



# Reproduction and Perinatology Update

A publication of the D.H. Barron Reproductive and Perinatal Biology Research Program

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## John Bromfield - New Faculty Member



The newest faculty member in the Repro group joined the Dept. of Animal Sciences in spring, 2014 as an assistant professor of physiology.

A major focus of Dr. Bromfield's research at UF is on infection and immunity in the female reproductive tract. Among his goals are to understand how lipopolysaccharide (LPS) and other bacterial components negatively

impact the ovary and oocyte. Dairy cows with uterine infections accumulate LPS in the ovarian follicle. The LPS initiates an inflammatory response by ovarian granulosa cells that degrades oocyte quality and reduces the follicular reserve.

Other areas of research will involve improving oocyte cryopreservation and the developmental environment of the early embryo.

Bromfield completed the PhD in the Department of Obstetrics and Gynaecology at the University of Adelaide under the supervision of Dr Sarah Robertson. While there, he studied the role of paternal seminal fluids in modulating the maternal immune response in early pregnancy and its

consequences for adult health. He then joined the laboratory of Dr David Albertini at the Kansas University Medical Centre to focus on oogenesis and folliculogenesis.

Subsequently, he worked with Dr Martin Sheldon in the Institute of Life Sciences at Swansea University to conduct research on the impact of uterine infection on ovarian function, oocyte quality and follicle development.

Prior to coming to Florida, Bromfield worked in the Obstetrics and Gynaecology Department at the University of Missouri with Dr. Susan Nagel on endocrine disruption and foetal programming of adult disease.

## Student, Postdoc and Alumni News

**Yamilette Borja** is a UF senior working in the laboratory of Kirk Conrad. She presented a paper on her research entitled "Choleocystokinin expression and localization in human placenta" at the NIH Short-Term Research Training for Minority Students Symposium held at the UF College of

Medicine on August 8, 2014.

**Eileen I-Ling Chang** received her PhD Medical Sciences in summer, 2014. Working under the supervision of Charles E. Wood, her dissertation is entitled "The role of ketamine in hypoxic induced inflammation and

apoptosis in fetal ovine brain and kidneys".

**Anna C. Denicol** and **Kyle B. Dobbs** are both headed to Jonathan Tilly's laboratory at Northeastern University as postdocs to study oocyte stem cells.

Kyle received his Ph.D. in Animal Molecular and Cellular Biology

### **Contribute IDC to Support Our Program**

*Our reproductive biology effort is supported by the Center for Perinatal Outcomes Research. This is a source of funds that are generated by indirect costs from us - up to 7.5% of IDC that otherwise goes to the Deans Office can be designated to the Center (Code - 00047347). These funds are used to invite speakers to campus, organize retreats and are used as a source of seed grants. Please consider designating some of your IDC to the Center*

### **Identify Our Program on Your Next Paper**

*Please consider including the D.H. Barron Reproductive and Perinatal Biology Research Program as one of your affiliations*

## Student, Postdoc and Alumni News (cont. from page 1)

(AMCB) in spring, 2014. His dissertation is entitled "Developmental programming of the preimplantation bovine embryo by colony stimulating factor 2".

Anna was awarded the Ph.D. in AMCB in summer 2014. Her dissertation is entitled "Regulation of development and survival of the pre-implantation bovine embryo by the canonical WNT signaling

pathway and its secreted antagonist dickkopf 1". In 2015, she will move to Universidade de São Paulo – Pirrasinunga to work on stem cells with Flavio Meirelles.

**Fabio Lima**, who received a PhD in Animal Sciences in 2013 under the supervision of Jose Santos, has recently taken a position as assistant professor of theriogenology at the

University of Illinois College of Veterinary Medicine. Lima recently completed a postdoc at Cornell University with Ricardo Bicalho.

**Sha Tao**, who received a PhD in the AMCB in 2012, recently joined the faculty of the Dept. of Animal and Dairy Science at University of Georgia-Tifton as an assistant professor.

## 2014 Barron Lecture – Yoel Sandovsky



The Fall 2014 Barron Lecturer is Yoel Sandovsky, M.D. of the University of Pittsburgh. Dr. Sandovsky serves as the Scientific Director of the Magee-Womens Research Institute, Elsie Hilliard Hillman Chair of Women's Health Research, Professor of Obstetrics, Gynecology and Reproductive Sciences, and Microbiology and Molecular Genetics.

