Program Book

37th Annual Conference of the International Embryo Transfer Society

Theme:
Reproductive Biotechnology at the Interface Between Animal Agriculture and Biomedical Research

January 8-12, 2011
Wyndham Orlando Resort
Orlando, Florida

Co-Chairs of the Scientific Program:
Ciro M. Barros and Eckhard Wolf

TABLE OF CONTENTS

2010-2011 IETS
Board of Governors

Patrick Lonergan, Immediate Past President

Peter Farin, President

Gabriel Bo, Vice President

Peter Hansen, Treasurer

Gregg Adams, Governor

Pascale Chavatte-Palmer, Governor

Andras Dinnyes, Governor

Lucky Nedambale, Governor

Matthew Wheeler, Governor

2011 PREFACE AND ACKNOWLEDGMENTS

The 37th Annual Meeting of the International Embryo Transfer Society will be held at the Wyndham Orlando Resort, Orlando, Florida, on January 8–12, 2011. The theme of this year's program is "Reproductive Biotechnology at the Interface Between Animal Agriculture and Biomedical Research." The theme emphasizes the unique opportunities and challenges for a rapidly expanding field. The program may be seen as an experiment to attract the interest of the broad audience joining IETS meetings: researchers, practitioners, and students alike. Three sessions will deal with recent developments in fields of immediate practical relevance: regulation and manipulation of follicular development, and cryopreservation of germ cells and embryos. A session on transgenic livestock in agriculture and biomedicine will provide an update on this attractive topic, with particular emphasis on tailored large animal models for translational biomedical research. Finally two sessions will discuss molecular profiles at the epigenome, transcriptome, and proteome levels as sensors and drivers of biological processes related to reproduction and fertility. An intellectual and visual highlight will be the keynote lecture by Thomas Cremer, demonstrating the most recent developments in light microscopy and their use for gaining unprecedented insights into the functional architecture of cell nuclei.

In addition to the 11 invited lectures, we will have nine short oral presentations selected from the 339 abstracts that have been submitted and positively evaluated. These presentations, together with the oral presentations of the student competition, will give excellent young scientists the chance to present their results to a broad and competent audience and to establish themselves as influential members of the community.

It is obvious that the organization of an IETS meeting required the help of many of our society's members and colleagues, and we are indebted to all those who willingly agreed to assist us. Foremost we would like to thank the invited speakers and their coauthors for providing excellent overviews of their topics. We are also grateful to the section editors and the reviewers of manuscripts and abstracts, who all provided their expert evaluations in a timely manner.

Special thanks go to Jose Santos and Cliff Lamb for arranging the Preconference Symposium, "Advances in Bovine Reproduction and Embryo Technology," to Fulvio Gandolfi and the IETS DABE Committee for organizing the 2nd DABE workshop, "Plasticity, Fate Control, and Therapeutic Safety of Stem Cells," and the IETS Committee on Companion Animals, Non-Domestic and Endangered Species (CANDES) for arranging the Postconference Seminar, "International Regulations and Requirements for the Import/Export of Reproductive Biomaterials: Embryos, Semen, and Tissues."

We would also like to thank the Board of Governors of the IETS for their continuous support in the organization of the conference and the contribution and participation of all the companies that decided to sponsor and participate in the conference. Without their important economic contributions, this meeting would not have been possible.

We would like to especially thank Debi Seymour, the executive secretary of IETS, and the local organizing committee chaired by Peter J. Hansen for their commitment and all efforts in preparing this meeting and making it a success.

Dr. Tony Flint, editor-in-chief, and Caroline Hadley, publisher of Reproduction, Fertility and Development, are gratefully acknowledged for production and publication of the conference proceedings.

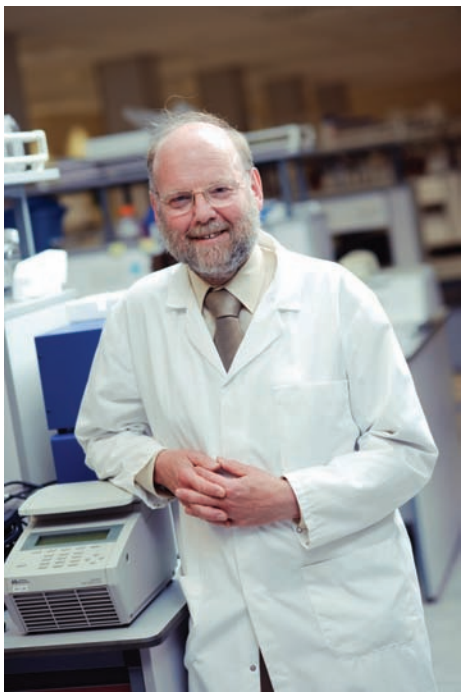
Finally, we thank all attendees for contributing to the conference and hope that the meeting will be an interesting and pleasant event for all.

Eckhard Wolf and Ciro Barros

Program Co-Chairs

2011 RECIPIENT OF THE IETS PIONEER AWARD

IAN WILMUT



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Award Presentation: Monday, January 10 at 16:30

Previous Recipients

R. J. Mapletoft (2010)
S. P. Leibo (2009)
G. Seidel, Jr. (2008)
A. Iritani (2007)
D. Kraemer (2006)
S. Willadsen (2005)
B. Brackett (2004)
K. Betteridge (2003)
R.H. Foote (2002)
P.J. Dziuk (2001)
R. Yanagimachi (2000)
R.M. Moor (1999)
I. Gordon (1998)
S. Wintenberger-Torres (1997)
W.K. Whitten (1996)
C.R. Austin (1995)
N.W. Moore (1994)
R.G. Edwards (1993)
R.L. Brinster (1992)
A.K. Tarkowski (1991)
J.D. Biggers (1990)
C. Thibault (1989)
A.L. McLaren and D. Michie (1988)
E.J.C. Polge (1987)
T.M. Sugie (1986)
L.E.A. Rowson (1985)
L.E. Casida (1984)
M.C. Chang (1983)
R.O. Berry (1982)

MAP OF THE VENUE

WYNDHAM ORLANDO RESORT MEETING ROOMS

CALENDAR OF EVENTS

Thursday, January 6, 2011

9:00 – 18:00 IETS Board of Governors Meeting (Largo Key)

Friday, January 7, 2011

9:00 – 18:00 IETS Board of Governors Meeting (Largo Key)
9:00 – 18:00 Health and Safety Advisory Committee (HASAC) – Research Subcommittee (Cedar/Marathon)
16:00 – 19:00 Registration (pick-up of preregistrations only) (Palms Ballroom Foyer)
13:00 – 20:00 W2171 Research Committee Meeting (Orange)

Saturday, January 8, 2011

7:00 – 18:00 Registration (Palms Ballroom Foyer)
8:00 – 17:00 Preconference Symposium – Advances in Bovine Reproduction and Embryo Technology (Jasmine)
9:00 – 12:00 Health and Safety Advisory Committee (HASAC) – Regulatory Subcommittee (Azalea)
13:00 – 18:00 Poster Setup (Palms Ballroom)
13:00 – 17:00 IETS Foundation Board of Trustees Meeting (Executive Boardroom)
13:00 – 18:00 2nd DABE Workshop: Plasticity, Fate Control, and Therapeutic Safety of Stem Cells (Magnolia)
13:00 – 18:00 Commercial Exhibit Setup (Palms Ballroom)
14:00 – 17:00 Health and Safety Advisory Committee (HASAC) – Food Safety Subcommittee (Azalea)
17:00 – 18:00 IETS Student Group (The Morulas) Meet and Greet (Longboat)

Sunday, January 9, 2011

6:00 – 8:00 Poster Setup (Palms Ballroom)
7:00 – 18:00 Registration (Palms Ballroom Foyer)
7:30 – 8:30 Past Presidents' Breakfast (Cedar/Marathon)
7:30 – 8:30 Student Competition Breakfast with Foundation Education Committee (Longboat Key)
8:00 – 17:00 Commercial Exhibition (Palms Ballroom)
8:00 – 17:00 A/V Library/Speaker Preparation (Hibiscus)
8:30 – 9:30 IETS Foundation Education Committee (Largo Key)
8:45 – 9:00 Opening and Welcome (Floral Ballroom)
9:00 – 10:30 Session I: Follicular Reserve
10:30 – 11:00 Refreshment Break/Exhibition (Palms Ballroom)
11:00 – 12:30 IETS Foundation Student Competition Presentations (Floral Ballroom)
12:30 – 14:00 Lunch Break
12:30 – 14:00 IETS Board Luncheon with Affiliate Society Representatives (Azalea)
12:30 – 14:00 Health and Safety Advisory Committee (HASAC) – Forms and Certificates Subcommittee (Longboat)
14:00 – 15:30 Session II: Growth Factor and Follicular Development (Floral Ballroom)
15:30 – 16:00 Refreshment Break/Exhibition (Palms Ballroom)
16:00 – 17:30 Session III: Recent Advances in *In Vivo* and *In Vitro* Cryopreservation (Floral Ballroom)
17:30 – 18:00 Short Presentations from Submitted Abstracts

18:00 – 20:00	Health and Safety Advisory Committee (HASAC) Open Meeting (Floral Ballroom)
20:00	Welcome Reception – Wyndham Orlando Resort

Monday, January 10, 2011

7:30 – 16:00	Registration (Palms Ballroom Foyer)
8:00 – 18:00	Commercial Exhibits (Palms Ballroom)
8:00 – 17:00	A/V Library/Speaker Preparation (Hibiscus)
8:30 – 10:30	Poster Session I/Refreshment Break/Exhibition (Palms Ballroom)
10:30 – 11:15	Session IV: Genetic Engineering of Livestock
11:15 – 12:30	Session V: From Epigenetics to Epigenomics
12:00 – 12:30	Short Presentations from Submitted Abstracts
12:30 – 14:00	Lunch Break
12:30 – 14:00	IETS Data Retrieval Committee Meeting (Azalea)
12:30 – 13:30	Exhibitors Luncheon with the IETS Board (Cedar Key)
14:00 – 16:00	Session VI: Molecular Networks as Sensors and Drivers of Fertility (Floral Ballroom)
15:30 – 16:00	Short Presentations from Submitted Abstracts
16:00 – 16:30	Refreshment Break/Exhibition (Palms Ballroom)
16:30 – 17:00	IETS Pioneer Award Presentation (Floral Ballroom)
17:00 – 18:00	IETS Annual Business Meeting (Floral Ballroom)
18:00 – 20:00	Companion Animal, Non-Domestic and Endangered Species (CANDES) Open Meeting (Floral Ballroom)
18:00 – 19:00	Domestic Animal Biomedical Embryology Committee (DABE) Open Meeting (Azalea)

Tuesday, January 11, 2011

7:00 – 8:30	Organizational Meeting of the IETS Board of Governors (Largo Key)
8:00 – 15:00	Registration (Palms Ballroom Foyer)
8:00 – 13:30	Commercial Exhibits (Palms Ballroom)
8:00 – 17:00	A/V Library/Speaker Preparation (Hibiscus)
8:30 – 10:30	Poster Session II/Refreshment Break/Exhibition (Palms Ballroom)
10:30 – 12:30	Practitioners' Forum: Recent Advances in Superovulation and Embryo Production (Floral Ballroom)
12:30 – 13:30	Lunch Break
12:00 – 13:30	Organizational Lunch Meeting of the IETS Foundation (Cedar Key)
13:30 – 17:00	Commercial Exhibit and Poster Teardown (Palms Ballroom)
13:30 – 14:00	IETS Foundation Student Competition Awards, CANDES and HASAC Updates (Floral Ballroom)
14:00 – 14:45	IETS Distinguished Service Award Presentation (Floral Ballroom)
15:00 – 15:45	Session VII: Keynote Address (Floral Ballroom)
15:45 – 16:00	Closing Ceremony (Floral Ballroom)
16:30 – 17:30	9th IETS Annual Running Competition (Wyndham Orlando Resort)
19:00	Closing Party (West Pool Pavilion)

Wednesday, January 12, 2011

7:30 – 11:00	Registration (Palms Ballroom Foyer)
8:00 – 17:00	Postconference Workshop: International Regulations and Requirements for the Import/Export of Reproductive Biomaterials: Embryos, Semen, and Tissue (Jasmine)

GENERAL INFORMATION

Meeting Room Directory

Main Conference Sessions	Floral Ballroom
Exhibits	Palms Ballroom
Poster Displays	Palms Ballroom

Please see the Calendar of Events for additional room assignments.

