



SPECIAL ISSUE:

JOINT FECUND/PROLIFIC FINAL CONFERENCE

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Dear Readers,

On the occasion of the Joint FECUND-PROLIFIC Final Conference, which will take place on October 30, 2016 in Lisbon, Portugal, as a satellite workshop to ESDAR 2016, we are pleased to distribute the special issue of FECUND newsletter.

In this issue, we will present the programme of the Joint Conference, provide you with practical information on the registration process and give you an overview of the FECUND topics and speakers.

For further information and questions, please visit the ESDAR 2016 website at www.esdar.org, FECUND-PROLIFIC website at www.cattle-fertility.eu or FECUND website at www.fecund-project.eu.

We hope that you enjoy reading this special issues of our newsletter and we look forward to a successful event.



Yours faithfully,

Conference Organising Committee

FECUND

PROGRAMME

JOINT FECUND-PROLIFIC FINAL CONFERENCE





October 30, 2016 - Lisbon, Portugal

The Conference will provide the opportunity to present the results of both of the projects to the stakeholders. It also aims to create a link between the industry and the researchers.

7:45 Registration

8:30 Opening & Introduction

Filippo Biscarini, FECUND Coordinator

Joëlle Dupont, PROLIFIC Coordinator

8:45 Horizon 2020: Opportunities for Animal Health Research and Innovation

Razvan Anistoroaei - DG Research and Innovation, European Commission

9:00 Dairy cow fertility worldwide: Current status and future perspectives

Matthew Lucy - University of Missouri, US

9:45 Advanced endoscopic techniques for the study of reproductive biology in dairy cows

Urban Besenfelder - University of Veterinary Medicine, Vienna

10:15 Impact of metabolic status on proteomic composition of oviduct fluid

Georg Arnold - LMU Gene Centre, Munich

10:45 Maternal environmental effects on the oviduct and early embryo development

Yann Locatelli - INRA, Tours

11:15 Coffee break

11:30 Lactational induced effects on the conceptus and endometrial transcriptome

Niamh Forde - University of Leeds, Leeds

12:00 Impact of metabolic imbalance and pro-inflammatory agents on molecular profiles in fat and reproductive tissues

Patrice Humblot – SLU, Uppsala

12:30 Nutritional and breed effects on indicator of reproductive performance in dairy cows

Stephen Butler – Agriculture and Food Development Authority, Cork

13:00 Lunch

14:00 The application of bioinformatics and biostatistics to dairy cattle fertility

Filippo Biscarini - PTP, Lodi

14:30 Benefit of genomic and progesterone information in genetic improvement of dairy cattle fertility

Eileen Wall – Scotland's Rural College, Midlothian

15:00 Modelling the reproductive function to identify candidate mechanisms involved in subfertility in dairy cows

Pierre Blavy – INRA, AgroParisTech MoSAR, Paris

15:30 Coffee break

15:45 A user-friendly simulation tool to test the effects of changes in reproductive management on the reproductive performance of a dairy herd

REGISTRATION

For registration please click on the link:

<http://esdarconference2016.admeus.net/forms/index?menu=yes>

Please select "Workshop Only" at Registration Type if you are only attending the Joint FECUND-PROLIFIC Final Conference.

ABSTRACTS

Dairy cow fertility worldwide: Current status and future perspectives

Matthew Lucy

University of Missouri, US

The genetics of modern dairy cows needs to be improved so that the cow possesses the underlying biology to sustain health and productivity in an extremely metabolic condition. Given the black box of the genetic selection process, it is extremely important that the dairy industry define "high fertility" and adopt a genetic selection program that yields the desired "high fertility" cow. If a genetic recording system is not developed that can account for the breeding interventions used in postpartum cows then we may find that 100 years from now our population of "fertile" cows are only "fertile" when treated with PGF_{2α}, GnRH, and (or) progesterone and timed AI. Selecting cows for a functional reproductive tract independent of intervention, therefore, is the best way to select cows for the future.

