**Pre-doctoral (PhD) researcher position**

****

**Details for the position (4-yrs):** [Convocatoria\_ProyectosGeneraciónConocimiento\_PID2023\_.pdf (aei.gob.es)](https://www.aei.gob.es/sites/default/files/convocatory_info/file/2023-12/Convocatoria_ProyectosGeneraci%C3%B3nConocimiento_PID2023_.pdf)

**Project:** “Metabolic and signalling requirements during conceptus elongation” (PID2023-151241OB-I00)

Reproductive failures in farm animals constitute a major burden for the economic and environmental viability of farming, as they impair the productive cycle by expanding the non-productive periods and reducing the offspring obtained per female and year. When reproductive failures are dissected into the different steps of the reproductive process, from conception to deliver, the developmental period spanning from blastocyst hatching to implantation –termed conceptus elongation- clearly stands out as the most susceptible period in ungulate species, which accounts for the four most relevant mammalian livestock species in Europe (cattle, sheep, goats and pigs). During this developmental period, the free-floating ungulate conceptus relies completely on the composition of the uterine fluid (UF), which constitutes the major determinant for embryo survival. Descriptive analyses of UF composition have identified metabolic and signaling compounds that may be required for embryo survival, but functional studies are needed to determine which of these of compounds present on that fluid are essential for embryo development. In this project, we will employ novel methodologies developed by the group to conduct pioneer functional studies to identify the embryonic requirements during bovine conceptus elongation. Candidate compound addition experiments will be conducted under a post-hatching *in vitro* culture system able to sustain ungulate embryo development beyond hatching to test their roles during embryo development, and loss-of-function gene knock-out experiments will unequivocally determine the role of specific metabolic and signalling pathways along bovine conceptus elongation. CRISPR-based gene ablation experiments will also serve to explore the inter-lineages signalling occurring during gastrulation in an embryonic disc, the epiblast-derived structure developed in ungulate and humans, which differs greatly from the egg cylinder developed by the predominant mammalian model to study developmental biology (the laboratory mouse). The identification of signalling and metabolic compounds required for conceptus elongation will serve as a launchpad for the development of pharmacological or nutritional approaches aimed to enhance embryo survival during the most susceptible period for embryonic loss, and thereby to reduce the economic and environmental effects of reproductive failures in farm animals.

**Principal Investigator:** Pablo Bermejo-Álvarez 🡪[bermejo-alvarez p - Search Results - PubMed (nih.gov)](https://pubmed.ncbi.nlm.nih.gov/?term=bermejo-alvarez+p)

**Group:** Animal Genomic Engineering 🡪[Animal genomic engineering Ingeniería genómica animal (inia.es)](https://www.inia.es/en-en/Research/Animalresearch/animalreproduction/Ingenier%C3%ADa%20gen%C3%B3mica%20animal/Pages/Home.aspx)

**Location:** Animal Reproduction Department, INIA, CSIC 🡪 [Av. Puerta de Hierro, 18 - Google Maps](https://www.google.com/maps/place/Av.+Puerta+de+Hierro,+18,+Moncloa+-+Aravaca,+28040+Madrid/@40.4528044,-3.7428507,592m/data=!3m2!1e3!4b1!4m6!3m5!1s0xd4229d4ce3dc2d5:0x8710b19f9f38a88d!8m2!3d40.4528044!4d-3.7402758!16s%2Fg%2F11cpd9lw3x?authuser=0&entry=ttu&g_ep=EgoyMDI0MDkwNC4wIKXMDSoASAFQAw%3D%3D)

**Contact info:** [**bermejo.pablo@inia.csic.es**](mailto:bermejo.pablo@inia.csic.es)