Registration Desk Hours

The registration desk is located in the Palms Ballroom foyer.

Pick-up of preregistration packets only

Friday, January 7	16:00–19:00

On-site registration hours

Saturday, January 8	07:00–18:00
Sunday, January 9	07:00–18:00
Monday, January 10	07:30–16:00
Tuesday, January 11	08:00–15:00
Wednesday, January 12	07:30–11:00

Exhibit Information

Palms Ballroom

Setup	Saturday, January 8	13:00–18:00
Exhibits Open	Sunday, January 9	08:00–17:00
		20:00 (Reception)
	Monday, January 10	08:00–18:00
	Tuesday, January 11	08:00–13:30
Teardown		
	Tuesday, January 11	13:30–17:00

Details on the exhibitors can be found in the Exhibit Directory on page ###.

Badges

As a security requirement, we request that all participants wear their conference name badges to all sessions and social functions.

Certificates of Attendance/Presentation

If you requested a Certificate of Attendance or Certificate of Presentation with your registration, it will be included in your badge packet. If you did not request a certificate and need one, please come to the registration desk.

Currency

The US Dollar is the legal tender in the United States. There are currency exchange centers located in Orlando 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.

Message Board

Any messages received for conference delegates will be posted on the message board located near the registration desk.

Refreshments

Morning and afternoon refreshments are included in your registration fee and are provided during the scheduled break times in the Exhibition area located in the Palms Ballroom.

Dining and Entertainment

Guests of the Wyndham Orlando Resort can enjoy the signature cuisine of Augustine's Bar & Grille, a sophisticated International Drive Orlando restaurant. Begin your stay with a hearty breakfast at Augustine's Restaurant. The Fields and Sun breakfast buffet features traditional favorites served with Wyndham flair. After a long day on the town, come to Augustine's Restaurant for a perfectly cooked steak or seafood. Located next to Augustine's Restaurant you'll find Augustine's Market Deli, serving sandwiches, salads, and more. Grab a bite to eat or a refreshing cup of Starbucks coffee. Spend the day lounging by the pool at Gatorville Pool Bar and Restaurant. This unique restaurant is the perfect place to grab a refreshing iced beverage and soak in the Florida sunshine. Dine poolside from a menu featuring a blend of Caribbean and Key West flavors. Cool off at Screams Ice Cream Parlor, located just outside Gatorville.

World-Class Dining Just Steps from Your Door

The Wyndham Orlando Resort is surrounded by a variety of International Drive Orlando restaurant choices. Venture just moments from this International Drive Orlando resort to discover some of central Florida's finest restaurants. From Italian to Greek, you'll find it all here.

Services and Amenities

The Wyndham Resort is a family-friendly hotel offering guests the most relaxing, entertaining, and carefree time in Orlando. There is a complimentary shuttle service to and from Orlando's most popular theme parks, including Universal Orlando, SeaWorld, and Wet 'n Wild. The resort offers a shuttle to Disney World for a small fee. Visit the on-site ticket concierge to purchase tickets to all nearby parks.

Families and business travelers alike can enjoy an exclusive Health Club, open 7 days a week, featuring a sauna, steam rooms, and a modern fitness center with state-of-the-art strength training and cardio equipment.

THE PROGRAM CO-CHAIRS WOULD LIKE TO ACKNOWLEDGE AND THANK THE FOLLOWING PEOPLE

Section Editors

Ken Bondioli, *Student Competition*
Eric Walters, *Artificial Insemination*
Keith Campbell, *Cloning/Nuclear Transfer*
Csaba Pribenszky, *Cryopreservation*
Brett White, *Developmental Biology*
Poul Hyttel, *Early Pregnancy/ Pregnancy Recognition*
Charles Rosenkrans, *Embryo Culture*
Marcelo Bertolini, *Embryo Manipulation*
Gabriel Bo, *Embryo Transfer*
Julie Gard, *Epidemiology/ Diseases*
Naida Loskutoff, *Exotic Species*
Christopher A. Price, *Folliculogenesis/Oogenesis*
Heiner Niemann, *Gene Expression*
Gisele Z. Mingoti, *IVF/IVP*
Heinrich Bollwein, *Male Physiology*
Ciro M. Barros, *Oocyte Activation*
Christine Wrenzycki, *Oocyte Maturation*
Detlef Rath, *Sexing*
Ciro M. Barros, *Sperm Injection*
Ken White, *Stem Cells*
Roberto Sartori Filho, *Superovulation*
Angelika Schnieke, *Transgenesis*Jorge Piedrahita, Transgenesis

Manuscript and Abstract Reviewers

Jonathan Aaltonen
Gregg P. Adams
Ramiro Alberio
Graca Almeida-Porada
Gary B. Anderson
Ciro M. Barros
Cinthia Ann Batchelder
Marcelo Bertolini
Keith Betteridge
Mario Binelli
Gabriel Bo
Lars Bolund
Ken Bondioli
Vilceu Bordignon
Angie Boyer
Gottfried Brem
Tiziana Brevini
Thomas Bunch
Maria Clara Bussiere
Henrik Callesen
Keith Campbell
Ricardo Chebel
Inchul Choi
Younes Chorfi
Jose Cibell
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S. J. Dieleman
Carmen Diez
Ina Dobrinski
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Stephen Downs
Fernanda C. L. Alavarenga
John Eppiq
Trudee Fair
Scott Fahrenkrug
Charlotte Farin
Peter Farin
José R. Figueiredo
Hiroaki Funahashi
Cesare Galli
Paulo Bayard D. Goncalves
Fulvio Gandolfi
Julie Gard
Phil Garnsworthy
Glen Gentry
Angelica Giraldo
Torben Greve

Bernard Guerin
Anne-Rose Günzel Apel
Alfonso Gutiérrez-Adán
Francis Gwazdauskas
Vanessa Hall
Peter Hansen
John F. Hasler
Bjorn Heindryckx
Stefan Hiendleder
Katrin Hinrichs
Michael Hölker
Peter Holm
Poul Hyttel
Clay Isom
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L. A. Johnson
Magosaburou Kasai
John Kastelic
Carol Keefer
P. G. Knight
Robert Knox
Hana Kovarova
Duane Kraemer
Rebecca Krisher
Giovanna Lazzari
Claudia L. V. Leal
Joon-Hee Lee
Stanley Leibo
Lino Loi
Pat Lonergan
Charles Long
Maria Denise Lopes
E. Losonczi
Zolten Machaty
Reuben Mapletoft
Shonda Marley
G. Mastromonaco
S. Matyas
Alejo Menchaca
Pascal Mermillod
David Miller
Gisele Z. Mingoti
Marcelo Miragaya
Bruce Murphy
Clifton Murphy
Hiroshi Nagashima
Marcilio Nichi
Heiner Niemann
E. Ostrup
O. Ostrup
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Jennifer Patterson
Jaana Peippo
Stoyan G. Petkov
Peter Pfeffer
Jorge Piedrahita
Irina Polejaeva
Earle Pope
Chris Porada
Randy Prather
Csaba Pribenszky
Christopher A. Price
Velichety H. Rao
Detlef Rath
Dimitrios Rizos
Michael Roberts
Jose Luiz Rodriques
Paula Rodriguez Villamil
Rick Rorie
Charles Rosenkrans
Thomas Ruppert
Tim Safranski
Marites Sales
Roberto Sartori Filho
Angelika Schnieke
George E. Seidel
Marcelo Seneda
Denise Sheer
Harald Sieme
Kevin Sinclair
Marc-Andre Sirard
Lawrence Smith
Bill Snyder
Tamas Somfai
Lee Spate
Amber Starnes
U. Taylor
Evelyn Telfer
William Thatcher
Michel Thibier
Jeremy Thompson
Gabor Vajta
Ann Van Soom
Morten Vejlsted
João H. Viana
Xavier Vignon
Dagmar Waberski
A. Watson
Eric Walters
Amy Webb
David Wells
Mark Westhusin
Matthew Wheeler
Brett White
Bruce Whitelaw
Milo Wiltbank
Eric Walters
Christine Wrenzycki
Curtis Youngs
Jie Zhu
Ralf Zimmer

MAIN SCIENTIFIC PROGRAM

Thursday, January 6, 2011

9:00 – 18:00 IETS Board of Governors Meeting

Friday, January 7, 2011

9:00 – 18:00 IETS Board of Governors Meeting

9:00 – 18:00 Health and Safety Advisory Committee (HASAC) – Research Subcommittee

16:00 – 19:00 Registration

13:00 – 20:00 W2171 Research Committee

Saturday, January 8, 2011

7:00 – 18:00 Registration

8:00 – 17:00 Preconference Symposium – Advances in Bovine Reproduction and Embryo Technology

8:00 – 12:00 Heath and Safety Advisory Committee (HASAC) – Regulatory Subcommittee

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

13:00 – 17:00 2nd DABE Workshop: Plasticity, Fate Control, and Therapeutic Safety of Stem Cells

13:00 – 18:00 Poster Setup

13:00 – 18:00 Commercial Exhibit Setup

14:00 – 17:00 Health and Safety Advisory Committee (HASAC) – Food Safety Subcommittee

17:00 – 18:00 IETS Student Group (The Morulas) Meet and Greet

Sunday, January 9, 2011

6:30 – 8:00 Poster Setup

7:30 – 8:30 Past Presidents' Breakfast

7:30 – 8:30 Student Competition Breakfast with Foundation Education Committee

7:00 – 18:00 Registration

8:00 – 17:00 Commercial Exhibition

8:00 – 9:30 IETS Foundation Education Committee

8:45 – 9:00 Opening and Welcome (E. Wolf and C. Barros)

