



**38th Annual Conference of the IETS**

**January 7–10, 2012 Phoenix, Arizona**

**Renaissance Glendale Hotel and Spa, Phoenix, Arizona**



**Registration & Program Book**



Dear Colleagues,

This is to invite you to participate in the 2012 Annual Conference of the IETS, which will be held in Phoenix, Arizona. For this year, program co-chairs Pascale Chavatte-Palmer and Rebecca Krisher have designed an outstanding scientific program with the theme “Improving outcomes through manipulations of the maternal environment,” with lots of new and relevant information that is very important to the field of embryo transfer. This year we are also introducing changes to the traditional meeting format to cover the diverse interests of the attendees; we are introducing concurrent sessions between 10:30 a.m. and 12:30 p.m. on Monday, January 9, and Tuesday, January 10. We hope these changes in the main program will be attractive to members and nonmembers who wish to attend. In addition, a Preconference Symposium cosponsored by the American Embryo Transfer Association (AETA) has been organized by Reuben Mapletoft for Saturday, January 7. This symposium will focus on bovine reproduction and embryo technology and was designed especially to meet the needs of students, clinical scientists, and embryo transfer practitioners. Furthermore, the Preconference Workshop on applications of domestic animal stem cells has been expanded this year by Fulvio Gandolfi, Matt Wheeler, and Pascale Chavatte-Palmer to a Preconference Symposium titled “The use of domestic animals as biomedical models.” Don’t forget to visit the 240 posters (representing 29 different countries) that will present the newest results of experiments performed during the last year. More detailed information is available in this brochure. The Local Organizing Committee, chaired by Chuck Long, has also worked on the social program. There will be ample opportunity to visit with friends and have a good time during the conference. Please look over the details of the scientific program contained in this brochure and on the IETS website. We believe we have an outstanding scientific program for 2012, with format changes and Preconference Symposia designed to meet everyone’s interests and needs, regardless of his or her place in embryo transfer. In addition, the local arrangements and the venue will be wonderful.

I look forward to seeing you all in Phoenix!

Gabriel A. Bó, DVM, MVSc, PhD

## Table of Contents

1 ...	Invitation from the President
2 ...	Tentative Calendar of Events
4 ...	Registration Information
6 ...	Travel Information
7 ...	Accommodation Information
8 ...	Program
12 ...	Preconference Symposium
12 ...	Preconference DABE Symposium
14 ...	Special Events
15 ...	Glendale Information and Attractions

## Tentative Calendar of Events

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Event times and locations are subject to change; events may be added.

### **Thursday, January 5, 2012**

09:00–18:00 IETS Board of Governors meeting

### **Friday, January 6, 2012**

09:00–18:00 IETS Board of Governors meeting

09:00–18:00 HASAC Research Subcommittee meeting

13:00–20:00 W2171 meeting

16:00–19:00 Registration

### **Saturday, January 7, 2012**

07:00–18:00 Registration

08:00–17:30 Preconference Symposium—Recent Advances in Bovine Reproduction and Embryo Transfer

08:00–17:30 Preconference DABE Symposium—The Use of Domestic Animals as Biomedical Models

13:00–18:00 Commercial exhibit setup and poster setup

13:30–17:00 IETS Foundation Board of Trustees meeting

17:00–18:00 IETS student group (The Morulas) business meeting

18:30–19:30 Morulas student mixer

### **Sunday, January 8, 2012**

06:30–08:00 Poster setup

07:00–08:30 HASAC Food Safety Subcommittee meeting

07:00–18:00 Registration

07:00–08:30 IETS Foundation Education Committee meeting

07:30–08:30 Past Presidents' breakfast

07:30–08:30 Student competition presenters breakfast with Foundation Education Committee

08:00–17:00 Commercial exhibition

08:45–09:00 Opening and welcome (Pascale Chavatte-Palmer and Rebecca Krisher, Chuck Long)

09:00–10:30 Session I: Environmental Effects on Gamete Quality

09:00–09:45 Intrafollicular Conditions as a Major Link Between Maternal Metabolism and Oocyte Quality: A Focus on Dairy Cow Fertility

Jo Leroy (University of Antwerp, Belgium)

09:45–10:30 Modification of Spermatozoa Quality in Mature Small Ruminants

Graeme Martin (University of Western Australia, Australia)

10:30–11:00 Refreshment break; poster exhibit and exhibition

11:00–12:30 IETS Foundation Student Competition presentations

12:30–14:00 Lunch break

12:30–14:00 IETS Board luncheon with affiliate society representatives

12:30–14:00 HASAC Forms and Certificates Subcommittee meeting

12:30–13:30 Morulas Journal Club luncheon

14:00–15:30 Session II: Nutrition, Obesity, and Fertility

14:00–14:45 Growth Hormone Regulation of Follicular Growth

Matt Lucy (University of Missouri, USA)

14:45–15:30 The Impact of Obesity on Oocytes—Evidence for Lipotoxicity Mechanisms

Rebecca Robker (University of Adelaide, Australia)

15:30–16:00 Refreshment break; poster exhibit and exhibition

16:00–17:30 Session III: Periconceptional Events Alter Subsequent Development

16:00–16:45 Adaptive Responses of the Embryo to Maternal Diet and Consequences for Postimplantation Development

Tom Fleming (University of Southampton, United Kingdom)

16:45–17:30 Periconceptional Influences on Offspring Sex Ratio and Placental Responses

Cheryl Rosenfeld (University of Missouri, USA)

17:30–18:00 Short presentations from submitted abstracts

18:00–20:00 Domestic Animal Biomedical Embryology (DABE) open meeting

20:00 Welcome reception

### **Monday, January 9, 2012**

07:30–16:00 Registration

07:30–9:30 HASAC Regulatory Subcommittee meeting

08:00–18:00 Commercial exhibits

08:30–10:30 Refreshment break; poster exhibit and exhibition

Event times and locations are subject to change; events may be added.