Sadovsky received his MD from the Hebrew University-Hadassah Medical School, Jerusalem in 1986 and performed residency training in OBGYN from Washington University in St. Louis in 1990. He completed a fellowship in maternal-fetal medicine at the University of California, San Francisco in 1992 and a post-doctorate from the University of California, San Francisco in 1993.

Dr. Sandovsky is a physician-scientist whose research on feto-placental development and trophoblast function parallels his clinical expertise in maternal-fetal medicine. The Sadovsky lab utilizes molecular and cellular approaches to decipher mechanisms underlying placental development and differentiation. The

trophoblast at the feto-maternal interface fulfills critical functions for embryonic development, including gas exchange, supply of nutrients, removal of waste products, endocrine regulation, and immunological defense.

Using cultured primary human placental cells, genetically-altered mice, and placental samples from abnormal human pregnancies, the lab examines trophoblast response to diverse stressors that adversely influence the homeostatic balance between cell injury and regeneration. These stressors contribute to placental dysfunction and fetal growth restriction, which predispose to childhood neurodevelopmental dysfunction and metabolic derangements in the adult.

## Awards and Recognitions

**Todd Bilby** (courtesy faculty, Animal Sciences and alumnus of the RPBR) was the 2014 recipient of the ADSA Foundation Scholar Award. The award is given by the American Dairy Science Assn. to recognize a young scholar for potential in research and educational leadership.

**Gregory Christman** (OB/Gyn) was recognized for presenting the top scientific abstract at the 2013 joint Meeting of the American Society of Reproductive Medicine and the International Federation of Fertility Societies.

**Kirk Conrad** (Physiol & Functional Genomics) was the recipient of the University of Florida College of Medicine Teacher Award in 2013.

**Geoffrey Dahl** (Animal Sciences) was the 2014 recipient of the West Agro Inc. Award given by the American Dairy Science Assn. to recognize outstanding research related to milk quality.

**Kyle Dobbs** (PhD student, AMCB) won the best poster award at the 2014 Annual Conference of the International Embryo Transfer Society for his paper entitled

"Gender-specific developmental programming of the bovine embryo by colony stimulating factor 2 (CSF2)". He was also the recipient of the 2014 Graduate Research Award from the UF Chapter of Sigma Xi.

**Klibs N. Galvão** (Large Animal Clinical Sciences) was recognized in 2013 by the University of Florida with an Excellence Award for Assistant Professors

**Peter Hansen** (Animal Sciences) was the 2014 recipient of the Society of Study of Reproduction (SSR) Research Award.

**Maureen Keller-Wood** (Pharmacodynamics) was appointed to the the CVS/Pharmacy Inc. Professorship in Pharmacy.

**Maria Padua** (Physiological Sciences) was the recipient of a travel grant to the 2014 SSR meeting.

**Eduardo de Souza Ribeiro** was the 2014 recipient of the National Milk Producers Federation Richard M. Hoyt Award presented by the American Dairy Science Assn. The award recognizes research efforts with direct

application to problems in the dairy industry. The winner must be enrolled in or have completed a program leading to an advance degree in dairy science, dairy production, dairy processing or a similar curriculum.

**Chris Mortensen** (Animal Sciences) was the recipient of the College of Agricultural and Life Sciences Roche Teaching Fellowship in 2014.

**Naohiro Terada** (Pathology) was the recipient of the 2013-2014 Doctoral Mentoring Award of the University of Florida College of Medicine.

**Sergei Tevosian** (Physiological Sciences) was the 2013 recipient of the Zoetis Animal Health Award for Excellence awarded at the College of Veterinary Medicine Phi Zeta Research Emphasis Day on March 15. The award recognizes the outstanding contributions of an established investigator to advancing knowledge in biomedical research.

**William Thatcher** (Animal Sciences) was the 2014 recipient of the Carl Hartman Award of the Society for the Study of Reproduction. This is the highest award bestowed by SSR.