Session I – Follicular Reserve
Session Co-Chair: Pat Lonergan, University College Dublin
Session Co-Chair: Fulvio Gandolfi, Institute Anatomia of Domestic Animals

9:00 *Does Size Matter in Females?*
James J. Ireland, Michigan State University, East Lansing, Michigan, USA

9:45 *In Vitro and In Vivo Regulation of Follicle Formation and Activation in Cattle*
Joanne E. Fortune, Cornell University, Ithaca, New York, USA

10:30 – 11:00 Refreshment Break/Exhibition

IETS Foundation Student Competition Presentations
Session Chair: Kenneth R. Bondioli, Louisiana State University

11:00 *Arginine Supplementation In Vitro Increases Porcine Embryo Development and Affects mRNA Transcript*
B. K. Bauer, L. D. Spate, C. N. Murphy, and R. S. Prather (Abstract #1)

11:15 *New IVF Transgenesis Strategy in Bovine Using Cell Cycle Inhibitors and Mosaicism Reversion by Cloning*
R. J. Bevacqua, F. Pereyra-Bonnet, R. Olivera, M. I. Hiriart, R. Fernandez-Martín, and D. F. Salamone (Abstract #2)

11:30 *Testis-Specific Protein, Y-encoded (TSPY) Copy Number and Expression in Bovine Blastocysts*
C. K. Hamilton, A. Combe, A. Macaulay, F. Ashkar, L. A. Favetta, and W. A. King (Abstract #3)

11:45 *Identification and Functional Characterization of Heat Shock Protein 40 in Pig Ovary*
G. Pennarossa, S. Maffei, M. M. Rahman, A. Vanelli, G. Berruti, T. A. L. Brevini, and F. Gandolfi (Abstract #4)

12:00 *Production of Transgenic Livestock Using a Lentivirus Expressing Multiple Short Interfering RNAS Targeting Foot and Mouth Disease Virus*
M. Peoples, M. Westhusin, K. Tessanne, and C. Long (Abstract #5)

12:15 *Cloning and Expression of Bovine Factor in the Germline Alpha (FIGLA) in Oocytes and Early Embroyos: A Potential Target of Microrna-212*
S. K. Tripurani, K. B. Lee, G. W. Smith, and J. Yao (Abstract #6)

12:30 – 14:00 Lunch Break

12:30 – 14:00 IETS Board Luncheon with Affiliate Society Representatives

12:30 – 14:00 Health and Safety Advisory Committee (HASAC) - Forms and Certificates Subcommittee

Session II: Growth Factor and Follicular Development
Session Co-Chair: Jeremy Thompson, The University of Adelaide
Session Co-Chair: James Ireland, Michigan State University

14:00 *Recent Insights into Oocyte-Follicle Cell Interactions Provide Opportunities for the Development of New Approaches to IVM*
Robert B. Gilchrist, University of Adelaide, Australia

14:45 *Follicular Somatic Cell Factors and Follicle Development*
José Buratini, Jr., São Paulo State University, São Paulo, Brazil

15:30 – 16:00 Refreshment Break/Exhibition

Session III: Recent Advances in In Vivo and In Vitro Cryopreservation
Session Co-Chair: Andras Dinnyes, Szent Istvan University
Session Co-Chair: Roberto Sartori, Embrapa Genetic Resources and Biotechnology

16:00 *Cryopreservation and In Vitro Culture of Caprine Preantral Follicles*
José Ricardo de Figueiredo, LAMOFOPA, State University of Ceará, Brazil

16:45 *Cells Under Pressure: How Sublethal Hydrostatic Pressure–Stress Treatment Increases Gametes' and Embryos' Performance*
Csaba Pribenszky, Szent Istvan University, Budapest, Hungary

17:30 *Developmental competence of ovine oocytes vitrified at germinal vesicle stage: In vitro f ertilization, parthenogenetic activation and somatic cell nuclear transfer (SCNT)*
A. R. Moawad, I. Choi, J. Zhu, and K. H. S. Campbell (Abstract # 79)

17:40 *Domestic Cat Kittens Born After Transfer of Cryopreserved Embryos Produced by In Vitro Fertilization of Oocytes with Flow-sorted Sperm*
C. E. Pope*, E. G. Crichton, M. C. Gómez, C. Dumas, B. L. Dresser (Abstract # 85)

17:50 *Treatment of Goat Sperm with Catalase to Improve Post-thaw Quality*
R. O. C. Silva, M. Nichi, E. G. A. Perez, P. A. A. Góes, A. Dalmazzo, J. R. C. Gurgel, C. C. Rocha, R. Simões, M. A. Peres, M. E. O. A. Assumpção, R. C. Barnabe, and V. H. Barnabe (Abstract #91)

18:00 – 20:00 Health and Safety Advisory Committee (HASAC) Open Meeting

20:00 Welcome Reception

Monday, January 10, 2011

7:30 – 16:00 Registration

8:00 – 18:00 Commercial Exhibits

8:00 – 17:00 A/V Library/Speaker Preparation

8:30 – 10:30 Poster Session I/Refreshment Break/Exhibition

Session IV: Genetic Engineering of Livestock
Session Co-Chair: Carol Keefer, University of Maryland
Session Co-Chair: Henrik Callesen, Aarhus University

10:30 *Perspectives on Transgenic Livestock in Agriculture and Biomedicine – An Update*
Jorge Piedrahita, North Carolina State University, Raleigh, North Carolina, USA

Session V: From Epigenetics to Epigenomics
Session Co-Chair: Rebecca Krisher, University of Illinois
Session Co-Chair: Gabriel Bo, Instituto De Reproduccion Animal Cordoba

11:15 *Epigenetic Control of Development and Expression of Quantitative Traits*
Hélène Jammes, INRA, UMR INRA-ENVA, Jouy en Josas, France

12:00 *Bioengineering of the Mammary Gland of Livestock: Increased Propeptide Processing of Factor IX in the Milk of Transgenic Pigs by Co-expression of Furin*
J. Zhao, E. Walters, J. Calcaterra, J. Ross, L. Spate, M. Samuel, A. Rieke, C. Murphy, S. Butler, W. Velander, and R. Prather (Abstract #339)

12:10 *Global H3K27me3 is Distinct in the Porcine Epiblast and Trophectoderm and is Potentially Correlated to X-inactivation in Female Embryos*
Y. Gao, V. Hall, and P. Hyttel (Abstract # 100)

12:20 E*pigenetic Reprogramming of Porcine Fibroblast Cells induced by Sturgeon's Oocyte Extract*
S. Y. Kim, S. H. Park, M. R. Lee, H. J. Eun, T. S. Kim, S. B. Park, J. G. Yoo, C. S. Park, and J. H. Lee (Abstract # 299)

12:30 – 14:00 IETS Data Retrieval Committee Meeting

12:30 – 14:00 Lunch Break

12:30 – 13:30 Exhibitors Luncheon with the IETS Board

Session VI: Molecular Networks as Sensors and Drivers of Fertility
Session Co-Chair: Christine Wrenzycki, University of Veterinary Medicine
Session Co-Chair: Randall Prather, University of Missouri

14:00 *Next Generation Sequencing Allows Deeper Analysis and Understanding of Genomes and Transcriptomes Including Aspects to Fertility*

Thomas Werner, Genomatix Software Inc., Ann Arbor, Michigan, USA

14:45 *Dynamic Proteome Signatures in Gametes, Embryos and Their Maternal Environment*

Georg J. Arnold, Ludwig Maximilian University of Munich, Munich, Germany

15:30 *Single Equine Embryo Lipid Fingerprinting by Mass Spectrometry*

R. F. Gonçalves, C. R. Ferreira, C. M. B. Orlandi, V. C. Sartori, H. N. Ferreira, F. C. Gozzo, S. A. Saraiva, E. J. Pilau, and M. N. Eberlin (Abstract # 111)

15:40 *Laser capture microdissection for gene expression analysis of inner cell mass and trophoblast from bovine blastocysts*

M. Filliers, W. de Spiegelaere, L. J. Peelman, K. Goossens, C. Burvenich, L. Vandaele, P. Cornillie, and A. Van Soom (Abstract # 186)

15:50 *Spermatozoal Protein Markers for Angus Bull Fertility*

E. Memili, X. Wang, A. Kaya (Abstract 195)

16:00 – 16:30 Refreshment Break/Exhibition

16:30 – 17:00 IETS Pioneer Award Presentation

17:00 – 18:00 IETS Annual Business Meeting

18:00 – 20:00 Companion Animal, Non-Domestic and Endangered Species (CANDES) Open Meeting

18:00 – 19:00 Domestic Animal Biomedical Embryology Committee (DABE) Open Meeting

Tuesday, January 11, 2011

7:00 – 8:30 Organizational Meeting of the IETS Board of Governors

8:00 – 15:00 Registration

8:00 – 13:30 Commercial Exhibits

8:00 – 17:00 A/V Library/Speaker Preparation

8:30 – 10:30 Poster Session II/Refreshment Break/Exhibition

Practitioner's Forum
Session Chair: Rueben J. Mapletoft, University of Saskatchewan

10:30 *Practitioners' Forum: Recent Advances in Superovulation and Embryo Production*

Speakers: Gabriel A. Bo, Institute of Animal Reproduction Cordoba (IRAC) and University of Villa Maria, Argentina: Simplified superovulation protocols using GnRH to control follicular development and one or two injections of FSH for superstimulation

Pietro S. Baruselli and Manoel Sa Filho, University of São Paulo, Brazil: Use of sexed semen in superovulated *Bos indicus* donors

Richard Remillard, Trans Ova Genetics, USA: Use of sexed semen in superovulated *Bos taurus* donors and in-vitro embryo production

12:30 – 13:30 Lunch Break

12:00 – 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 and HASAC Updates

14:00 – 14:45 IETS Distinguished Service Award Presentation

Session VII: Keynote Address
Session Chair: Eckhard Wolf, University Munich

15:00 *Nuclear Architecture in Developmental Biology and Cell Specialization*
Thomas Cremer, Ludwig Maximilian University of Munich, Munich, Germany

15:45 – 16:00 Closing Ceremony

16:30 – 17:30 9th IETS Annual Running Competition

19:00 Closing Party

Wednesday, January 12, 2011

7:30 – 11:00 Registration

8:00 – 17:00 Postconference Workshop: International Regulations and Requirements for the Import/Export of Reproductive Biomaterials: Embryos, Semen, and Tissue

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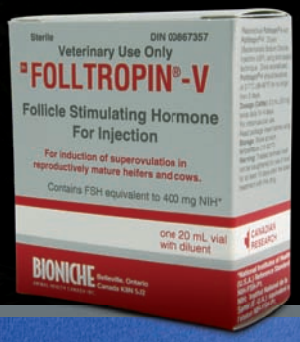

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POSTER SESSIONS

Location
Posters are located in the Palms Ballroom of the Wyndham Orlando Resort. (See map on page ###.)