10:30–12:00	Session IV: Embryo Quality and Implantation
10:30–11:15	The Role of Fatty Acids in Oocyte and Early Embryo Development Roger Sturmey (University of Hull, United Kingdom)
11:15–12:00	Novel Aspects of Endometrial Function: A Biological Sensor of Embryo Quality and Driver of Pregnancy Success Olivier Sandra (INRA, France)
12:00–12:30	Short presentations from submitted abstracts
12:30–14:00	Lunch break
12:30–14:00	IETS Data Retrieval Committee meeting
12:30–14:00	Exhibitors' luncheon with the IETS Board
12:30–13:30	Morulas and mentors luncheon Concurrent Sessions
14:00–15:30	Practitioners' Think Tank: How Can We Achieve the Highest Fertility in Our Herds? Chair/Discussion Leader: Patrick Blondin
14:00–16:00	Session V: Development of the Embryo and Feto-Placental Unit
14:00–14:45	Environmental Regulation of Placental Phenotype: Implications for Fetal Growth Abby Fowden (Cambridge, United Kingdom)
14:45–15:30	Programming the Offspring Through Altered Uteroplacental Hemodynamics: How Maternal Environment Impacts Uterine and Umbilical Blood Flow in Cattle, Sheep, and Pigs Kim Vonnahme, Caleb Lemley, coauthor (North Dakota State University, USA)
15:30–16:00	Short presentations from submitted abstracts
16:00–16:30	Refreshment break; poster exhibit and exhibition
16:30–16:45	Tribute to Peter W. Farin
16:45–17:15	IETS Pioneer Award presentation
17:15–18:00	IETS annual business meeting
18:00–20:00	Companion Animal, Non-Domestic and Endangered Species (CANDES) open meeting
18:00–20:00	HASAC open meeting

### **Tuesday, January 10, 2012**

07:30–08:30	Organizational meeting of the IETS Board of Governors
08:00–15:00	Registration
08:00–13:30	Commercial exhibits
08:30–10:30	Poster Session II; refreshment break; exhibition Concurrent Sessions
10:30–12:30	Practitioners' Forum: Recent Advances in the Use of IVF and IVF Frozen Embryos in Commercial Embryo Transfer Chair: Peter Hansen John Schmidt, TransOva. Incorporation of OPU, IVF and Sexed Semen in Commercial ET Programs in the USA Claire Ponsart, Association Européenne de Transfert Embryonnaire. Adoption or Lack of Adoption of IVF Technologies in the European ET Industry Joao Henrique Viana, Embrapa Dairy Cattle Research Center. Use of IVF Technologies in South America
10:30–12:30	CANDES Scientific Session: Advances in Reproductive Technologies in CANDES
12:30–13:30	Lunch break
12:30–13:30	2012, 2013, 2014 Program Committee luncheon
12:30–13:30	Organizational lunch meeting of the IETS Foundation
13:30–17:00	Commercial exhibit and poster teardown
13:30–14:00	IETS Foundation Student Competition Awards, CANDES, DABE, and HASAC updates
14:00–14:45	IETS Distinguished Service Award presentation
15:00–15:45	Session VI: Keynote Address
15:00–15:45	Evidence for Similar Changes in Offspring Phenotype Following Either Maternal Undernutrition or Overnutrition: Potential Impact on Fetal Epigenetic Mechanisms Stephen Ford (University of Wyoming, USA)
15:45–16:00	Closing ceremony
16:30–17:30	10th IETS annual running competition
19:00	Closing party

*Check out the IETS website (<http://www.iets.org/2012>) for changes in the Calendar of Events and other activities as well as links to the sponsor web sites.*

## Registration Information

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### Registration Materials

All registration materials are included in this mailing. Each technical registrant should complete the enclosed General Registration Form—one registrant per form. Please use the enclosed form to register for all events, including the Pre- and Postconference Symposia. Registration materials are also available on the IETS website at <http://www.iets.org/2012>.

### Registration Deadline

Registrations that are postmarked November 16, 2011, or before will receive a lower rate than those sent after November 16, 2011. No telephone registrations will be accepted. Faxed [(217) 398-4119] registrations will be accepted only if payment is made by credit card. Be sure to preregister to avoid higher prices, missed events, and long lines in Phoenix.

### Membership Information

You do not have to be a member of the IETS to attend the conference. However, the difference between the member and nonmember registration fees makes joining the Society at the time of registration very attractive. A membership application for the IETS is included in this booklet on page 17.

### Payment

Payment must accompany the registration form. Checks must be in US funds drawn on a US bank made payable to the IETS. Payment by credit card (Visa, MasterCard, American Express, or Discover) is available. Please complete the credit card payment section of the General Registration Form or go online at <http://www.iets.org/2012/>.

### Confirmations/Receipts

If you preregister by November 16, 2011, you will receive a registration confirmation/receipt. Please verify the receipt and events registered for and contact the IETS business office with any questions.

### Calendar of Events

Included in this booklet on pages 2 and 3 is a tentative calendar of events for the conference. Event times and locations are subject to change, and certain events may be added.

### Proceedings

Participants will receive a copy of the proceedings with their registration packet in Phoenix. A CD copy of the proceedings is included with your registration; you may purchase a copy of the printed proceeding on the registration form. IETS members who are unable to attend the conference will be mailed a CD copy of the proceedings after the conclusion of the event.

### Reminder

Wear your name tag at all functions; it is your admission pass to all conference events. Tickets for special events and functions will be collected at the door or at the table. All tickets look alike, but event name, location, and date will appear on them. Be sure to give the ticket takers the appropriate ticket.

### Special Needs

All conference rooms are wheelchair accessible. Please indicate any special needs when sending in your registration form.