Maureen Keller-Wood



Eduardo de Souza Ribeiro



Sergei Tevosian with Ammon Peck and Harvey Crumm representing Zoetis



Funerary model of cow giving birth  
Egypt, Middle Kingdom (ca 2055-1650 BC)  
Royal Museum of Archaeology, Toronto

## Schedule Fall Seminar Series

### Reproductive & Perinatal Biology Seminar Wednesday 4:00-5:00 PM

D.H. Barron Conference Room Medical Sciences Building M-304

- September 24: **John Bromfield, PhD**  
*Ovarian innate immunity: impacts of female reproductive tract infections on oocytes and follicles*  
Assistant Professor, Department of Animal Sciences, University of Florida, Gainesville
- October 1: **Paul Cooke, PhD**  
*Role of estrogen and progesterone receptors in neonatal uterine cell proliferation in the mouse*  
Professor and Chair, Department of Physiological Sciences, University of Florida College of Veterinary Medicine, Gainesville
- October 8: **Yoel Sadovsky, MD**  
**Barron Lecturer**  
*The Unique Function and Transport of Placental TrophomiRs*  
Director, Magee-Women's Research Institute; Elsie Hilliard Hillman Chair of Women's Health Research; Professor of Obstetrics, Gynecology & Reproductive Sciences and Microbiology and Molecular Genetics, Magee-Women's Research Institute, Pittsburgh, Pennsylvania
- October 15: **Peter Hansen, PhD**  
*Regulation of preimplantation embryonic development by colony stimulating factor 2*  
Distinguished Professor and L.E. "Red" Larson Professor, Department of Animal Sciences, University of Florida, Gainesville
- October 22: **Crystal West, PhD**  
*Renal K+ Handling during Pregnancy*  
Postdoctoral Fellow, Department of Physiology & Functional Genomics, University of Florida College of Medicine, Gainesville
- October 29: **Naohiro Terada, MD, PhD**  
*Patient iPSC Research @ UF Health: Opportunities and Challenges*  
Professor, Department of Pathology, Immunology, & Laboratory Medicine, University of Florida College of Medicine, Gainesville
- November 5: **Gregory Christman, MD**  
*Uterine Fibroid Pathophysiology and Treatment: Time to put down your scalpel and pull out the prescription pad*  
J. Wayne Reitz Professor and Chief, Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology, University of Florida College of Medicine, Gainesville
- November 12: **Mitch Knutson, PhD**  
*Molecular aspects of iron transport across the placenta*  
Associate Professor, Food Science & Human Nutrition, Institute of Food and Agricultural Sciences, University of Florida, Gainesville
- November 19: **M. Sofia Ortega**  
*Single nucleotide polymorphisms in candidate genes related to fertility in Holstein cows*  
PhD Student, Animal Molecular & Cellular Biology Graduate Program, University of Florida, Gainesville
- December 3: **Tom Geary, PhD**  
**Warnick Lecturer**  
*Limitations to pregnancy success in beef cattle*  
Research Animal Scientist and Reproductive Physiologist, USDA Agricultural Research Service Fort Keogh Livestock and Range Research Laboratory, Miles City, MT

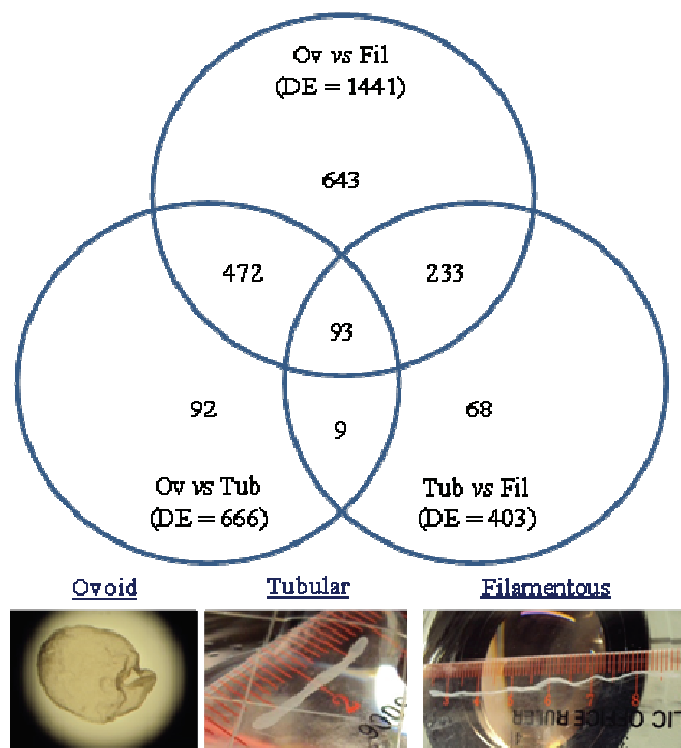
## Research Highlight 1 - What Does It Take for an Preimplantation Embryo to Elongate?