Poster Numbers
Posters are identified by the number corresponding to their abstract number in *Reproduction, Fertility and Development* 2011; 23 (1). Numbering begins at 1 and ends at 339.

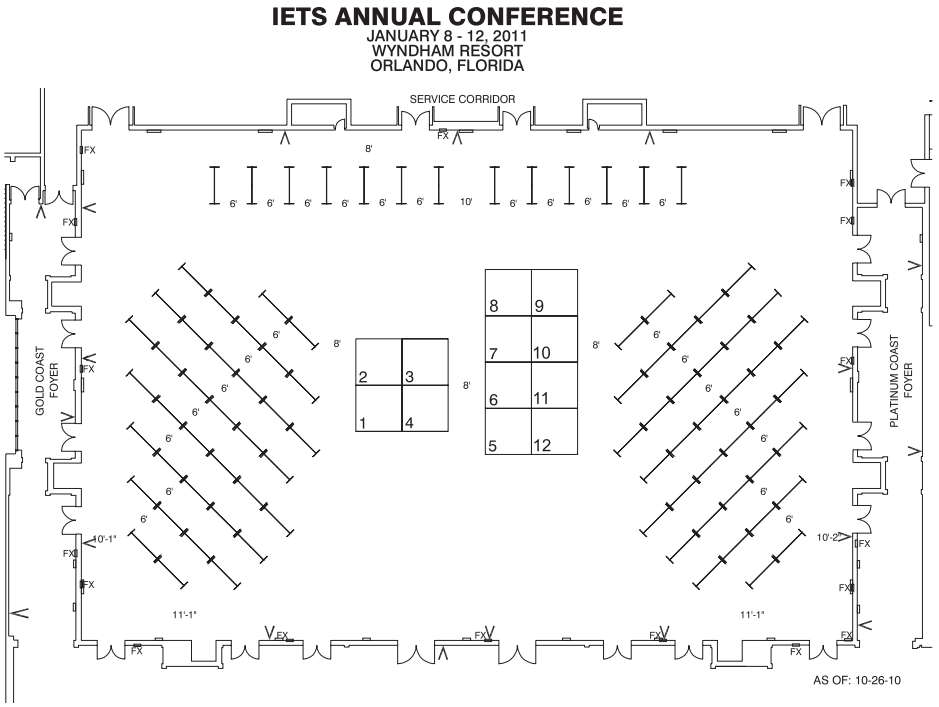
Setup
Posters can be put up from 13:00 to 18:00 Saturday, January 8, 2011, and 6:30 to 8:00 Sunday, January 9, 2011. All posters must remain up throughout the meeting. Authors of posters that are not put up by 8:00 on Sunday will be reported to the IETS president for possible disciplinary action.

Poster Session I
Presentations by authors of odd numbered abstracts (i.e., 7, 9, 11) in *Reproduction, Fertility and Development* 2011; 23 (1) and the Student Competition finalist poster presentations will take place Monday, January 10, 2011, from 8:30 to 10:30.

Poster Session II
Presentations by authors of even numbered abstracts (i.e., 8, 10, 12) in *Reproduction, Fertility and Development* 2011; 23 (1) will take place Tuesday, January 11, 2011, from 8:30 to 10:30.

Teardown
Poster teardown must take place from 13:30 to 17:00 Tuesday afternoon (January 11, 2011). Posters that are not taken down by 17:00 on Tuesday will be taken down and thrown away.

POSTER AND EXHIBIT ROOM LAYOUT



POSTER SESSION ORDER BY TOPIC

Poster Number = Abstract number in *Reproduction, Fertility and Development* 2011; 23 (1)

Student Competition Finalists

1 ARGININE SUPPLEMENTATION *IN VITRO* INCREASES PORCINE EMBRYO DEVELOPMENT AND AFFECTS mRNA TRANSCRIPT EXPRESSION
B. K. Bauer, L. D. Spate, C. N. Murphy, and R. S. Prather

2 NEW IVF TRANSGENESIS STRATEGY IN BOVINE USING CELL CYCLE INHIBITORS AND MOSAICISM REVERSION BY CLONING
R. J. Bevacqua, F. Pereyra-Bonnet, R. Olivera, M. I. Hiriart, R. Fernandez-Martín, and D. F. Salamone

3 TESTIS-SPECIFIC PROTEIN, Y-ENCODED (TSPY) COPY NUMBER AND EXPRESSION IN BOVINE BLASTOCYSTS
C. K. Hamilton, A. Combe, A. Macaulay, F. Ashkar, L. A. Favetta, and W. A. King

4 IDENTIFICATION AND FUNCTIONAL CHARACTERIZATION OF HEAT SHOCK PROTEIN 40 IN PIG OVARY
G. Pennarossa, S. Maffei, M. M. Rahman, A. Vanelli, G. Berruti, T. A. L. Brevini, and F. Gandolfi

5 PRODUCTION OF TRANSGENIC LIVESTOCK USING A LENTIVIRUS EXPRESSING MULTIPLE SHORT INTERFERING RNAS TARGETING FOOT AND MOUTH DISEASE VIRUS
M. Peoples, M. Westhusin, K. Tessanne, and C. Long

6 CLONING AND EXPRESSION OF BOVINE FACTOR IN THE GERMLINE ALPHA (FIGLA) IN OOCYTES AND EARLY EMBRYOS: A POTENTIAL TARGET OF MICRORNA-212.
S. K. Tripurani, K. B. Lee, G. W. Smith, and J. Yao

Artificial Insemination

7 ESTRUS LENGTH AND INTENSITY IN *BOS TAURUS* (HOLSTEIN) VERSUS *BOS INDICUS* (NELORE) NONLACTATING COWS
M. R. Bastos, M. A. P. Meschiatti, R. S. Surjus, A. B. Prata, A. P. Lemes, M. M. Guardieiro, F. A. P. Santos, and R. Sartori

8 THE USE OF ANNEXIN V MAGNETIC-ACTIVATED CELL SORTING TO SEPARATE APOPTOTIC SPERM FROM THE EJACULATE OF STALLIONS
M. A. Coutinho da Silva, C. R. F. Pinto, J. M. Young, and K. Cole

9 EVALUATION OF FERTILITY TRAITS OF HOLSTEIN CATTLE IN ARGENTINA
F. A. Di Croce, A. M. Saxton, D. Casanova, and F. N. Schrick

10 *IN VITRO* PROGESTERONE RELEASE KINETICS: A COMPARATIVE STUDY OF DIFFERENT INTRAVAGINAL DEVICES USED IN CATTLE
G. C. Gomes, A. Kehrle, M. Maturana Filho, C. V. F. Caetano, J. R. V. Pimentel, P. H. P. Miguez, and E. H. Madureira

11 PREGNANCY RATES IN ESTONIAN HOLSTEIN HEIFERS AFTER INSEMINATION WITH SEXED SPERM
J. Kurykin, M. Jalakas, L. Majas, T. Kaart, and Ü. Jaakma

12 INDUCTION OF OVARIAN ACTIVITY IN THE MANED WOLF (*CHRYSOCYON BRACHYURUS*) USING A GnRH-AGONIST
A. E. Johnson, L. R. Padilla, K. Hope, D. E. Wildt, and N. Songsasen

13 THE RELATIONSHIP BETWEEN EARLIER POSTPARTUM CYCLICITY AND SUBSEQUENT REPRODUCTIVE PERFORMANCE IN DAIRY COWS: A FIELD TRIAL
I. H. Kim, H. C. Lee, and H. G. Kang

14 EFFECT OF PORCINE SEMINAL PLASMA AND EGG YOLK ON CHEMOTAXIS AND PHAGOCYTOSIS OF NEUTROPHILS DERIVED FROM PERIPHERAL BLOOD OF PIGS AND COWS
J.-C. Li and H. Funahashi

15 *IN VIVO* PROGESTERONE RELEASE KINETICS: A COMPARATIVE STUDY OF DIFFERENT INTRAVAGINAL DEVICES USED IN CATTLE
M. Maturana Filho, G. C. Gomes, C. V. F. Caetano, A. Kehrle, P. H. P. Miguez, J. R. V. Pimentel, and E. H. Madureira

16 FERTILITY RATE OBTAINED WITH A NEW INTRAVAGINAL PROGESTERONE RELEASING DEVICE DICO IN SHEEP
C. García-Pintos, P. C. dos Santos-Neto, and A. Menchaca

17 PREGNANCY RATE OBTAINED WITH THE REUTILIZATION OF INTRAVAGINAL DEVICE DICO AFTER 6 DAYS OF TREATMENT FOR ESTRUS SYNCHRONIZATION IN SHEEP
P. C. dos Santos-Neto, C. García-Pintos, and A. Menchaca

18 EFFECTS OF SKIM MILK ON THE QUALITY AND FERTILITY OF BOAR SEMEN FOLLOWING LIQUID PRESERVATION AT 5°C AND 15°C
Z. Namula, R. Kodama, Y. Kaedei, F. Tanihara, V. L. Vien, and T. Otoi

19 FACTORS AFFECTING PREGNANCY RATE AFTER ARTIFICIAL INSEMINATION WITH EQUINE SEMEN: PRODUCTION OF THE FIRST FOAL USING FROZEN SEMEN IN KOREA
Y. S. Park, Y. G. Cho, K. H. Cho, and G. J. Cho

20 FACTORS THAT AFFECT PURITY AND YIELD OF BOVINE SEX-SORTED SPERM
Y. Sakamoto, M. Ueda, S. Toda, and H. Kimura

21 THE INJECTION OF CORTISOL TO UTERUS INCREASES THE IMPLANTATION RATE AND LITTER SIZE IN PIG ARTIFICIAL INSEMINATION USING CYROPRESERVED SPERMATOZOA
M. Shimada and T. Okazaki

22 INFLUENCE OF SEASONALITY ON OVULATORY FOLLICULAR WAVE DYNAMIC IN LONG PROTOCOLS IN SANTA INÊS SHEEP IN THE TROPICS
M. E. F. Oliveira, H. Ayres, L. G. Oliveira, P. P. M. Teixeira, S. D. Bicudo, J. F. Fonseca, and W. R. R. Vicente

23 EFFECTS OF THE NUMBER OF SERVICES ON FERTILITY IN DAIRY COWS
M. Yamaguchi, M. Tanisawa, H. Koyama, S. Takahashi, and O. Dochi

24 EFFECT OF CULTURE OF SEMEN IN A LOW PRESSURE CONDITION AT ROOM TEMPERATURE ON VIABILITY AND CAPACITATION STATUS OF BOAR SPERM
K. Yamashita, S. Ishida, and H. Funahashi

25 EFFECT OF REPRODUCTIVE TRACT SIZE ON CONCEPTION RATES IN LACTATING DAIRY COWS UTILIZING A REPRODUCTIVE TRACT SCORING SYSTEM
C. Young, F. A. Di Croce, D. Roper, J. Harris, N. Rohrbach, J. Wilkerson, and F. N. Schrick

