

1. Institution

Ministerio de Ciencia e Innovación, Instituto Nacional de Investigación Agraria y Alimentaria (INIA), Departamento de Reproducción Animal, Ctra. de la Coruña Km. 5,9 - 28040 Madrid, Spain.

<http://www.inia.es> (Departamentos→Reproduccion Animal→Grupos de Investigacion→Early embryo development and quality)

2. Principal investigator and contact person

Dimitrios Rizos (drizos@inia.es)

3. Key personnel

Maria Clemente Maltes	mcmaltes@inia.es	In vitro, genomics, maternal embryonic interaction
Pablo Bermejo Alvarez	borrillobermejo@hotmail.com	Genomics, male vs female embryos
Celia de Frutos	celia.frutos@inia.es	In vitro, genomics, RNA-interference

4. Research profile

Our main line of research is on early mammalian embryonic development. We focus on development and quality of embryos produced in vitro compared with in vivo. We are using intermediate hosts (ewe, mouse, and cow) for culturing bovine zygotes/embryos investigating the importance of the post fertilization culture environment, the origin of the oocyte/embryo and the interactions between hosts and embryos. We have established criteria for embryo quality using microscopic and ultrastructure morphology, kinetics of development, cryotolerance and gene expression analysis. Lately we are studying the effect of in vitro culture conditions on the sex of the produced embryos and their quality.

5. Key technologies and tools

In vivo and in vitro embryo production in mammals, in vivo culture using intermediate hosts (sheep and mice up to Day 7 – bovine up to Day 14), cryopreservation/vitrification, oocyte/embryo gene expression analysis by quantitative RT-PCR, embryo sexing by PCR, epigenetic differences.

6. Selected publications (max. 5)

1. Rizos D, Bermejo-Alvarez P, Gutierrez-Adan A, Lonergan P. (2008). Effect of duration of oocyte maturation on kinetics of cleavage, embryo development and sex ratio in cattle. *Reproduction Fertility and Development* 20: 734-740.
2. Bermejo-Alvarez P, Rizos D, Rath D, Lonergan P, Gutierrez-Adan A. (2008). Epigenetic differences between male and female bovine blastocysts produced in vitro. *Physiological Genomics* 32(2):264-72.
3. Rizos D, Pintado B, De la Fuente J, Lonergan P, Gutierrez-Adan A. (2007). Developmental and pattern of mRNA relative abundance of bovine embryos cultured in the isolated mouse oviduct in organ culture. *Molecular Reproduction and Development* 74 (6):716-723.
4. Corcoran D, Rizos D, Fair, Evans ACO, Lonergan P. (2007). Temporal expression of transcripts related to embryo quality in bovine embryos cultured from the two-cell to blastocyst stage in vitro or in vivo. *Molecular Reproduction and Development* 74 (8):972-977.
5. Lonergan P, Woods A, Fair T, Carter F, Rizos D, Ward F, Quinn K, Evans A. (2007). Effect of embryo source and recipient progesterone environment on embryo development in cattle. *Reproduction Fertility and Development* 19 (7): 861-868.