Eduardo Ribeiro, William Thatcher and José Santos

Animal Molecular and Cellular Biology Program, Department of Animal Sciences

Pioneer work at the University of Florida paved the way for four decades of research and increased understanding on preimplantation embryo development in ruminants. We have now the appreciation that early embryonic development and placentation in ruminants is unique. In contrast to other eutherian species whose implantation starts soon after hatching from the zona pellucida,

implantation in ruminants occurs later in development and requires drastic morphophysiological changes in the developing conceptus. The trophoblast of the spherical blastocyst must elongate along the uterine lumen to create a large area of apposition with the endometrium, secrete bioactive products that modify endometrial physiology, and then form intimate physical interactions with endometrial cells. This complex biological process represents a bottleneck for fertility in cattle. Embryonic losses during this period are substantial and cause economic losses and reduced sustainability. Future improvements in reproductive efficiency in cattle herds will require the development of strategies to minimize those embryonic losses. But what information is still missing for the development of such strategies? What does it takes for a bovine preimplantation embryo to elongate and develop into a healthy pregnancy?



Interestingly, most of the research conducted to investigate the period of conceptus elongation has focused on the biology of endometrial cells. Less effort has been placed on the biology of conceptus cells, which could be essential information for a holistic understanding of normal developmental requirements and etiology of pregnancy losses. Our research group decided to investigate this vital area. Some of our research projects has focused on changes in the transcriptome of conceptus cells during the process of elongation and how this process differs in low vs. high fertility models. We believe that the outcomes from these projects could help to understand what is required in terms of transcription regulation and cell signaling for an ovoid embryo to progress in an elongated healthy conceptus. Our first step to achieve this goal was to investigate changes occurring in normal development. For that, the uteri of 160 lactating dairy cows were flushed 15 days after insemination. On day 15 of development, we expected to find embryos at different stages of elongation, which was confirmed in the study. The recovered conceptuses were then classified based on morphology/length as ovoid (OV; 1-4 mm), tubular (TUB; 5-19 mm) and filamentous (FIL; 20-85 mm). A subsample of conceptuses from each group had mRNA extracted and subjected to transcriptome analysis using Affymetrix Gene Chip® Bovine Array (8 OV, 17 TUB, and 17 FIL).

Preliminary results revealed that, in fact, transcriptome of conceptus cells is highly dynamic during conceptus elongation (see figure). Differently expressed genes were associated significantly with cellular movement, cell-to-cell signaling and interaction, cellular assembly and organization, lipid metabolism, small molecule biochemistry,

## Research Highlight 1 (continued from page 5)

and molecular transport. We then focused on the identification of potential transcription factors and cell signaling pathways coordinating such changes. Functional analysis of the data using Ingenuity Pathway Analysis revealed, among others, PPAR $\gamma$  and IGF-1 as potential upstream regulators of the observed changes in the transcriptome. PPAR $\gamma$  is a transcription factor that has been demonstrated to be essential for placentation in mice and humans. In fact, genetic ablation of PPAR $\gamma$  in mice leads to embryonic lethality due to placental defects. In our research, transcript expression of PPAR $\gamma$  increased as the conceptus elongated and, in addition, several other genes differently expressed among the stages of elongation are regulated by or associated with PPAR $\gamma$  activity. Most of these genes are involved in lipid uptake and metabolism, fatty acid availability and elongation. Transcript expression of enzymes involved in the production of prostaglandins was also increased as the bovine conceptus elongated. Interestingly, transcript expression of PPAR $\gamma$  and PTGS2 were highly correlated and perhaps their transcription control is related. Collectively, these results suggest that lipid metabolism and PPAR $\gamma$  activity, as in others species, are also important for early placentation in cattle.

Our group is now working on the analyses of uterine fluid composition in samples of the same project and their impact on the endometrial physiology. We expect to contribute for the understanding of the developmental biology in cattle and development of therapeutic or nutraceutical strategies to minimize embryonic losses. Identification of PPAR $\gamma$  and IGF-1 as potential regulators of conceptus elongation in cattle gives us a broad range of opportunities for therapeutic manipulations and development of strategies to minimize pregnancy losses. The indication that IGF-1 signaling might be a major factor in conceptus elongation reinforces the importance of research findings associating IGF-1 and fertility in dairy cattle. This year, our group published a study in *Biology of Reproduction* (90:10) in which supplementation of low doses of bST during the entire preimplantation period resulted in hastening of conceptus development, reduction in pregnancy losses, and increased fertility in lactating dairy cows. We expect that, in the near future, new strategies will be developed to reduce consistently embryonic losses and maximize sustainability in cattle herds.