[Read more at FECUND website.](#)

Advanced endoscopic techniques for the study of reproductive biology in dairy cows

Urban Besenfelder

University of Veterinary Medicine, Vienna

The use of endoscopy allows to visually access reproductive organs and to apply techniques which enable to puncture follicles and collect oocytes and embryos of different stages from the oviduct. Vice versa, this technique also provides the possibility to transfer embryos into the oviduct either for generating pregnancies or for temporary in vivo culture followed by re-collection. Moreover, a method has been developed to recover oviductal fluid or its components, and cells during embryo

passage through the Fallopian tube. It is concluded that using advanced endoscopic techniques allows combining and comparing in vitro and in vivo embryo development at a time point where fertility is mostly compromised.

[Read more at FECUND website.](#)

Impact of metabolic status on proteomic composition of oviduct fluids

*Katrin Meyer, Thomas Fröhlich, Miwako Kösters, Eva-Maria Riedel, Eckhard Wolf and [Georg J. Arnold](#)
Ludwig-Maximilians-University, Munich*

In order to investigate influences on fertility in dairy cattle, a so-called genetic and metabolic model for fertility was created by the FECUND project for studies of reproductive tissues, oocytes and embryos on the genome, transcriptome, metabolome and proteome level. A holistic proteome analysis of fluid taken from isthmus and ampulla of ipsilateral oviducts of the genetic and metabolic model was performed in the current study. From 2240 proteins identified in total, 216 differed significantly in abundance in pairwise comparisons among different groups. Analysis revealed that enriched GO terms are mainly related to translation, immune response, cytoskeletal protein binding and enzyme inhibitor activity, supporting the hypothesis that immune processes are involved in early embryonic loss.

[Read more at FECUND website.](#)

Influence of metabolic status on oviduct gene expression in Holstein-Friesian cows

[Y. Locatelli](#), M. Saint-Dizier and P. Mermillod (INRA PRC); H. Blum, E. Wolf (LMU); N. Forde, P. Lonergan (UCD)

The objective of this study was to investigate the effect of metabolic status on the molecular dialogue between the early embryo and maternal somatic tissues and its possible role in reproductive success in dairy cows. The impact of metabolic status on oviduct gene expression was addressed in postpartum lactating and non-lactating Holstein-Friesian cows and maiden heifers using high throughput RNA sequencing. Animals were slaughtered at Day 3 of a synchronised oestrous cycle. Each oviduct segment was flushed to collect oviduct fluid and then scraped to collect epithelial cells from which total RNA was extracted for RNA-sequencing. RNA-seq data indicate a strong influence of ovulation side at Day 3 of the ovarian cycle on oviduct gene expression. Tissues from the lactating group showed a lower number of differentially expressed genes between sides. The results may illustrate a direct effect of energy balance on oviduct physiology and/or an indirect effect of metabolism on corpus luteum formation and its consequences for the oviduct function.

[Read more at FECUND website.](#)

Lactational induced effects on the conceptus and endometrial transcriptome

*Niamh Forde
University of Leeds, Leeds*

The study presented tested the hypothesis that the endometrial transcriptome and the uterine environment of lactating cows differed to non-lactating cows and maiden heifers. In order to isolate effects of lactation on the conceptus from those on the oocyte and early embryo, high quality embryos were transferred into synchronised recipients. The recovered conceptuses and endometrium as well as the uterine luminal fluid was analysed on Day 19 by RNA sequencing and

HPLC to identify how the maternal metabolic effect of lactation impacted on conceptus-maternal interactions during the peri-implantation period of pregnancy.

[Read more at FECUND website.](#)

The application of bioinformatics and biostatistics to dairy cattle fertility

*Filippo Biscarini,
PTP, Lodi*

SNP data at low, medium or high density are now available for a large number of dairy cows and bulls from most breeds. Common applications of SNP genotypes are genome-enabled predictions of breeding values, to be used in genomic selection schemes, and genome-wide association studies (GWAS) for the dissection of complex traits. However, SNP genotypes -with or without corresponding phenotypic data- can serve many other purposes. In the Fecund project, by using high-density SNP data 261 such potentially deleterious haplotypes were identified in Holstein cattle. The detection of runs of homozygosity and of heterozygosity can assist with the identification of haplotypes associated to fertility. Bioinformatics pipelines can be of great help in the functional analysis of genes, by automatically querying databases and retrieving and summarizing the necessary information for the biological interpretation of experimental results.

[Read more at FECUND website.](#)

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Horizon 2020 is a European Union Funding Programme for Research and Innovation.
The research leading to these results has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n°312097 - FECUND

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