### Questions?

All inquiries about preregistration or the conference should be made to the IETS Business Office, 2441 Village Green Place, Champaign, IL 61822 USA; phone: (217) 398-4697; FAX: (217) 398-4119; e-mail: [iets@assoqh.org](mailto:iets@assoqh.org).

## On-Site Registration Hours

Friday, January 6	16:00–19:00
Preregistration pickup only – Onsite registration to start Saturday	
Saturday, January 7	07:00–18:00
Sunday, January 8	07:00–18:00
Monday, January 9	07:30–16:00
Tuesday, January 10	08:00–15:00

## At the Conference

Your conference packet will be available at the Registration Desk during registration hours.

## Venue

Renaissance Glendale Hotel & Spa, Phoenix, Arizona

## Lunch and Dining Options

The Soleil offers American cuisine designed with a Southwest flair. They are open for breakfast, lunch, and dinner and have a casual dress code. At Ray's you will find beverages and light appetizers; they are also open for breakfast, lunch, and dinner. For additional food choices there is Jimmy Buffet's Margaritaville, Camarones Restaurant & Cantina, Yard House Restaurant, Kabuki, and Gordon Biersch Brewery, as well as many other choices.

## Climate

From the desert floor to the highest mountain peak, Arizona's renowned sunshine ensures that nearly every day is a perfect one for sightseeing, playing golf, skiing a slope, or simply relaxing by a sparkling swimming pool. Generally, peak season in the desert lasts from January through March, shoulder season is from April to May and September through December, and value season is June through August. Peak and value seasons in mountainous regions are the opposite of the desert areas. The temperature during this time of the year will normally be around a high of 68°F (20°C) and a low of 38°F (3°C).

## What to Wear

Depending on the time of year and where one plans to travel in Arizona, anything from a swimsuit to a winter jacket may be appropriate. Overall, dress is casual with an emphasis on comfort. Few restaurants require jackets and ties for dining. Jeans and Western wear are always in style. If attending a cultural event or dining at one of the finer restaurants, bring along a more formal outfit. During summer, shorts and sandals are appropriate during the day, and a sweater or light jacket is perfect for the evenings. In the cooler months, a sweater or light jacket is perfect in the desert for evenings, and a winter jacket is recommended in the mountains. Also, wide-brim hats, sunglasses, and sunscreen are recommended year-round.

## Currency

The US dollar is the legal tender in the United States. There are currency exchange centers located in Phoenix Airport. For up-to-date currency exchange information, check the Universal Currency Converter™ at <http://www.xe.net/ucc/>. International credit cards are accepted throughout the country, and traveler's checks can be changed at banks, hotels, resorts, and most city stores.

## Electricity

The standard for the United States is 110 volts. An adapter is needed for electrical appliances using another type of current, such as 220-volt European systems.

## Language

The official conference language will be English.

## Time Zone

Arizona is located in the Mountain Standard Time Zone (MST), which is 5 hours behind GMT (= GMT - 0700).

## Passport and Visa Information

As with all IETS meetings, we expect attendees from all over the world. All foreigners who wish to enter the United States require a passport valid for six months. Invitation letters are located at [http://www.iets.org/2012/inv\\_letter\\_request\\_form.asp](http://www.iets.org/2012/inv_letter_request_form.asp).

Note:

- (a) For nationals included in the Visa Waiver Program (see Visas), passports must be valid for at least 90 days from date of entry.
- (b) All travelers entering the USA under the Visa Waiver Program require individual machine-readable passports. Children included on a parent's passport also now require their own machine-readable passport. Travelers not in possession of machine-readable passports will require a valid USA entry visa.
- (c) As of 12 January 2009, all travelers visiting the US under the Visa Waiver Program are to provide details online 72 hours prior to travel. For more information, please see below.
- (d) Passports issued on or after 26 October 2005 will need to have a biometric identifier in order for the holder to travel visa free under the Visa Waiver Program. Machine-readable passports issued between 26 October 2005 and 25 October 2006 require a digital photograph printed on the data page or an integrated chip with information from the data page. Machine-readable passports issued on or after 26 October 2006 will require an integrated chip with information from the data page (e-passport).

Visa Note:

- (a) Landed Immigrants of Canada and British residents of Bermuda who are citizens of, and have valid passports from, Commonwealth countries or Ireland are not eligible to enter the USA without a visa.
- (b) All passengers using US airports for transit purposes are required to obtain a transit visa. This does not affect qualified travelers travelling visa free under the Visa Waiver Program.
- (c) To qualify for visa-free travel under the Visa Waiver Program, nationals must travel on a valid passport, for holiday, transit, or business purposes only and for a stay not exceeding 90 days. (ESTA). See below for more information.
- (d) Holders of UK passports with the endorsement British Subject, British Dependent Territories Citizen, British Protected Person, British Overseas Citizen, or British National (Overseas) Citizen do not qualify for the Visa Waiver Program. A passport that states holder has right of abode or indefinite leave to remain in the UK does not qualify for visa-free travel.
- (e) A visa does not expire with the expiry of the holder's passport. An unexpired, endorsed visa in an expired passport may be presented for entry into the USA, as long as the visa itself has not been cancelled, is undamaged, is less than 10 years old, and is presented with a valid nonexpired passport, provided that both passports are for the same nationality.

## Travel Information

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### **Air Transportation**

The main airport serving Arizona, Phoenix Sky Harbor entertains more than 36 million passengers per year and is served by 21 airlines, which provide nonstop service to more than 100 cities in the United States and around the world. Nonstop international service is provided by Aeromexico (Mexico), British Airways (London's Gatwick Airport), Lufthansa German Airlines (Frankfurt, Germany), Air Canada (Toronto), Air Jamaica (Montego Bay), and America West Airlines (Canada and Mexico).