Cloning/Nuclear Transfer

26 EFFECT OF TREATMENT OF BOVINE DONOR CELLS WITH MOUSE EMBRYONIC STEM CELL EXTRACT ON THE DEVELOPMENT OF EMBRYOS AFTER NUCLEAR TRANSFER
S. Akagi, E. Mizutani, Y. Inaba, M. Kaneda, T. Somfai, S. Haraguchi, S. Watanabe, Y. Hashiyada, and K. Matsukawa

27 CLONING OF ADULT PIGS USING SCRIPTAID TREATMENT AND PREOVULATORY EMBRYO TRANSFER
M. Albornoz, C. Colato, N. El-Beyrouthi, F. Mellano, A. Mellano, P. H. Mellano, M. L. Mellano, M. A. Mellano, J. C. Mellano, H. Baldassarre, and V. Bordignon

28 GENERATION OF REACTIVE OXYGEN SPECIES IN BOVINE CULTURED SOMATIC CELLS AND SOMATIC CELL NUCLEAR TRANSFER EMBRYOS DURING MICROMANIPULATION PROCEDURES AND EARLY *IN VITRO* DEVELOPMENT
H. K. Bae, J. Y. Kim, I. S. Hwang, C. K. Park, B. K. Yang, and H. T. Cheong

29 PROTEOMIC ANALYSIS OF CLONED TERM PLACENTA DERIVED FROM SOMATIC CELL NUCLEAR TRANSFER CATS
J. I. Bang, D. W. Bae, Y. S. Kwon, S. J. Cho, G. K. Deb, A. N. Ha, and I. K. Kong

30 SCRIPTAID TREATMENT IMPROVES POST-IMPLANTATION DEVELOPMENT OF SHEEP CLONED EMBRYOS
V. Bordignon, M. Albornoz, C. Colato, N. El-Beyrouthi, J. I. Mellano, A. Meltsas, F. Mellano, P. H. Mellano, M. L. Mellano, M. A. Mellano, J. C. Mellano, and H. Baldassarre

31 DEVELOPMENT AND APOPTOSIS IN BOVINE CLONED EMBRYOS RECONSTRUCTED WITH OOCYTES COLLECTED BY REPEATED OVUM PICKUP SESSIONS OR FROM SLAUGHTERED COW OVARIES
L. S. A. Camargo, M. M. Pereira, C. C. R. Quintao, J. N. S. Sales, L. T. Iguma, R. V. Serapiao, and J. H. M. Viana

32 A CLONED FOAL PRODUCED USING OOCYTES RECOVERED BY TRANSVAGINAL ASPIRATION OF IMMATURE FOLLICLES
Y. H. Choi, J. D. Norris, I. C. Velez, C. C. Jacobson, D. L. Hartman, and K. Hinrichs

33 PRODUCTION OF CLONED BOER GOATS AND DORPER SHEEP IN ARGENTINA
C. Colato, M. Albornoz, M. L. Mellano, P. H. Mellano, J. I. Mellano, A. Meltsas, M. A. Mellano, J. C. Mellano, V. Bordignon, and H. Baldassarre

34 EVALUATION OF DIFFERENT SEQUENTIAL CULTURE SYSTEMS ON THE DEVELOPMENT AND QUALITY OF BOVINE EMBRYOS GENERATED BY SOMATIC CELL NUCLEAR TRANSFER
R. F. Felmer, M. E. Arias, J. L. Riveros, G. A. Munoz, and J. H. Rio

35 EFFECTIVENESS OF MICROWELL-BASED *IN VITRO* CULTURE SYSTEMS FOR BOVINE ZONA-FREE CLONED EMBRYOS
C. Feltrin, M. Machado, L. M. V. Queiroz, M. A. S. Peixer, P. F. Malard, G. M. Santana, M. Bertolini, M. Wheeler, and J. L. Rodrigues

36 CHANGES IN PLASMA CONCENTRATIONS OF PROGESTERONE AND ESTROGENS DURING GESTATION IN COWS WITH STILLBORN SOMATIC CELL CLONED CALVES
M. Hirako, H. Takahashi, M. Aoki, H. Ishizaki, Y. Kariya, Y. Hanafusa, M. Kubo, M. Suto, N. Adachi, and S. Akagi

37 LIMITATION OF BOVINE OOPLASM IN REPROGRAMMING OF PORCINE SOMATIC CELLS
O. Østrup, F. Strejcek, I. Petrovicova, M. Morovic, N. Laurincikova, A. Lucas-Hahn, B. Petersen, H. Niemann, J. Laurincik, and P. Hyttel

38 DNA METHYLATION IN PORCINE PREIMPLANTATION EMBRYOS DEVELOPED *IN VIVO* AND PRODUCED BY *IN VITRO* FERTILIZATION, PARTHENOGENETIC ACTIVATION AND SOMATIC CELL NUCLEAR TRANSFER
R. S. Deshmukh, O. Oestrup, E. Oestrup, M. Vejlsted, H. Niemann, A. Lucas-Hahn, B. Petersen, J. Li, H. Callesen, and P. Hyttel

39 *IN VITRO* DEVELOPMENT OF CANINE EMBRYOS PRODUCED BY INTERSPECIES SOMATIC CELL NUCLEAR TRANSFER USING ENUCLEATED BOVINE OOCYTES
Y. Kaedei, A. Fujiwara, F. Tanihara, Z. Namula, V. L. Vien, and T. Otoi

40 VARIOUS DNA METHYLATION LEVELS OF IMPRINTED GENES IN CLONED COWS FROM THE SAME DONOR CELLS
M. Kaneda, S. Watanabe, S. Akagi, T. Somfai, S. Haraguchi, M. Hirako, M. Geshi, and T. Nagai

41 DEVELOPMENT OF SOMATIC CELL NUCLEAR TRANSFERRED RAT EMBRYOS TO THE BLASTOCYST BY A HISTONE DEACETYLASE INHIBITOR, TRICHOSTATIN A
N. Kashiwazaki, N. Nakajima, K. Fujimaki, K. Syudo, and J. Ito

42 LARGE-SCALE PRODUCTION OF CLONED TRANSGENIC PIGS: EFFICIENCY AND SIDE EFFECTS
M. Kurome, B. Kessler, N. Klymiuk, A. Wuensch, V. Zakhartchenko, H. Nagashima, and E. Wolf

43 SHORT- AND LONG-LASTING EFFECTS OF TRICHOSTATIN A TREATMENT OF SCNT EMBRYOS IN CATTLE
I. Lagutina, R. Duchi, S. Colleoni, G. Lazzari, and C. Galli

44 *IN VITRO* DEVELOPMENT OF INTERSPECIES NUCLEAR TRANSFER EMBRYOS GENERATED WITH BOVINE OOCYTES AND EQUINE SKIN FIBROBLASTS
J. Lee, J. Park, Y. Chun, W. Lee, and K. Song

45 *IN VITRO* DEVELOPMENT OF BOVINE TRANSGENIC NUCLEAR TRANSFER EMBRYOS IN SERUM-FREE AND SERUM-SUPPLEMENTED MEDIA
J. Y. Lee, S. G. Lee, E. J. Jung, S. H. Jeong, C. J. Yang, Y. W. Jeong, S. H. Hyun, Y. W. Kim, T. Shin, E.-B. Jeung, and W. S. Hwang

46 THREE STAGES ESTABLISHMENT OF *IN VITRO* MATURATION OF PORCINE OOCYTES USED AS RECIPIENT CYTOPLASTS FOR SOMATIC CELL NUCLEAR TRANSFER
M. R. Lee, S. H. Park, T. S. Kim, S. Y. Kim, H. J. Eun, C. S. Park, and J. H. Lee

47 PHYSIOLOGICAL STATUS OF MALE AND FEMALE MINIATURE PIGS CLONED WITH MESENCHYMAL STEM CELLS
S. L. Lee, G. H. Maeng, W. J. Lee, R. H. Chon, and G. J. Rho

48 DEVELOPMENTAL COMPETENCE OF CLONED OR PARTHENOGENETICALLY ACTIVATED PORCINE EMBRYOS: EFFECT OF DIAMETER OF PREPUBERTAL GILT OOCYTES
J. Li, J. Adamsen, R. Li, H. Pedersen, Y. Liu, S. Purup, G. Vajta, and H. Callesen

49 IMPROVED PORCINE CLONING EFFICIENCY WITH CELLS CULTURED FOR SEVERAL GENERATIONS AFTER A SINGLE TREATMENT WITH XENOPUS EGG EXTRACT
Y. Liu, O. Østrup, J. Li, G. Vajta, P. M. Kragh, S. Purup, R. Li, and H. Callesen

50 FIRST EQUINE CLONE BORN IN ARGENTINA BY SOMATIC CELL NUCLEAR TRANSFER FROM A POLO ARGENTINO MARE
M. Miragaya, M. Revora, F. Rigali, C. Herrera, L. Viviani, C. Quintans, S. Pascualini, and L. Losinno

51 SCRIPTAID AND MG132 IMPROVE DEVELOPMENT OF PORCINE EMBRYOS RECONSTRUCTED BY SOMATIC CELL NUCLEAR TRANSFER
J. Mao, L. Tracy, J. Zhao, K. M. Whitworth, L. Spate, E. M. Walters, and R. S. Prather

52 THE EFFECTS OF DONOR CELL CYCLE AND THE TIMING OF OOCYTE ACTIVATION ON DEVELOPMENT OF BOVINE NUCLEAR TRANSFERRED EMBRYOS *IN VIVO*
K. Matsukawa, S. Akagi, K. Fukunari, Y. Hosokawa, C. Yonezawa, S. Watanebe, and S. Takahashi

53 IMPACTS OF USING PROCAINE AS A DNA-DEMETHYLATING AGENT IN *IN VITRO* CULTURE OF BOVINE CELLS
V. A. Michalczechen-Lacerda, F. C. Rodrigues, R. V. de Sousa, R. Rumpf and M. M. Franco

54 THE EFFECT OF TREATMENT OF BOVINE NUCLEAR TRANSFER EMBRYOS WITH VALPROIC ACID ON THEIR SUBSEQUENT *IN VITRO* DEVELOPMENT
E. Mizutani, S. Akagi, M. Kaneda, T. Somfai, S. Watanabe, M. Geshi, and T. Nagai

55 CONSTRUCTION AND *IN VITRO* DEVELOPMENT OF FOLLISTATIN TRANSGENIC PORCINE EMBRYO BY SOMATIC CELL NUCLEAR TRANSFER
Y. S. Mu, D. D. Jiang, Y. J. Huan, J. Zhu, H. Li, and Z. H. Liu

56 ESTABLISHMENT OF TRANSGENIC RED FLUORESCENCE PROTEIN (RFP) CLONE DOGS THROUGH A STABLE TRANSMISSION OF RFP GENE TO NEXT GENERATION
H. J. Oh, J. E. Park, M. J. Kim, G. A. Kim, E. J. Park, S. G. Hong, G. Jang, and B. C. Lee