## 2014 Warnick Lecture – Tom Geary, USDA-ARS



*Geary in his natural habitat*

The 2014 Warnick Lecture will be presented on December 3 at 4:00 PM as part of the Reproductive & Perinatology Seminar Series. The lecture will be presented by Dr. Tom Geary of the USDA-ARS.

Dr. Geary received his B.S. in Animal and Range Sciences from Montana

State University in 1985. He spent two years on a family ranch in Montana before returning to Washington State University school to complete his M. S. (1989) and Ph.D. (1994) in Animal Science. Geary served as an Assistant Professor in the Animal Science Department at Colorado State University before returning to Montana in 1999. He is currently employed as a research scientist with the USDA-ARS Fort Keogh, Livestock and Research Range Laboratory in Miles City, MT.

Dr. Geary's research focuses on reproductive efficiency in beef cattle by evaluating strategies to

improve pregnancy establishment and maintenance. He directs research toward understanding early embryonic loss and applications that minimize these losses.

The Alvin C. Warnick Lecture Series was created by the Department of Animal Sciences to recognize the achievements of Dr. Alvin C. Warnick. One of the founders of the Reproductive and Perinatal Biology Group, Dr. Warnick made important contributions to the improvement of the livestock industry through innovative research, outreach to the industry through extension

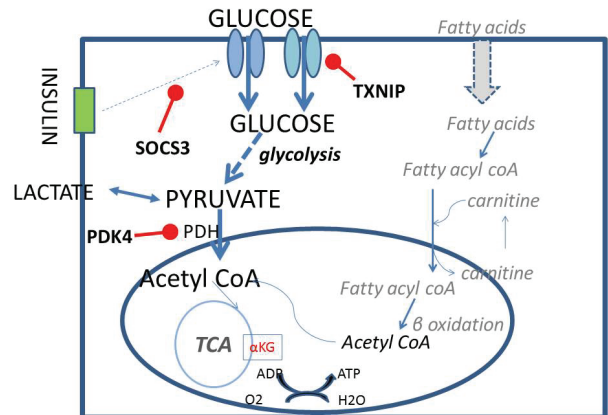
activities and teaching livestock specialists.

Dr. Warnick joined the Animal Science faculty at the University of Florida in 1953 as the university's first reproductive physiologist. At the time he came to Florida, ranches in the state were plagued with severe mineral deficiencies, screw worm was a major pest, cattle were largely unimproved genetically and management was minimal. Dr. Warnick was one of a team of scientists at the University of Florida who brought science to bear on these problems and, as a result, changed the face of the industry.

## Research Highlight 2 – Hypercortisolemia and the Fetal Heart

Maureen Keller-Wood  
Department of Pharmacodynamics

My laboratory has a long-standing interest in the action of the adrenal steroids during pregnancy, including effects in the mother and her developing fetus. In normal pregnancy, the adrenal steroids are elevated. It is thought that the increase in cortisol contributes to the increase in blood glucose, relative insulin insensitivity, and blood volume expansion in the pregnant state. However, Cushing's disease in pregnancy increases both maternal and fetal morbidity, and chronic maternal stress leads to increased fetal loss. In order to study the effects of chronically increased maternal cortisol on the fetus, we use an ovine model with maternal cortisol infusion to double cortisol levels from 115 days gestation (80% of term), during the rapid growth phase in the fetus. This infusion produces cardiac enlargement by 130 days, with myocyte hyperplasia and Purkinje fiber apoptosis, without inducing markers of cardiac hypertrophy. When the infusion is continued to term, the cardiac enlargement is less pronounced, but the incidence of peripartum fetal death is dramatically increased. To model the effect of hypercortisolemia on the fetal hearts at 130 d and at term, we used an ovine gene array with pathway inference using Webgestalt and Cytoscape, and discovered pathways significantly over-represented by differentially expressed genes, ie up or downregulated genes in the cortisol-exposed fetuses. In 130d hearts, growth factor and muscle cell apoptosis pathways are significantly overrepresented, consistent with hyperplasia and apoptosis in the hearts at 130 d. In the hearts of term fetuses (collected during or near the onset of labor), nutrient pathways are significantly overrepresented. Among the over-expressed genes are pyruvate dehydrogenase kinase4, suggesting decreased TCA cycle activity, and several genes that impair glucose metabolism, including SOCS3, a regulator of insulin signaling. Down-regulation of mtDNA expression confirm a significant decrease in mitochondria. In the fetus glucose and lactate predominate with little fatty acid metabolism; thus, the transcriptomic analysis suggests defects in cardiac energy production consequent to hypercortisolemia, or in response to maternal and/or fetal hyperglycemia. Cortisol infusion increases maternal glucose, and reduces glucose disappearance rate in response to glucose challenge in the ewes. The pathways modelled as altered in the term cortisol infused hearts include only a few with known glucocorticoid response elements (GRE), but more associated with the estrogen-related receptor (ESSRA) which has known influences on mitochondrial function. Thus we propose that alternations in metabolic pathways may underlie the fetal heart pathophysiologies seen in pregnancies complicated by stillbirth, including gestational diabetes, Cushing's disease and chronic stress.