Sky Harbor operates three passenger terminals. Ten national car rental agencies have service counters in the baggage claims area in each terminal. Some companies have cars available at the terminal, and others use a courtesy van or bus to shuttle visitors to their off-airport locations. In addition, limousine, taxi, and shuttle services are available from any terminal.

### **Ground Transportation**

Super Shuttle-ExecuCar

4610 S. 35th Street

Phoenix, AZ 85040

602-225-2225/1-800-258-3826

[www.supershuttle.com](http://www.supershuttle.com)

[www.execucar.com](http://www.execucar.com)

Super Shuttle-ExecuCar, the nation's leader in airport transportation, offers convenient, reliable, and affordable 24-hour service daily. Airport shuttle and around-town private luxury sedan transfers are available from home, office, or hotel. They offer professional, courteous drivers and established fares. Specialty vehicles, charter rates, and group arrangements are also available.

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## Renaissance Glendale Hotel & Spa

9495 W. Coyotes Blvd.

Glendale, Arizona 85305 USA

Phone: +1-623-937-3700

<http://www.marriott.com/hotels/travel/phxgr-renaissance-phoenix-glendale-hotel-and-spa/?toDate=1/11/12&groupCode=ietieta&fromDate=1/6/12&app=resvlink>

### General Hotel Information

The West Valley's premier upscale hotel, this hotel and conference center offers "everything under the sun," with designs in rich colors inspired by desert sunsets splashed with contemporary accents and furnishings. The hotel and spa offers a fitness center, swimming pool, whirlpool, and sauna. Along with these amenities, you will find two restaurants inside the hotel, the Soleil and Ray's. The hotel is surrounded by restaurants, shops, and entertainment venues including Jobing.com Arena (home of the NHL's Phoenix Coyotes), University of Phoenix Stadium (home of the NFL's Arizona Cardinals, as well as the Tostitos Fiesta Bowl and the 2008 Super Bowl), and an AMC 20 Theater Complex, all within walking distance.

### Room Rates Available for the IETS 2012 Annual Conference

The hotel has confirmed the following guest room rates: single occupancy \$199, double occupancy \$199.

### Reservations

Please make your reservations directly with the hotel: +1-800-468-3571.

Make sure to mention that you are with the International Embryo Transfer Society Meeting, or go online: <http://www.marriott.com/hotels/travel/phxgr-renaissance-phoenix-glendale-hotel-and-spa/?toDate=1/11/12&groupCode=ietieta&fromDate=1/6/12&app=resvlink>

### Hotel Reservations

The deadline for hotel reservations is December 5, 2011. Please make your hotel reservation before this date to ensure that you receive the discounted rate.

### ***Hotel Reservations***

*The deadline for hotel reservations is **December 6, 2010.**  
Please make your hotel reservation before this date to ensure  
that you receive the discounted rate.*

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## Main Theme: Improving Outcomes Through Manipulations of the Maternal Environment

### Session I: Environmental Effects on Gamete Quality

#### *Intrafollicular Conditions as a Major Link Between Maternal Metabolism and Oocyte Quality: A Focus on Dairy Cow Fertility*

*Jo Leroy, University of Antwerp, Belgium*

Reduced oocyte and embryo quality are recognized as major factors in the problem of disappointing fertility in high-producing dairy cows. This review aims to shed more light on the importance of the intrafollicular environment in the subfertility problem in dairy cows. Metabolic disturbances associated with negative energy balance (NEB) early postpartum are associated with ovarian dysfunction. Changes in the growth pattern of the ovarian follicle during a period of NEB can indirectly affect oocyte quality. Furthermore, a maternal metabolic disorder (linked with NEB or nutritionally induced) may alter the endocrine and biochemical composition of the follicular fluid, the micro-environment of the growing and maturing female gamete. The maturing oocyte is very sensitive to any perturbation in its direct environment, and *in vitro* maturation models revealed that some of these metabolic changes reduce the oocyte's developmental competence. Also, embryo quality is significantly reduced due to maturation in adverse conditions. Well-balanced and timed oocyte metabolism and gene expression are crucial to safeguard an optimal oocyte development. In that perspective, metabolome and transcriptome parameters of the oocyte may serve to predict reproductive success rates. Finally, there is growing evidence that adverse conditions for oocyte growth and maturation may also jeopardize the health and performance of the offspring.

#### *Modification of Spermatozoa Quality in Mature Small Ruminants*

*Graeme Martin, University of Western Australia, Australia*

This review paper is based largely, but not entirely, on the assumption that gamete quality is directly linked to sperm output and thus testicular mass, an approach made necessary by the absence of a large body of data on factors that affect gamete quality in ruminants. The premise is that the documented changes in the efficiency of sperm production per gram of testicular tissue when the testis is growing or shrinking are a clear indicator of changes in the rates of cell loss during the process of spermatogenesis, probably through apoptosis. We therefore postulate that the spermatozoa that do survive when the testis is shrinking are of a lower quality than those that are produced when the testis is growing and the rate of sperm survival is increasing. In adult small ruminants in particular, testicular mass and sperm production are highly labile and can be manipulated by management of photoperiod (melatonin), nutrition, genetics, and behavior (mating pressure). Importantly, these factors do not act independently of each other, rather, the outcomes in terms of sperm production are dictated by interactions. It therefore seems likely that spermatozoa quality will be affected by these same factors, but definitive answers await detailed studies.