57 GENE EXPRESSION PATTERN OF MINIATURE PIG SOMATIC CELL NUCLEAR TRANSFER EMBRYOS TREATED WITH THE HISTONE DEACETYLASE INHIBITOR SCRIPTAID
C. H. Park, S. G. Lee, H. J. Lee, T. K. Jung, Y. H. Jeong, Y. W. Jeong, S. H. Hyun, Y. W. Kim, T. Shin, E.-B. Jeung, and W. S. Hwang

58 ISOLATION OF BOVINE TROPHOBLAST AND ITS REPROGRAMMING BY NUCLEAR TRANSFER
I. M. Saadeldin, B. H. Kim, B. Roibas da Torre, O. J. Koo, G. Jang, and B. C. Lee

59 SYNCHRONIZATION OF CELL CYCLE STAGE OF BUFFALO (*BUBALUS BUBALIS*) FETAL FIBROBLAST CELLS BY DIFFERENT TREATMENTS
N. L. Selokar, A. George, A. P. Saha, R. Sharma, M. Muzaffar, P. Palta, M. S. Chauhan, R. S. Manik, and S. K. Singla

60 EFFECT OF CYTOPLASMIC VOLUME ON DEVELOPMENTAL COMPETENCE OF HAND-GUIDED CLONED BUFFALO (*BUBALUS BUBALIS*) EMBRYOS
S. K. Panda, A. George, A. P. Saha, R. Sharma, N. M. Kamble, R. S. Manik, M. S. Chauhan, P. Palta, and S. K. Singla

61 EFFECT OF ROOM TEMPERATURE HOLDING PROCEDURE ON ABILITY OF OOCYTES TO MATURE AND DEVELOP *IN VITRO* AFTER EQUINE SOMATIC CELL NUCLEAR TRANSFER
K. Song, J. Lee, J. Park, W. Lee, Y. Chun, J. Lee, and S. Yeon

62 COMPARATIVE PROTEOMIC ANALYSIS OF LIVER MITOCHONDRIA DERIVED FROM DECEASED NEWBORN CLONED CALVES AND ADULT CLONES BY TWO-DIMENSIONAL DIFFERENTIAL GEL ELECTROPHORESIS
K. Takeda, M. Tasai, S. Akagi, S. Watanabe, M. Oe, K. Chikuni, M. Ohnishi-Kameyama, Y. Nakamura, T. Tagami, H. Hanada, and K. Nirasawa

63 OOCYTE GENOME CLONING USED IN TRANSGENIC BOVINE EMBRYO PRODUCTION
G. Vichera, R. Olivera, and D. Salamone

64 MACROGLOSSIA IN CLONED PIGLETS IS ASSOCIATED WITH HYPOMETHYLATION AT THE KCNQ-OT1 CpG ISLAND
C. Li, C. O'Gorman, R. S. Prather, J. A. Green, and K. D. Wells

65 SCRIPTAID CORRECTS GENE EXPRESSION OF A FEW ABERRANTLY REPROGRAMMED TRANSCRIPTS IN NUCLEAR TRANSFER PIG BLASTOCYST STAGE EMBRYOS
K. M. Whitworth, J. Zhao, L. D. Spate, and R. S. Prather

66 DNA METHYLOME ANALYSIS IN NUCLEAR TRANSFER DONOR CELLS AND ITS RELATIONSHIP TO CLONING EFFICIENCY IN SWINE
J. J. Whyte, S. C. Isom, W. G. Spollen, S. M. Blake, E. M. Walters, and R. S. Prather

67 PIG OOCYTES WITH A LARGE PERIVITELLINE SPACE MATURED *IN VITRO* HAVE GREATER DEVELOPMENTAL COMPETENCE AFTER PARTHENOGENESIS AND SOMATIC CELL NUCLEAR TRANSFER
J. You, N. Kim, S. Kang, and E. Lee

Cryopreservation/Cryobiology

68 OSMOTIC RESPONSES OF EQUINE EMBRYOS WITH AND WITHOUT CAPSULES TO CRYOPROTECTANTS
J. P. Barfield, S. P. Leibo, P. M. McCue, and G. E. Seidel Jr.

69 QUALITY OF *IN VITRO* PRODUCED AND CRYOPRESERVED PORCINE EMBRYOS ASSESSED BY CELL NUMBER, TUNEL-POSITIVE NUCLEI, AND CASPASE-3 ACTIVITY
M. Bryla, M. Trzcinska, and B. Gajda

70 REFREEZING POST-THAWED GOAT SEMEN
D. B. Carwell, B. R. Scott, G. T. Gentry Jr., K. R. Bondioli, and R. A. Godke

71 WILL DEHYDRATION BY EXPOSURE TO SUCROSE IMPROVE POST-VITRIFICATION SURVIVAL OF MURINE EMBRYOS VITRIFIED BY THE OPEN PULLED STRAW METHOD?
M. El-Gayar, J. Reischl, M. Gauly, and W. Holtz

72 SUPERIOR PREGNANCY RATES WITH THE TRANSFER OF OPEN PULLED STRAW-VITRIFIED VERSUS CONVENTIONALLY CRYOPRESERVED EMBRYOS IN GOATS
M. El-Gayar, A. N. Al Yacoub, M. Gauly, and W. Holtz

73 LIPID CONTENT AND CRYOTOLERANCE OF PORCINE EMBRYOS CULTURED WITH PHENAZINE ETHOSULFATE
B. Gajda, M. Romek, I. Grad, E. Krzysztofowicz, M. Bryla, and Z. Smorag

74 MECHANICAL DELIPIDATION IMPROVES CRYOSURVIVAL AND *IN VITRO* DEVELOPMENT OF VITRIFIED CAT OOCYTES
J. Galiguis, M. C. Gómez, C. E. Pope, B. L. Dresser, and S. P. Leibo

75 INFLUENCE OF CRYOPRESERVATION ON THE SUSCEPTIBILITY OF GOAT SPERM AGAINST DIFFERENT REACTIVE OXYGEN SPECIES
P. A. A. Góes, M. Nichi, R. O. C. Silva, E. G. A. Perez, A. Dalmazzo, J. R. C. Gurgel, C. C. Rocha, R. Simões, M. A. Peres, M. E. O. A. Assumpção, R. C. Barnabe, and V. H. Barnabe

76 EFFECT OF CULTURE METHOD ON THE mRNA EXPRESSION BEFORE AND AFTER CRYOPRESERVATION IN BOVINE BLASTOCYSTS
A. Kuzmany, V. Havlicek, C. Wrenzycki, S. Wilkening, G. Brem, and U. Besenfelder

77 PREGNANCY RATES AFTER VITRIFICATION OF FRESH AND COOLED EQUINE EMBRYOS USING THE CRYOTOP METHOD
C. Baca Castex, G. Dalvit, M. Miragaya, A. Alonso, M. Pinto, V. Etcharren, C. Castaneira, and L. Losinno

78 EFFECT OF EXTENDER AND STORAGE PERIOD ON THE SOUTH AFRICAN INDIGENOUS KOLBROEK BOAR SPERM CELL MOTILITY RATES FOLLOWING ANALYSIS BY COMPUTER-ASSISTED SPERM ANALYSIS
M. B. Masenya, M. L. Mphaphathi, P. H. Munyai, I. Egerszegi, D. O. Umesiobi, A. Dinnyes, and T. L. Nedambale

79 DEVELOPMENTAL COMPETENCE OF OVINE OOCYTES VITRIFIED AT GERMINAL VESICLE STAGE: *IN VITRO* FERTILIZATION, PARTHENOGENETIC ACTIVATION, AND SOMATIC CELL NUCLEAR TRANSFER
A. R. Moawad, I. Choi, J. Zhu, and K. H. S. Campbell

80 TREATING BOAR SPERM WITH CHOLESTEROL IMPROVES CRYOSURVIVAL
E. A. Moraes, C. A. A. Torres, J. K. Graham, P. L. Romualdo, and P. S. Lopes

81 HIGH THROUGHPUT VITRIFICATION OF *IN VIVO* FERTILIZED AND *IN VITRO* CULTURED PORCINE EMBRYOS
C. N. Murphy, L. D. Spate, B. K. Bauer, and R. S. Prather

82 CRYOPRESERVATION OF BOAR EPIDIDYMAL SPERMATOZOA; ADDITION OF SEMINAL PLASMA TO THAWING SOLUTION IMPROVES REPRODUCTIVE PERFORMANCE BY ARTIFICIAL INSEMINATION
T. Okazaki, T. Akiyoshi, M. Kan, H. Teshima, and M. Shimada

83 EFFECTS OF CYTOCHALASIN B AND VITRIFICATION PROCEDURE ON SURVIVAL AND *IN VITRO* MATURATION OF SWAMP BUFFALO OOCYTES CRYOPRESERVED AT THE IMMATURE STAGE
Y. Y. Liang, T. Phermthai, T. Nagai, T. Somfai, and R. Parnpai

84 COMPARISON BETWEEN *IN VIVO* AND *IN VITRO* PRODUCED EMBRYOS WITH FORSKOLIN AFTER VITRIFICATION
D. M. Paschoal, M. J. Sudano, T. S. Rascado, L. C. O. Magalhães, L. F. Crocomo, J. F. Lima–Neto, A. Martins Júnior, and F. C. Landim–Alvarenga

85 DOMESTIC CAT KITTENS BORN AFTER TRANSFER OF CRYOPRESERVED EMBRYOS PRODUCED BY *IN VITRO* FERTILIZATION OF OOCYTES WITH FLOW-SORTED SPERM
C. E. Pope, E. G. Crichton, M. C. Gómez, C. Dumas, and B. L. Dresser

86 EFFECT OF CRYOPROTECTANT EXPOSURE, VITRIFICATION, AND WARMING TIME OF BOVINE CUMULUS OOCYTE COMPLEXES ON *IN VITRO* FERTILIZATION AND EMBRYONIC DEVELOPMENT
J. R. Prentice, J. Singh, R. J. Mapletoft, and M. Anzar

87 EFFECT OF CRYOPROTECTANT CONCENTRATION IN THE VITRIFICATION SOLUTION ON THE ZONA PELLUCIDA HARDENING AND SPERMATOZOA PENETRATION OF BOVINE OOCYTES
A. Quiñones Martorello, G. Rios, A. Cano, and R. H. Alberio

88 EFFECT OF VITRIFICATION PROCEDURE ON SURVIVAL RATE OF BOVINE EMBRYOS PRODUCED *IN VITRO*
E. Y. Herrera, C. de Frutos, R. Laguna-Barraza, A. Gutierrez-Adan, and D. Rizos

89 SURVIVAL OF CAT EPIDIDYMAL SPERM AFTER TEMPORARY COOL STORAGE OR CRYOPRESERVATION IN DEFINED EXTENDERS
J. R. Saenz, C. Dumas, B. L. Dresser, M. C. Gómez, R. A. Godke, and C. E. Pope