cardiac enlargement by 130 days, with myocyte hyperplasia and Purkinje fiber apoptosis, without inducing markers of cardiac hypertrophy. When the infusion is continued to term, the cardiac enlargement is less pronounced, but the incidence of peripartum fetal death is dramatically increased. To model the effect of hypercortisolemia on the fetal hearts at 130 d and at term, we used an ovine gene array with pathway inference using Webgestalt and Cytoscape, and discovered pathways significantly over-represented by differentially expressed genes, ie up or downregulated genes in the cortisol-exposed fetuses. In 130d hearts, growth factor and muscle cell apoptosis pathways are significantly overrepresented, consistent with hyperplasia and apoptosis in the hearts at 130 d. In the hearts of term fetuses (collected during or near the onset of labor), nutrient pathways are significantly overrepresented. Among the over-expressed genes are pyruvate dehydrogenase kinase4, suggesting decreased TCA cycle activity, and several genes that impair glucose metabolism, including SOCS3, a regulator of insulin signaling. Down-regulation of mtDNA expression confirm a significant decrease in mitochondria. In the fetus glucose and lactate predominate with little fatty acid metabolism; thus, the transcriptomic analysis suggests defects in cardiac energy production consequent to hypercortisolemia, or in response to maternal and/or fetal hyperglycemia. Cortisol infusion increases maternal glucose, and reduces glucose disappearance rate in response to glucose challenge in the ewes. The pathways modelled as altered in the term cortisol infused hearts include only a few with known glucocorticoid response elements (GRE), but more associated with the estrogen-related receptor (ESSRA) which has known influences on mitochondrial function. Thus we propose that alternations in metabolic pathways may underlie the fetal heart pathophysiologies seen in pregnancies complicated by stillbirth, including gestational diabetes, Cushing's disease and chronic stress.

## Fall Picnic at Lake Wauburg November 7

Each year, the Reproductive Biology group meets with the Animal Molecular and Cellular Biology Graduate Program to hold a joint picnic at Lake Wauburg (north entrance).

Located eight miles south

of campus on Highway 441, Lake Wauburg offers many activities including boating, swimming, volleyball, and more.

This year's picnic will be held on November 7 at 3:00 PM. A UF ID is required for admission.



## Selected Publications

Bromfield JJ, Schjenken JE, Chin PY, Care AS, Jasper MJ, Robertson SA. Maternal tract factors contribute to paternal seminal fluid impact on metabolic phenotype in offspring. *Proc Natl Acad Sci U S A*. 2014;111:2200-55.

Conrad KP, Baker V.L. Corpus luteal contribution to maternal pregnancy physiology and outcomes in assisted reproductive technologies. *Am J Physiol Regul Integrative Comp Physiol* 2013; 304:R69-72.

Denicol AC, Block J, Kelley DE, Pohler KG, Dobbs KB, Mortensen CJ, Ortega MS, Hansen PJ. The WNT signaling antagonist Dickkopf-1 directs lineage commitment and promotes survival of the preimplantation embryo. *FASEB J* 2014; in press.

Jeon SJ, Oh M, Yeo WS, Galvão KN, Jeong KC. Underlying mechanism of antimicrobial activity of chitosan microparticles and implications for the treatment of infectious diseases. *PLoS One*. 2014; 9:e92723.

Kelley D, LeBlanc MM, Warren LK, Mortensen CJ. Influence of L-arginine supplementation on reproductive blood flow and embryo recovery rates in mares. *Theriogenology* 2014;81:752-7.

Legro RS, Brzyski RG, Diamond MP, Coutifaris C, Schlaff WD, Casson P, Christman GM, Huang H, Yan Q, Alvero R, Haisenleder DJ, Barnhart KT, Bates GW, Usadi R, Lucidi S, Baker V, Trussell JC, Krawetz SA, Snyder P, Ohl D, Santoro N, Eisenberg E, Zhang H; NICHD Reproductive Medicine Network. Letrozole versus clomiphene for infertility in the polycystic ovary syndrome. *N Engl J Med* 2014; 371:119-29.