### Session II: Nutrition, Obesity, and Fertility

#### *Growth Hormone Regulation of Follicular Development*

*Matt Lucy, University of Missouri, USA*

The somatotrophic axis—consisting of growth hormone (GH), the insulin-like growth factors 1 and 2 (IGF1 and IGF2), GH binding protein (GHBP), IGF binding proteins (IGFBP) 1 to 6, and the cell-surface receptors for GH and the IGF—has major effects on growth, lactation, and reproduction. The functionality of the somatotrophic axis depends in part on the expression of liver GH receptor (GHR), which determines the amount of IGF1 released from the liver in response to GH. The IGF1 acts as a pleiotropic growth factor and also serves as the endocrine negative feedback signal controlling GH. Cells within the reproductive tract can respond directly to GH but to a lesser degree than the primary target tissues—liver, muscle, adipose tissue, and bone. The major effect that GH has on reproduction, therefore, may be secondary to its systemic effects on metabolism (including insulin sensitivity) or secondary to the capacity for GH to control IGF1 secretion. Insulin-like growth factor 1 and IGFBP are also synthesised within the ovary, and this local synthesis is a component of the collective IGF1 action on the follicle.

#### *The Impact of Obesity on Oocytes—Evidence for Lipotoxicity Mechanisms*

*Rebecca Robker, University of Adelaide, Australia*

Obese women often experience reduced pregnancy rates and even with assisted reproduction have fewer oocytes retrieved and lower success rates. We have sought to understand how alterations in the ovarian environment of obese females lead to impaired oocyte maturation and early embryo development. Female mice fed high-fat diets have oocytes that contain dramatically more lipid than oocytes from mice fed control diets, and this is associated with induction of lipotoxicity responses,

including endoplasmic reticulum (ER) stress, decreased mitochondrial membrane potential, and apoptosis, as well as reduced ovulation and fertilization rates. To determine whether similar events occur in ovaries of obese women, follicular fluid and granulosa/cumulus cells were obtained from women of varying body mass indices (BMI) undergoing assisted reproduction. Levels of triglyceride lipid in follicle fluid was positively correlated with increasing BMI, and there was higher expression of ER stress marker ATF4 in granulosa cells from obese women compared with levels in nonobese women. Thus there are marked changes, including ER stress, in the ovarian follicle environment during obesity that are likely to contribute to infertility.

### **Session III: Periconceptional Events Alter Subsequent Development**

#### *Adaptive Responses of the Embryo to Maternal Diet and Consequences for Postimplantation Development*

*Tom Fleming, University of Southampton, United Kingdom*

Periconception nutrition in several animal models may influence developmental plasticity, leading to altered growth, physiology, and metabolism, often associated with adult disease. Other animal models (periconceptional maternal sickness; embryo culture mimicking ART) further demonstrate long-term programming of adult phenotype from diverse early environmental conditions. We investigated nutritional programming in rodents mainly with maternal low-protein diets administered during preimplantation development, with control nutrition provided elsewhere. This model revealed cardiovascular dysfunction (notably hypertension and attenuation in arterial relaxation), behavioral abnormalities, metabolic effects, and altered growth in offspring. Undernutrition during the periconceptional period leading to fetal and adult cardiovascular abnormalities has also been reported for sheep. Our mouse model indicates nutritional programming occurs by the blastocyst stage, mediated through altered metabolic signaling that changes homeostatic regulators affecting ribosome biogenesis, protein translation, and cellular proliferation. Blastocysts exhibit compensatory responses to poor maternal diet within extra-embryonic lineages to enhance nutrient retrieval and growth from the mother during later gestation. However, activation of compensatory growth, while promoting offspring competitive fitness, occurs at the expense of later disease risk. Our studies indicate the importance of maternal nutrition around conception for optimizing health into adulthood. Funded by BBSRC, NICHD, MRC, and Gerald Kerkut Trust.

#### *Periconceptional Influences on Offspring Sex Ratio and Placental Responses*

*Cheryl Rosenfeld, University of Missouri, USA*

Maternal diet and secondary factors strikingly influence fetal outcomes, including biasing offspring sex ratio and altering molecular biological responses in the placenta. Alterations in the in utero environment lead to profound developmental origin of health and disease outcomes, with males in general being at greater risk. Female mice maintained on a very high fat diet birth more sons than those on a chow-based and low fat, high carbohydrate diet, with the latter group producing more daughters. However, neither the underlying mechanisms that contribute to this shift in offspring sex ratio nor when they occur during pregnancy has been resolved. We consider the evidence that maternal diet and other factors influence secondary sex ratio in a variety of species and discuss when this skewing might occur. We examine how fetal sex and maternal diet influence gene expression patterns in the murine placenta, which serves as the primary nutrient acquisition and communication organ between mother and her developing pups. Adaptations to diet observed as changes in gene expression are likely to provide insight into how the placenta buffers the fetus from environmental shifts in nutrient availability during pregnancy and whether male and female conceptuses respond differently to such challenges.

### **Session IV: Embryo Quality and Implantation**

#### *The Role of Fatty Acids in Oocyte and Early Embryo Development*

*Roger Sturmey, University of Hull, United Kingdom*

Growing evidence suggests that endogenous and exogenous fatty acids play diverse roles in developing mammalian oocytes and early embryos. In this review, we describe some of the regulatory roles of fatty acids in early development, in addition to their metabolic functions. We focus initially on the provision and effect of individual fatty acids and then discuss how these might affect metabolism, oxidative stress, membrane composition, cell signaling events, and gene expression. We propose that ongoing research should focus on physiologically relevant ratios and combinations of fatty acids, rather than isolated individual fatty acids, because their combined roles are both subtle and complex. Changing the ratio of specific fatty acids in the diet of animal models and in vitro culture medium can cause significant dysregulation of cellular processes and development, an issue that extends to human fertility.