90 OPEN PULLED STRAW VITRIFICATION OF *IN VITRO* PORCINE BLASTOCYTS IN A CHEMICALLY DEFINED MEDIUM
J. Sanchez-Osorio, C. Cuello, J. Gomis, C. Maside, M. A. Gil, I. Parrilla, J. Roca, J. M. Vazquez, and E. A. Martinez

91 TREATMENT OF GOAT SPERM WITH CATALASE TO IMPROVE POST-THAW QUALITY
R. O. C. Silva, M. Nichi, E. G. A. Perez, P. A. A. Góes, A. Dalmazzo, J. R. C. Gurgel, C. C. Rocha, R. Simões, M. A. Peres, M. E. O. A. Assumpção, R. C. Barnabe, and V. H. Barnabe

92 EFFECT OF LOW-DENSITY LIPOPROTEIN ON THE QUALITY OF CRYOPRESERVED RAM SEMEN
P. P. N. Snoeck, M. C. Silva, L. C. O. Moura, M. M. Neves, and M. Henry

93 EFFECT OF ANTIOXIDANTS SUPPLEMENTATION ON THE QUALITY OF CRYOPRESERVED SPERM OF DOGS
C. A. B. Sobrinho, M. Nichi, P. A. A. Góes, A. Dalmazzo, S. E. Crusco, E. G. A. Perez, P. I. M. Pacheco Filho, P. B. S. Cardoso, M. P. Rodrigues, R. C. Barnabe, and V. H. Barnabe

94 EFFECT OF OVARIAN SIZE ON THE VIABILITY OF CRYOPRESERVED SYRIAN HAMSTER OVARIES
O. Suzuki, M. Koura, Y. Noguchi, K. Uchio-Yamada, and J. Matsuda

95 THE EFFECT OF FREEZING TECHNIQUES ON QUALITY OF CAT TESTICULAR SPERM
M. Techakumphu, S. Buarpung, and T. Tharasanit

96 THE EFFECT OF CHEMICAL DELIPIDATION ON CRYOPRESERVABILITY OF CAT EMBRYOS
T. Tharasanit and M. Techakumphu

97 IMPROVED CRYOPRESERVATION OF DOMESTIC CAT SPERMATOZOA IN A SOY LECITHIN-BASED EXTENDER
M. M. Vick, H. L. Bateman, and W. F. Swanson

Developmental Biology

98 THE FETAL AND POSTNATAL EFFECTS OF PERICONCEPTIONAL HYPERGLYCEMIA USING A RABBIT MODEL
R. Brat, A. Rolland, R. Thieme, M. Dahirel, G. Boyer, A. Navarette-Santos, B. Fischer, P. Boileau, and P. Chavatte-Palmer

99 EFFICIENCY OF CATIONIC LIPID-BASED DNA TRANSFECTION OF BOVINE IVF-DERIVED ZONA-FREE BLASTOCYSTS
C. Feltrin, I. S. Carneiro, J. B. S. Neto, R. R. Freire, D. B. Rios, T. M. M. Nobre, J. B. Barreto, L. R. Bertolini, and M. Bertolini

100 GLOBAL H3K27me3 IS DISTINCT IN THE PORCINE EPIBLAST AND TROPHECTODERM AND IS POTENTIALLY CORRELATED TO X-INACTIVATION IN FEMALE EMBRYOS
Y. Gao, V. Hall, and P. Hyttel

101 EXTERNAL PARAMETRIC INDICATORS OF *IN VITRO* DEVELOPMENTALLY COMPETENT WATER BUFFALO OOCYTES
D. Hufana-Duran, P. G. Duran, E. P. Atabay, Y. Kanai, Y. Takahashi, and L. C. Cruz

102 PROTEOMIC ANALYSIS OF CONDITIONED MEDIUM SUPPLEMENTED WITH PORCINE FOLLICULAR FLUID
S. Hwang, K. B. Oh, H.-C. Lee, B.-C. Yang, D. Lim, G.-S. Im, J.-S. Woo, and S.-B. Park

103 TRANSDUCTION PATHWAYS RELATED TO GLUCOSE METABOLISM IN MALE AND FEMALE BOVINE EMBRYOS PRODUCED *IN VITRO*
M. Garcia-Herreros, I. M. Aparicio, D. Rath, T. Fair, and P. Lonergan

104 COMPARATIVE ANALYSIS OF THE YOLK SAC OF BOVINE EMBRYOS AT 30 DAYS OF PREGNANCY DERIVED FROM ARTIFICIAL INSEMINATION OR *IN VITRO* FERTILIZATION
C. M. Oliveira, A. Oliveira, E. Fonseca, and M. A. Miglino

105 *IN VIVO* DEVELOPMENT OF CANINE PARTHENOTES AND THE EXPRESSION PATTERN OF Igf2/Igf2r GENES
J. E. Park, H. J. Oh, M. J. Kim, G. A. Kim, E. J. Park, G. Jang, and B. C. Lee

106 EFFECTS OF BONE MORPHOGENETIC PROTEIN 4 (BMP4) AND ITS INHIBITOR NOGGIN ON BOVINE *IN VITRO* EMBRYO DEVELOPMENT
I. La Rosa, R. Fernandez-Martin, D. A. Paz, and D. F. Salamone

107 DIFFERENCES IN THE INNER MITOCHONDRIAL MEMBRANE POTENTIAL BETWEEN NON-CULTURED AND CULTURED PORCINE EMBRYOS
M. Romek, B. Gajda, M. Rolka, and Z. Smorag

108 A CRITICAL-SIZE CRANIOFACIAL BONE DEFECT MODEL IN THE YORKSHIRE PIG
A. J. Maki, S. G. Clark, J. R. Woodard, M. Goldwasser, and M. B. Wheeler

109 INTRAFOLLICULAR GLUCOSE CONCENTRATION HAS AN INFLUENCE ON THE SEX OF BOVINE BLASTOCYSTS PRODUCED *IN VITRO*
E. Abele, H. Stinshoff, A. Hanstedt, S. Wilkening, S. Meinecke-Tillmann, and C. Wrenzycki

Early Pregnancy/Pregnancy Recognition

110 EXPRESSION AND CLONING OF OESTRADIOL RECEPTOR α AND PROGESTERONE RECEPTORS AND INTERFERONE STIMULATED GENE 15 IN ENDOMETRIUM AND CORPUS LUTEUM OF PREGNANT CAMEL
A. S. Abdoon, O. M. Kandil, H. Kleim, D. Schams, B. Berisha, and C. M. Zeng

111 SINGLE EQUINE EMBRYO LIPID FINGERPRINTING BY MASS SPECTROMETRY
R. F. Gonçalves, C. R. Ferreira, C. M. B. Orlandi, V. C. Sartori, H. N. Ferreira, F. C. Gozzo, S. A. Saraiva, E. J. Pilau, and M. N. Eberlin

112 EXPRESSION OF DNA METHYLTRANSFERASES (DNMT) IN PLACENTAL TISSUES DURING EARLY PREGNANCY IN SHEEP
A. T. Grazul-Bilska, M. L. Johnson, P. P. Borowicz, D. A. Redmer, and L. P. Reynolds

113 EFFECT OF SOME FACTORS ON CONCEPTION RATE IN ALPACAS UNDER PERUVIAN HIGHLAND CONDITION
A. Diaz, W. Huanca, A. Ampuero, H. Huaman, J. Camacho, T. Huanca, D. Quispe, and H. Diaz

114 BOVINE EMBRYO-MATERNAL RECOGNITION MAY OCCUR EARLIER IN AI THAN IN EMBRYO TRANSFER (ET)
A. Ideta, Y. Nakamura, K. Tsuchiya, H. Fujiwara, T. Yamaguchi, K. Imakawa, and Y. Aoyagi

115 EXPRESSION OF RADICAL S-ADENOSYL METHIONINE DOMAIN CONTAINING-2 (RSAD2) AND TRANSFORMING GROWTH FACTOR β (TGF-β) IN BOVINE PERIPHERAL BLOOD MONONUCLEAR CELLS DURING PREGNANCY: IDENTIFICATION OF POTENTIAL BIOMARKERS TO DETERMINE PREGNANCY STATUS
N. Mansouri-Attia, L. J. Oliveira, F. Carter, N. Forde, P. Lonergan, and T. Fair

116 PREGNANCY RATES AFTER ADMINISTRATION OF EQUINE CHORIONIC GONADOTROPIN (ECG) AT PROGESTERONE INTRAVAGINAL DEVICE REMOVAL AND 14 DAYS AFTER FIXED-TIME AI IN BEEF CATTLE
R. Núñez, T. de Castro, L. Cutaia, G. Bó, and A. Menchaca

117 SERUM PROGESTERONE CONCENTRATION AND EMBRYO DIAMETER ON DAY 7 POST-OVULATION IN MARES
B. R. Scott, D. B. Carwell, R. A. Hill, K. R. Bondioli, R. A. Godke, and G. T. Gentry, Jr.

118 A SINGLE INTRAUTERINE INFUSION OF SUSTAINED RELEASE RECOMBINANT BOVINE INTERFERON τ ON DAY 13 EXTENDS CORPUS LUTEUM LIFESPAN IN CYCLIC COWS
H. Takahashi, Y. Hashiyada, Y. Inaba, T. Yasuda, M. Hirako, and M. Geshi

119 FGF2 AND FGF10 STIMULATES BOVINE AND OVINE TROPHOBLAST CELL MIGRATION
Q. E. Yang, K. Zhang, M. I. Giassetti, M. Ozawa, S. E. Johnson, and A. D. Ealy

Embryo Culture

120 SUPPLEMENTATION OF VASCULAR ENDOTHELIAL GROWTH FACTOR DURING *IN VITRO* MATURATION OF PORCINE IMMATURE CUMULUS-OOCYTE COMPLEXES AND SUBSEQUENT DEVELOPMENTAL COMPETENCE AFTER PARTHENOGENESIS AND SOMATIC CELL NUCLEAR TRANSFER
D. Biswas, Y.-B. Jeon, G.-H. Kim, E.-B. Jeung, and S. H. Hyun

121 DEVELOPMENTAL CHANGES IN THERMOPROTECTIVE ACTIONS OF INSULIN-LIKE GROWTH FACTOR-1 ON THE PREIMPLANTATION BOVINE EMBRYO
A. Q. S. Bonilla, L. J. Oliveira, M. Ozawa, E. M. Newsom, M. C. Lucy, and P. J. Hansen

122 EXTENSIVE ALTERATIONS IN THE QUANTITATIVE PROTEOME PROFILE DURING EARLY EMBRYONIC DEVELOPMENT
M. Demant, T. Fröhlich, E. Wolf, and G. J. Arnold

123 AGGREGATION OF CLONED EQUINE EMBRYOS: IMPROVEMENT OF *IN VITRO* AND *IN VIVO* DEVELOPMENT
A. Gambini, J. Jarazo, R. Olivera, F. Karlanian, and D. F. Salamone

