from animals, alternative for non-mammalian species





# Planning

- All ESRs started!
- Finetune the activities between the ESRs due to
  - New insights
  - Prevent overlap
  - Personal preferences/experience of ESRs
- Set up meetings for progress reporting in WP3
- Manage collaboration with (industrial) partners
- Set up informal update structure between 5 ESRs