*Novel Aspects of Endometrial Function: A Biological Sensor of Embryo Quality and Driver of Pregnancy Success*

*Olivier Sandra, INRA, France*

Successful pregnancy depends on complex biological processes that are regulated temporally and spatially throughout gestation. The molecular basis of these processes has been mainly examined in relation to gamete quality, early blastocyst development, and placental function, and data have been generated showing perturbations of these developmental stages by environmental insults or embryo biotechnologies. During the time period spanning the entry of the blastocyst into the uterine cavity to implantation of the embryo, biological functions of the endometrium have been extensively studied, namely uterine receptivity (controlled by maternal factors) and maternal pregnancy recognition (that requires conceptus-produced signals). Nevertheless, recent data based on experimental perturbations have unveiled unexpected biological properties of the endometrium that make this tissue a dynamic and reactive entity. Persistent or transient modifications in organization and functionality of the endometrium can dramatically affect preimplantation embryo trajectory through epigenetic alterations with lasting consequences on later stages of pregnancy, including placentation, foetal development, pregnancy outcome, and postnatal health. Recent data—with a special focus on assisted reproductive technologies and ruminant models—will be presented that illustrate the sensor and driver properties of the endometrium.

**Practitioners' Think Tank**

*How Can We Achieve the Highest Fertility in Our Herds?*

*Chair/Discussion Leader: Patrick Blondin*

How can we achieve the highest fertility in our herds? This is a very broad question that involves multiple parameters. As scientists and practitioners, we approach this question from different angles. To address the fertility of a herd, we must evaluate various parameters such as the semen quality used for embryo production, the donor superovulation protocols, the embryo quality and grading system used (it is the same for in vivo and in vitro embryos), the status of the animals inseminated or the recipients that received embryos, and many other parameters. The Think Tank is an excellent opportunity for participants to discuss these questions. A panel of speakers will share their experiences and data, and we hope this will generate an exchange of information that will guide all participants in future aspects to consider and monitor to increase the overall fertility of bovine herds. The hope of this session is to motivate IETS participants to engage in rewarding discussions that will become topics of discussion for future meetings!

**Session V: Development of the Embryo and Feto-Placental Unit**

*Environmental Regulation of Placental Phenotype: Implications for Fetal Growth*

*Abby Fowden, University of Cambridge, United Kingdom*

Environmental conditions during pregnancy determine birth weight, neonatal viability, and adult phenotype in human and other animals. In part, these effects may be mediated by the placenta, the principal source of nutrients for fetal development. However, little is known about the environmental regulation of placental phenotype per se. Generally, placental weight is reduced by suboptimal conditions during pregnancy, but compensatory adaptations can occur in the placental nutrient transport capacity to help maintain fetal growth. In vivo studies show that transplacental glucose and amino acid transfer adapt to the prevailing conditions induced by manipulating maternal calorie intake, dietary composition, and hormone exposure. These adaptations are due to changes in placental morphology, metabolism, and abundance of specific nutrient transporters. Similarly, there are changes in placental growth and phenotype after embryo transfer and other assisted reproductive technologies. However, the systemic, cellular, and molecular mechanisms involved in signalling environmental cues to the trophoblast remain largely unknown. Ultimately, the ability of the placenta to balance the competing interests of mother and fetus in resource allocation may determine not only the success of pregnancy in producing viable neonates but also the long-term health of the offspring.

*Programming the Offspring Through Altered Uteroplacental Hemodynamics: How Maternal Environment Impacts Uterine and Umbilical Blood Flow in Cattle, Sheep, and Pigs*

*Kim Vonnahme, North Dakota State University, USA*

Because placental growth and vascularity precedes exponential fetal growth, not only is proper establishment of the placenta important, but also a continual plasticity of placental function throughout gestation. Inadequate maternal environment, such as nutritional plane, has been documented to alter fetal organogenesis and growth, thus leading to improper postnatal growth and performance in many livestock species. The timing and duration of maternal nutritional restriction appears to influence

the capillary vascularity, angiogenic profile, and vascular function of the placenta in cattle and sheep. In environments where fetal growth or fetal organogenesis are compromised, potential therapeutics may augment placental nutrient transport capacity and improve offspring performance. Supplementation of specific nutrients, including protein, as well as hormone supplements, such as indolamines, during times of nutrient restriction may assist placental function. Current use of Doppler ultrasonography has allowed for repeated measurements of uterine and umbilical blood flow including assessment of uteroplacental hemodynamics in cattle, sheep, and swine. Moreover, these variables can be monitored in conjunction with placental capacity and fetal growth at specific time points of gestation. Elucidating the consequences of inadequate maternal intake on the continual plasticity of placental function will allow us to determine the proper timing and duration for intervention.

### **Practitioners' Forum**

*Recent Advances in the Use of IVF and IVF Frozen Embryos in Commercial Embryo Transfer*

*Chair: Peter Hansen, University of Florida*

*John Schmidt, TransOva. Incorporation of OPU, IVF and Sexed Semen in Commercial ET Programs in the USA*

*Claire Ponsart, Association Européenne de Transfert Embryonnaire. Adoption or Lack of Adoption of IVF Technologies in the European ET Industry*

*Joao Henrique Viana, Embrapa Dairy Cattle Research Center. Use of IVF Technologies in South America*

### *CANDES Scientific Session*

*Advances in Reproductive Technologies in CANDES*

Nucharin Songsasen, PhD, from the Smithsonian Conservation Biology Institute, at Front Royal, Virginia, will speak on Canid Reproduction: Challenges and Current Knowledge. Along with Dr. Songsasen's presentation, there will be six short communications from accepted poster abstracts that include companion animals, non-domestic and/or endangered species in their research.