Leseva M, Santostefano KE, Rosenbluth AL, Hamazaki T, Terada N. E2f6-mediated repression of the meiotic *Stag3* and *Smc1β* genes during early embryonic development requires *Ezh2* and not the de novo methyltransferase *Dnmt3b*. *Epigenetics* 2013; 8:873-84.

Padua MB, Fox SC, Jiang T, Morse DA, Tevosian SG. Simultaneous gene deletion of *Gata4* and *Gata6* leads to early disruption of follicular development and germ cell loss in the murine ovary. *Biol Reprod* 2014; 91:24.

Ribeiro ES, Bruno RG, Farias AM, Hernández-Rivera JA, Gomes GC, Surjus R, Becker LF, Birt A, Ott TL, Branen JR, Sasser RG, Keisler DH, Thatcher WW, Bilby TR, Santos JE. Low doses of bovine somatotropin enhance conceptus development and fertility in lactating dairy cows. *Biol Reprod* 2014; 90:10.

Richards EM, Wood CE, Rabaglino MB, Antolic A, Keller-Wood M. Mechanisms for the adverse effects of late gestational increases in maternal cortisol on the heart revealed by transcriptomic analyses of the fetal septum. *Physiol Genomics* 2014;46:547-59.

Tao S, Dahl GE. Invited review: Heat stress impacts during late gestation on dry cows and their calves. *J Dairy Sci* 96:4079-93.

Wood CE, Rabaglino MB, Richards E, Denslow N, Zarate MA, Chang EI, Keller-Wood M. Transcriptomics of the fetal hypothalamic response to brachiocephalic occlusion and estradiol treatment. *Physiol Genomics* 2014; 46:523-32.

## Work In Progress Meetings

The Reproductive and Perinatal Research **Work in Progress** Conference will again convene this semester. Organized by Kirk Conrad, the purpose is to present new ideas and new data, in order to solicit feedback from one's peers, educate trainees, and find common ground for new NIH R01 and P01 applications.

We will meet at the New Deal Café from 4 to 6 PM on one Friday each month. Beverages and hors d'oeuvres are provided! It is preferred that the presentations should be really informal with NEW IDEAS and data to back them up, if you have any (not necessary). PowerPoint and screen are available, but you

are encouraged to use them sparingly. There is also a white board with markers. We want spontaneity and interruptions; presenters can expect wild and off the wall questions and comments from PIs and trainees. Dates for Fall semester are 9/26, 10/24, 12/5 and 12/12.



## Recent Grants and Contracts

Abbvie. A randomized, double blind, placebo-controlled phase iii study to evaluate the safety and efficacy of elagolix in subjects with moderate- associated pain. Protocol M12-671. GM Christman.

American Heart Assn., Southeastern Affiliate. Increases in maternal cortisol alter the metabolism and function of the fetal heart at term. Maureen Keller-Wood, 2014-2016, \$82,500 per year.

Bayer. A randomized, parallel-group, double-blind, placebo-controlled, multi-center phase II study to assess the efficacy and safety of different doses of BAY 1002670 in subjects with uterine fibroids over 3 months. Protocol 15788. GM Christman.

Binational Agricultural Research & Development Fund. Improving oocyte competence in dairy cows exposed to heat stress. Grant No. US-4719-14. PJ Hansen, Z Roth, and J Block, 2014-2017, \$275,000.

Florida Dept. of Health. T3SS-mediated cardiomyocyte engineering. N. Terada, 2013-2014, \$172,500.

National Institutes of Health. Sexual dimorphism in embryo responses to maternal regulatory factors, Grant R03 HD080855-01. PJ Hansen, 2014-2017, \$139,232.

National Institutes of Health. Imprinting defects leading to Angelman and Prader Willi syndromes. JL Resnick and RS Williams, 2013-2018, \$1,093,750.

Novartis Pharmaceuticals. Unveiling novel signaling mechanisms of serelaxin in vasculature. KP Conrad, 2014-2016, \$164,764.

Renova Life Inc. Non-invasive method to evaluate the quality of human oocytes and embryos. P.J. Hansen and J. Block, 2013, \$10,000.

Southeast Milk Inc. Milk Check-off Program. Use of chitosan microparticles to prevent metritis in lactating dairy cows. KN Galvão KC, CA Risco, JE Santos, and KC Jeong, 2013-2015, \$25,000.

