

EMBRYO-INDUCED ALTERATIONS IN THE ENDOMETRIAL TRANSCRIPTOME OF PREPUBERTAL BOVINE HEIFERS

S. Bagés-Arnal¹, J.M. Sánchez¹, B. Fernandez-Fuertes², M. McDonald¹, C.J. Byrne³, A.K. Kelly¹, D.A. Kenny³, S.K. Behura⁴, T.E. Spencer⁴, T. Fair¹, P. Lonergan¹

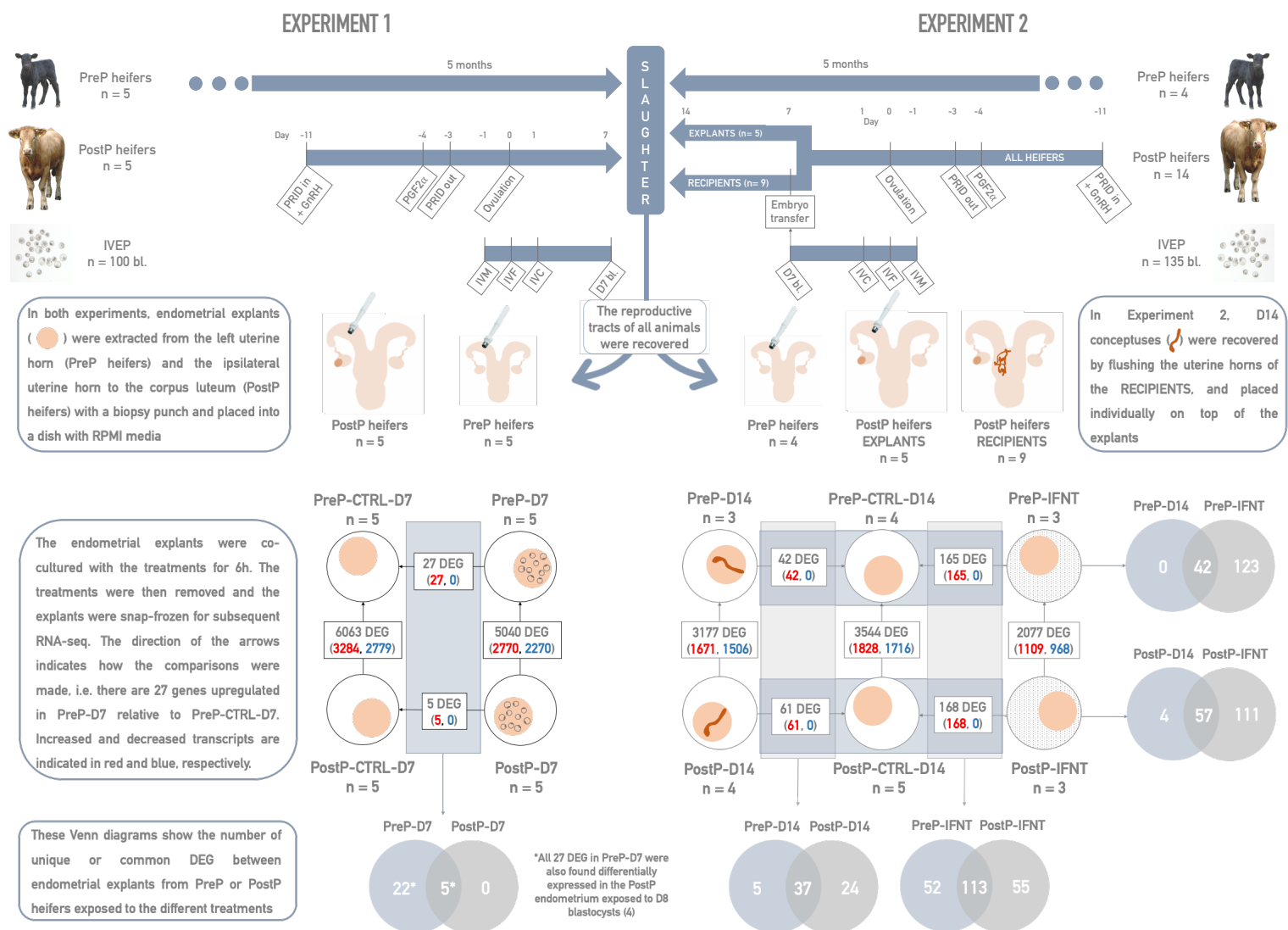


¹ School of Agriculture and Food Science, University College Dublin, Belfield, Dublin 4, Ireland
² Biotechnology of Animal and Human Reproduction (TechnoSperm), Department of Biology, Institute of Food and Agricultural Technology, University of Girona, Spain
³ Teagasc Animal and Grassland Research and Innovation Centre, Grange, Dunsany, Co. Meath, Ireland
⁴ Division of Animal Sciences, University of Missouri, Columbia, Missouri, 65211, USA

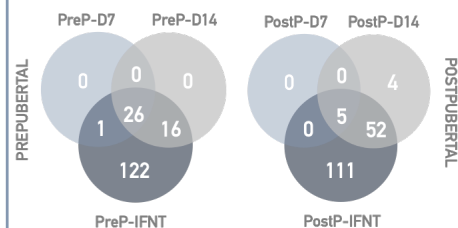
INTRODUCTION

Advancing the age at which puberty is reached in replacement heifers is central to the financial and environmental sustainability of cattle production systems (1). Puberty onset is regulated by a complex network of biochemical processes and involves interaction between key metabolic, neuroendocrine and reproductive tissues (2). Most components that regulate the hypothalamic-pituitary-ovarian axis are in place before the occurrence of puberty (3). However, it is unclear if the prepubertal uterus is capable of responding to the presence of an embryo or conceptus. Thus, the objectives of this study were to determine the response of the endometrium of 5-month-old prepubertal heifers to i) twenty Day (D) 7 blastocysts (Experiment 1), and ii) a single D14 conceptus or 100 ng/ml of interferon tau (IFNT) (Experiment 2), and to compare this response to that of a postpubertal endometrium.