### **Session VI: Keynote Address**

*Evidence for Similar Changes in Offspring Phenotype Following Either Maternal Undernutrition or Overnutrition: Potential Impact on Fetal Epigenetic Mechanisms*

*Stephen Ford, University of Wyoming, USA*

Evidence is presented supporting the concept that both maternal undernutrition and overnutrition can induce the same cadre of fetal organ and tissue abnormalities and lead to the same postnatal metabolic changes in the resulting offspring. Furthermore, evidence is presented that in both overnourished and undernourished ovine pregnancies, fetuses experience a period of nutrient restriction as a result of alterations in placental delivery of maternal nutrients into the fetal compartment. It is further argued that this bout of reduced fetal nutrition in undernourished and overnourished pregnancies leads to the development of a thrifty phenotype, in which the fetus attempts to alter the function of its tissues and organs to maximize its chances of survival in a postnatal environment deficient in nutrients. Importantly, evidence is presented to support the concept that these phenotypic changes in offspring quality resulting from maternal malnutrition are transmitted to subsequent generations, independent of subsequent maternal nutritional inputs.



## Recent Advances in Bovine Reproduction and Embryo Transfer

Phoenix, Arizona  
Saturday, January 7, 2012

- 08:00 **Opening remarks and introductory comments**
- 08:30 **The physiology of multifactorial problems limiting the establishment of pregnancy in dairy cattle** (Alex Evans, Ireland)
- 09:15 **Improving fertility to timed-AI by manipulation of circulating progesterone concentrations in lactating dairy cattle** (Milo Wiltbank, USA)
- 10:00 Coffee break
- 10:30 **The use of endocrine treatments to improve pregnancy rates in cattle** (Jose Santos, USA)
- 11:15 **Impact of circulating concentrations of progesterone and antral age of the ovulatory follicle on fertility of high producing lactating dairy cows** (Richard Pursley, USA)
- 12:00 Lunch
- 13:30 **Embryo death in cattle: An update** (Michael Diskin, Ireland)
- 14:15 Coffee break
- 14:45 **The effects of endometritis on the establishment of pregnancy** (Robert Gilbert, USA)
- 15:30 **Treatments for the synchronization of bovine recipients for fixed-time embryo transfer and improvement of pregnancy rates** (Gabriel Bo, Argentina)
- 16:15 **The evolution of superovulation protocols in cattle** (Reuben Mapletoft, Canada)
- 17:00 General discussion

Sponsored by Bioniche Animal Health.



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## The Use of Domestic Animals as Biomedical Models

Phoenix, Arizona  
Saturday, January 7, 2012

- 08:00–08:15 **Opening and welcome:** Fulvio Gandolfi (University of Milan, Italy), Matt Wheeler (University of Illinois, USA), Pascale Chavatte-Palmer (INRA, PremUp, France)
- 08:15–08:45 **Animal models for the study of human ovarian function** (Gregg Adams, University of Saskatoon, Canada)
- 08:45–09:15 **The pig as a biomedical model—How the National Swine Resource and Research Center can help you** (Eric Walters, University of Missouri, USA)
- 09:15–09:45 **Progress towards the derivation of porcine induced pluripotent stem cells** (Stoyan Petkov, Institute of Farm Animal Genetics, Germany)
- 09:45–10:15 **Coffee break**
- 10:15–10:45 **Generation and characterization of induced pluripotent stem cells (iPSCs) from adult canine fibroblasts** (Jorge Pedrahita, North Carolina State University, USA)
- 10:45–11:15 **Introducing pluripotency in ruminants** (Paul Verma, Monash University, Australia)
- 11:15–11:45 **Generation of rabbit pluripotent stem cell lines** (Andras Dynnes, BioTalentum Ltd., Hungary)
- 11:45–13:15 **Lunch break**
- 13:15–13:45 **The use of ruminants for biomedical research in perinatology** (Pascale Chavatte-Palmer, INRA, France)
- 13:45–14:15 **The horse as a large animal model for extra-fetal derived cell therapy of chronic respiratory diseases** (Anna Lange Consiglio, University of Milan, Italy)
- 14:15–14:45 **The importance of large animal models for translational research in bone tissue engineering** (Scott Hollister, University of Michigan, USA)
- 14:45–15:15 **Coffee break**
- 15:15–15:45 **Impact of large mammals models in immunology** (Isabelle Schwartz, INRA, France)
- 15:45–16:15 **Neurodegenerative diseases** (Anthony Chan, Emory University, USA)
- 16:15–16:45 **Reprogramming of porcine epiblast-derived neural progenitor cells to pluripotency** (Mikkel A Rasmussen, University of Copenhagen, Denmark)
- 16:45–17:00 **Conclusion and closure**

Sponsored by INRA and premup



## Special Events

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### **Morulas Pub Night**

Saturday, January 7, 2012

18:30–19:30

Following the Morulas business meeting, all trainees are invited to gather at a local pub to start the meeting off in friendship. Hosted by IETS and the Morulas student group, this will be a great opportunity to establish a network at the start of the meeting and build the Morulas association. Student membership to IETS or the Morulas is not necessary, and two drinks with appetizers are included. Tickets are required, so make sure you sign up early for this event.

### **Morulas Journal Club Luncheon**

Sunday, January 8, 2012

12:30–13:30

Learn what it takes to prepare a manuscript for publication at this Morulas-hosted luncheon. During this informal presentation, the speaker will discuss scientific writing and the manuscript submission process in today's competitive research field. This will be a great opportunity for students to receive guidance and helpful hints on preparing well-written journal articles (Ticket Required).

### **Welcome Reception**

Sunday, January 8, 2012

20:00

### **Open Meeting of the Domestic Animal Biomedical Embryology Committee**

Sunday, January 8, 2012

18:00–19:00

### **Practitioners' Think Tank—How Can We Achieve the Highest Fertility in Our Herds?**

Monday, January 9, 2012

10:30–12:30

### **Morulas and Mentors Luncheon**

Monday, January 9, 2012

All trainees are encouraged to attend this luncheon. Take advantage of the opportunity to build one-on-one connections with established researchers in the society and meet colleagues with similar research interests. Membership to IETS or the Morulas is not yet required to attend this event (Ticket Required).