Southeast Milk Inc. Milk Check-off Program. Enhancing antimicrobial activity of chitosan microparticles to treat cows with uterine diseases. KC Jeong and KN Galvão et al, 2014-2016, \$20,000.

Southeast Milk Inc. Milk Checkoff Program. Validation of discovery of genes controlling fertility in dairy cattle. PJ Hansen and S Dikmen, 2014-2015, \$6,500.

USDA-NIFA-CRIS Consolidated Faculty Research Grant. Bacterial diversity and succession in healthy cows and cows that develop uterine disease. FLA-VME-005338. KN Galvão, KC

Jeong, and SJ Jeon. 2014-2016, \$34,275.00.

USDA-NIFA AFRI. Genomic selection for improved fertility of dairy cows with emphasis on cyclicity and pregnancy. P Pineda, JEP Santos, WW Thatcher, C Seabury, R Bicalho, R Gilbert, KN Galvão, R Chebel, G Schuenemann, G. Rosa, S. Rodriguez-Zas, and J. Fetrow. 2013-2017, \$2,977,638.

USDA-NIFA AFRI. Development of chitosan nanoparticles targeting pathogenic Escherichia coli in beef and dairy cattle. KC Jeong, KN Galvão, N. DiLorenzo, and C Lamb, 2014-2016, \$489,510.

USDA-NIFA AFRI. Improving fertility of dairy cattle using translational genomics. Grant No. 2013-68004-20365. T.E. Spencer, P.J. Hansen, H. Neibergs, JC. Dalton, A. de Vries and J.B. Cole, 2013-2017, \$2,984,255.



### DH Barron Reproductive & Perinatal Biology Research Program

University of Florida

Repro & Perinatal Update is issued each August and January

Send items of interest to P.J. Hansen at Hansen@animal.ufl.edu

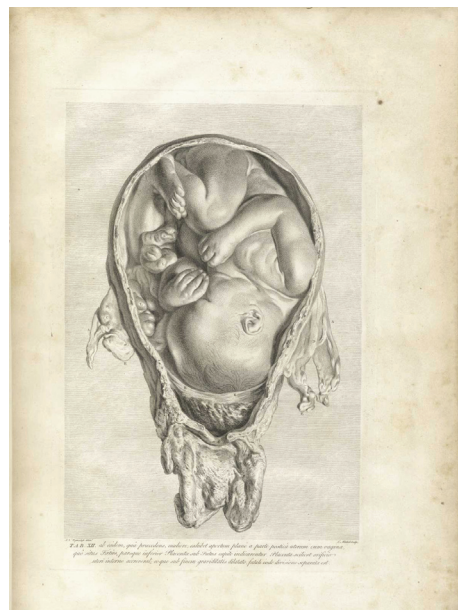
We're on the Web!  
www.perinatal.ufl.edu

## About the D.H. Barron Reproductive and Perinatal Biology Research Program

**History:** The RPBR was founded in 1969 by Donald Henry Barron, Fuller Bazer and others. Seminars have been held continuously since that time. Donald Henry Barron (1905-1993) came to UF as the J. Wayne Reitz Professor of Reproductive Biology after a career at Cambridge and Yale. His research in fetal physiology has led to his being referred to as the Father of Scientific Obstetrics and the Father of Fetal-Placental Physiology. Known to his colleagues and students as "Dr. B.", his portrait is on the masthead. In 1969, Fuller Bazer, currently the O.D. Butler Chair in Animal Science at Texas A&M University, was an assistant professor in the Dept. of Animal Sciences. Since then, he has become one of the pioneers in understanding the nature of communication between the embryo and mother. Among the many recognitions he has received was the Wolf Prize in Agriculture in 2003.

**Mission:** To foster collaborative, multidisciplinary, and integrative approaches to basic and translational research that (i) improves the health of pregnant women and their babies, (ii) enhances the reproductive success of agriculturally important animals and wildlife, and (iii) prepares the next generation of scientists in these research disciplines.

**Scope:** Basic, translational and clinical research aimed at understanding (i) the biology of reproduction in humans and animals from fertilization to delivery and early postnatal development, and (ii) genetic, epigenetic or environmental influences that cause abnormal pregnancy outcomes, including those influences that predispose the mother and offspring to adult diseases.



Fetus in utero

William Hunter

*Anatomia uteri humani gravidi tabulis illustrata* (1774)

(National Library of Medicine)