MATERIAL AND METHODS + RESULTS



EXPERIMENT 1 vs. EXPERIMENT 2



PreP: prepubertal; PostP: postpubertal; PRID: progesterone-releasing intravaginal device; GnRH: gonadotropin-releasing hormone; PGF2α: prostaglandin F2α; IVEP: in vitro embryo production; IVM: in vitro maturation; IVF: in vitro fertilization; IVC: in vitro culture; bl: blastocysts; CTRL: control; DEG: differentially expressed genes; RNA-seq: RNA sequencing

CONCLUSIONS

- The PreP endometrium is capable of responding to D7 blastocysts, a D14 conceptus and IFNT.
- The response of the PreP endometrium to blastocysts was similar to the PostP endometrium. However, the response to a D14 conceptus and specially to IFNT differed.
- In both the PreP and PostP endometrium, practically all genes altered by D7 blastocysts were also altered by D14 conceptuses, and all except 4 embryo and conceptus induced genes were interferon stimulated.

References:

- (1) Wathes et al., (2014). *Animal*. Suppl 1:91-104. doi: 10.1017/S1751731114000755.
- (2) Amstalden et al. (2011). *Front. Endocrinol.* 2:109. doi: 10.3389/fendo.2011.00109
- (3) Day and Anderson (1998). *J. Anim. Sci.* 76(Suppl.):1-15. doi:10.2527/1998.76suppl_31x.
- (4) Passaro et al. (2019). *Reproduction* 158, 3; 10.1530/REP-19-0064

Correspondence: sandra.bagesarnal@ucdconnect.ie

35th Annual Meeting of the Association of Embryo Technology in Europe

This work was supported by European Union, Horizon 2020 Marie Skłodowska-Curie Action, REPBIOTECH (675526)