### **Open Meeting of the Companion Animals, Non-Domestic and Endangered Species Committee**

Monday, January 9, 2012

18:00–19:00

### **Open Meeting of the Health and Science Advisory Committee**

Monday, January 9, 2012

18:00–19:00

### **Practitioners' Forum—Recent Advances in the Use of IVF and IVF Frozen Embryos in Commercial Embryo Transfer**

Tuesday, January 10, 2012

10:30–12:30

### **10th IETS Annual Running Competition**

Tuesday, January 10, 2012

16:30–17:30

### **Closing Party**

Tuesday, January 10, 2012

19:00

Glendale is a city with a diverse history that is treasured not only by its residents and community members, but also by the visitors who come and experience the roots of the city. Cowboys, farmers, and ranchers wove the fabric that is the Glendale of today, and visitors are afforded a number of ways to catch a glimpse of these pioneers at the many cultural and heritage attractions within the city.

### **Sports—Glendale’s Got Game!**

Crack of the bat. Rev of the engine. Thud of a perfect tackle. Crunch of a shoulder into the glass. Forget your serenity CD, these are the new sounds of the desert, or at least in the desert of Glendale and the West Valley—an area fast becoming the nation’s newest sports mecca, with a lineup of professional football, hockey, spring training baseball, auto racing, NCAA regionals, and home to the Annual Tostitos Fiesta Bowl and the 2008 Super Bowl—all of which exude, embrace, and even fuel that famous Arizona Heat. Keep informed on all the latest Glendale Mega Event information by visiting [www.Glendale-GotGame.com](http://www.Glendale-GotGame.com).

### **Jobing.com Arena—Home of the NHL Coyotes**

9400 W. Maryland Ave.  
Glendale, AZ 85303  
Phone: (623) 772-3200  
[www.jobingarena.com](http://www.jobingarena.com)

Jobing.com Arena is an award-winning, state-of-the-art, multipurpose facility that hosts national and international chart-topping recording artists, a variety of sporting events, and exciting family shows each year. Owned by the City of Glendale, Jobing.com Arena is home to the National Hockey League Phoenix Coyotes and has established itself as Arizona’s premiere sports and entertainment facility. With two separate concourses on two seating levels, Jobing.com Arena provides guests with nonrestricted views of the action featuring an intimate seating bowl with all the modern amenities.

### **Challenger Space Center**

21170 N. 83rd Ave.  
Peoria, AZ 85382  
623-322-2006  
[www.azchallenger.net](http://www.azchallenger.net)

The Challenger Space Center is Arizona’s only museum dedicated to space and space exploration. Come view hundreds of artifacts and exhibits from America’s past NASA launches and space missions, or take part in one of the center’s simulated space missions, where you will assume the roles of mission control specialists and astronauts aboard the Center’s \$1 million simulated International Space Station, much like the one orbiting Earth today! Monthly themed activities include stargazing, the indoor planetarium, family fun days, special guest speakers, summer and holiday day camps, and more. The center is available for private and corporate parties, weddings, and anniversary receptions too!

### **Family Tour**

There are several options to enhance your stay in Phoenix during the Annual Conference. For more details, please visit <http://www.visitglendale.com/plan/index.html>.

## **REMINDER**

**Early registration deadline is November 16, 2011**

***Looking for  
that perfect job?***

***Looking for the  
perfect employee?***

***Let IETS end your search at the Job Resource Center  
at the 2012 Annual Conference in Phoenix***

If you are looking for the perfect job, please bring 10 copies of your resume to the IETS Annual Conference in Phoenix, Arizona. Graduates, undergraduates, and professionals looking for a job are encouraged to participate. If you are unable to attend the conference but would like to participate in the Job Resource Center, please send your 10 resumes by December 1, 2011, to IETS Job Resource Center, 2441 Village Green Place, Champaign, IL 61822 USA.

If your company is looking for the perfect employee, please bring 10 copies of your position announcement including details such as qualifications and deadlines to the IETS Annual Conference. Companies, universities, and government agencies are encouraged to participate. If you are unable to attend the conference but would like to participate in the Job Resource Center, please send your 10 position announcements by December 1, 2011, to IETS Job Resource Center, 2441 Village Green Place, Champaign, IL 61822 USA.

Membership Application  
International Embryo Transfer Society  
2012 Annual Conference Special

Join the IETS  
now and save  
on registration  
fees for the  
2012 Annual  
Conference in  
Phoenix, Arizona

By becoming a member of the IETS  
now, you will enjoy a reduced  
rate when you register for the  
2012 Annual Conference.

As a member, you will receive the  
online quarterly *Embryo Trans-  
fer Newsletter* of the IETS, a free  
online subscription to *Reproduc-  
tion, Fertility and Development*,  
an online searchable membership  
directory, discounted rates for all  
product items (manuals, books,  
videos, and slides) offered by the  
IETS, and discounts and advance  
information on future conferences  
and events. You will also be enti-  
tled to reduced subscription rates to  
*Theriogenology* and *Animal Repro-  
duction Science*.

*Yes!* I'd like to become a new member of the  
IETS now for 2012 and save when I register for the  
conference.

Name \_\_\_\_\_

Last First M.I.

Title \_\_\_\_\_

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State/Province \_\_\_\_\_

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Country \_\_\_\_\_

Phone \_\_\_\_\_

FAX \_\_\_\_\_

E-mail \_\_\_\_\_

**Membership Type**

Full Member US \$160\*

Associate Member US \$160\*

Student Member US \$80\*

*\*Includes a \$10 administrative fee for joining  
with the Annual Conference.*

**Payment**

Check # \_\_\_\_\_

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**Please mail with registration and remittance to:**

**IETS**  
**2441 Village Green Place**  
**Champaign, IL 61822 USA**  
**(217) 398-4697, FAX: (217) 398-4119**  
**E-mail: [iets@assoqh.org](mailto:iets@assoqh.org)**  
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