124 CO-CULTURE WITH BOVINE INTACT CUMULUS-OOCYTE COMPLEXES DURING *IN VITRO* FERTILIZATION OF BUFFALO DENUDED OOCYTES COMPLETELY RESTORES THEIR FERTILIZING AND DEVELOPMENTAL COMPETENCE
M. De Blasi, M. Rubessa, L. Boccia, S. Di Francesco, M. V. Suárez Novoa, V. Longobardi, and B. Gasparrini

125 EFFECT OF GLYCERALDEHYDE-3-PHOSPHATE DURING BOVINE *IN VITRO* EMBRYO CULTURE
M. Rubessa, S. Di Francesco, M. V. Suárez Novoa, L. Boccia, V. Longobardi, M. De Blasi, and B. Gasparrini

126 EFFECT OF REDUCING GLUCOSE CONCENTRATION DURING *IN VITRO* EMBRYO CULTURE IN BUFFALO (*BUBALUS BUBALIS*)
M. V. Suárez Novoa, S. Di Francesco, M. Rubessa, L. Boccia, V. Longobardi, M. De Blasi, and B. Gasparrini

127 EFFECT OF DIETARY FATS ON EMBRYO QUALITY AND YIELD IN HEAT-STRESSED DAIRY CATTLE
Y. Z. Guzey and A. G. Onal

128 MULTIPLICATION OF 8-CELL EMBRYOS BY AGGREGATION OF A SINGLE ENHANCED GREEN FLUORESCENT PROTEIN-LABELED BLASTOMERE WITH PUTATIVE TETRAPLOID EMBRYOS
M. I. Hiriart, R. J. Bevacqua, R. Fernandez-Martin, and D. F. Salamone

129 DEVELOPMENTAL COMPETENCE OF PORCINE OOCYTES AFTER *IN VITRO* MATURATION AND *IN VITRO* CULTURE UNDER COMPARATIVE OXYGEN TENSION
J. T. Kang, M. Atikuzzaman, D. K. Kwon, S. J. Park, S. J. Kim, J. H. Moon, M. N. Gomez, O. J. Koo, G. Jang, and B. C. Lee

130 THE SYNERGIC EFFECT OF NERVE GROWTH FACTOR AND VASCULAR ENDOTHELIAL GROWTH FACTOR ON *IN VITRO* MATURATION AND DEVELOPMENTAL COMPETENCE IN BOVINE OOCYTES
B. Kim, I. M. Saadeldin, B. Lee, and G. Jang

131 EFFECT OF BREED AND FROZEN-THAWED RAM SEMEN ON *IN VITRO* FERTILIZATION AND OVINE EMBRYONIC DEVELOPMENT
K. C. Lehloenya, N. Mahoete, J. P. C. Greyling, and T. L. Nedambale

132 EFFECTS OF OXYGEN TENSION, MEDIUM, AND WELL OF THE WELL ON *IN VITRO* DEVELOPMENT OF THE MOUSE EMBRYO
Y. S. Li, Z. B. Cao, Y. Liu, H. G. Cao, Y. Tao, X. R. Zhang, and Y. H. Zhang

133 EVALUATION OF OOCYTE DONOR SOURCE AND CULTURE MEDIUM ON DOMESTIC CAT EMBRYO DEVELOPMENT RATES
A. J. Pearks Wilkerson, R. D. Landry, and C. R. Long

134 EFFECTS OF VITAMIN E AND VITAMIN C ON THE DEVELOPMENTAL COMPETENCE OF BUFFALO (*BUBALUS BUBALIS*) EMBRYOS DERIVED FROM PARTHENOGENETIC ACTIVATION, *IN VITRO* FERTILIZATION, AND NUCLEAR TRANSFER
F. Lu, Z. Zhang, S. Zhang, N. Li, J. Jiang, and D. Shi

135 EXPRESSION OF APOPTOSIS-RELATED GENES IN BUFFALO (*BUBALUS BUBALIS*) EMBRYOS PRODUCED THROUGH *IN VITRO* FERTILIZATION AND PARTHENOGENETIC ACTIVATION
S. Saw, K. P. Singh, R. Kaushik, M. Muzaffar, M. S. Chauhan, R. S. Manik, S. K. Singla, P. Palta, and M. K. Singh

136 *N*-METHYL-D-ASPARTIC ACID and HOMOCYSTEINE CAN BE USED TOGETHER AS A REPLACEMENT FOR BOVINE SERUM ALBUMIN IN EARLY PORCINE EMBRYO CULTURE
L. D. Spate, B. K. Bauer, C. N. Murphy, and R. S. Prather

137 PHENAZINE ETHOSULFATE AND FETAL CALF SERUM EFFECTS ON THE DEVELOPMENT AND APOPTOSIS OF *IN VITRO* PRODUCED BOVINE EMBRYOS
M. J. Sudano, D. M. Paschoal, T. S. Rascado, L. C. O. Magalhães, L. F. Crocomo, J. F. Lima–Neto, R. Machado, and F. C. Landim-Alvarenga

138 TIME-LAPSE CINEMATOGRAPHY-COMPATIBLE INJECTION-MOLDED MICROWELL CULTURE SYSTEM FOR TRACKING THE DEVELOPMENT OF INDIVIDUAL BOVINE EMBRYOS
S. Sugimura, T. Akai, T. Somfai, M. Hirayama, Y. Aikawa, M. Ohtake, H. Hattori, S. Kobayashi, Y. Hashiyada, K. Konishi, and K. Imai

139 TRICHOSTATIN A IMPROVED *IN VITRO* DEVELOPMENT OF PORCINE NUCLEAR TRANSFER EMBRYOS PRODUCED BY A NEW ACTIVATION METHOD
L. C. Sui, W. Wang, Y. S. Li, Y. L. Zhang, S. F. Ji, Z. B. Cao, J. W. Chen, T. Gui, M. L. Zhang, X. R. Zhang, and Y. H. Zhang

Embryo Manipulation

140 PRODUCTION OF RECONSTRUCTED *IN VITRO* PRODUCED BOVINE EMBRYOS BY INNER CELL MASS AND TROPHECTODERM AGGREGATION *IN VITRO*
I. P. Emanuelli, E. Razza, C. M. Barros, and M. F. G. Nogueira

141 A NOVEL METHOD FOR PURIFICATION OF INNER CELL MASS AND TROPHECTODERM CELLS FROM BOVINE BLASTOCYSTS USING MAGNETIC ACTIVATED CELL SORTING
M. Ozawa and P. J. Hansen

142 CHIMERISM BY AGGREGATION OF BISECTED *IN VITRO* PRODUCED BOVINE EMBRYOS
E. M. Razza, I. P. Emanuelli, C. M. Barros, and M. F. G. Nogueira

143 TREATMENT WITH VITAMINS A AND E IMPROVE OOCYTE QUALITY AND *IN VITRO* EMBRYO DEVELOPMENT IN *BOS INDICUS* COWS
J. J. F. Evangelista, C. E. A. Souza, M. E. A. Moraes, and A. A. A. Moura

Embryo Transfer

144 HEAT TOLERANCE OF DEMI-EMBRYOS FROM A TROPICAL-ADAPTED *BOS TAURUS* BREED
R. H. Alvarez, A. C. Martinez, and R. M. L. Pires

145 EFFECT OF TRANSFER OF CATTLE ELONGATING EMBRYO TO A REPEAT BREEDER COW ON PREGNANCY RATE AND INCIDENCE OF A RETURN TO ESTRUS
K. Kimura, S. Matsuyama, and T. Kojima

146 CONSEQUENCES OF EMBRYONIC EXPOSURE TO COLONY-STIMULATING FACTOR 2 ON TROPHOBLAST ELONGATION, INTERFERON TAU SECRETION, AND GENE EXPRESSION IN THE EMBRYONIC DISC AND TROPHECTODERM
B. Loureiro, M. G. Favoreto, J. Block, S. Carambula, K. Pennington, A. D. Ealy, and P. J. Hansen

147 USE OF EQUINE CHORIONIC GONADOTROPIN AFTER EMBRYO TRANSFER IN NELORE AND CROSSBRED RECIPIENT CATTLE
M. C. C. Mattos, M. R. Bastos, A. C. S. Oliveira, J. R. S. Gonçalves, T. A. Oliveira, G. B. Mourão, and R. Sartori

148 PIGLET GROWTH AND BLOOD COMPONENTS DURING LACTATION FOLLOWING RECIPROCAL EMBRYO TRANSFER BETWEEN MEISHAN AND WHITE CROSSBRED GILTS
J. R. Miles, J. L. Vallet, J. J. Ford, B. A. Freking, R. A. Cushman, W. T. Oliver, and R. K. Christenson

149 AN INEXPENSIVE LABORATORY PRACTICE TO TEACH EMBRYO COLLECTION AND TRANSFER
A. Martinez, G. Tovar, C. Estrada, E. Esperon, and S. Romo

150 CONCEPTION RATES OF FRESH AND FROZEN *IN VIVO*-PRODUCED MORULAE AND BLASTOCYSTS IN LACTATING DAIRY RECIPIENT COWS
R. Sartori, M. C. C. Mattos, M. R. Bastos, T. A. Oliveira, J. N. Guenther, and M. C. Wiltbank

151 PREGNANCY RATES AFTER A NONSTEROIDAL ANTI-INFLAMMATORY (FLUNIXIN MEGLUMINE) AND PROGESTERONE (P_4) ADMINISTRATION TO MANGALARGA MARCHADOR RECIPIENT MARES
P. G. Rodrigues, A. M. Resende, J. C. Souza, R. R. Carvalho, and R. Maculan

152 EFFECT OF EMBRYO TRANSFER AFTER ARTIFICIAL INSEMINATION ON THE CONCEPTION RATE IN DAIRY COWS UNDER HEAT STRESS IN SOUTHERN JAPAN
M. Tani, C. Tani, K. Tomokawa, D. Funakoshi, M. Sakatani, M. Takahashi, G. Kitahara, and S. Kamimura

153 EFFECT OF DIFFERENT HOLDING AND TRANSPORT MEDIA ON CONCEPTION RATES FOLLOWING TRANSFER OF *IN VIVO* AND *IN VITRO* FERTILIZATION-DERIVED BOVINE EMBRYOS
C. A. Zanenga, C. M. Martins, N. C. Rodovalho, F. Aidar, J. F. Hasler, I. C. C. Santos, and R. Valentim

Epidemiology/Diseases

154 EVALUATION OF THE EFFECTIVENESS OF TREATMENT WITH TRYPSIN IN MURINES EMBRYOS EXPERIMENTALLY EXPOSED TO BOVINE HERPESVIRUS TYPE-1 (BoHV-1) BY THE NESTED-PCR TECHNIQUE
E. Palazzi, D. Pavão, M. Alves, L. Batista, R. Queiroz, F. Souza, and M. D'Angelo

155 EMBRYONIC APOPTOSIS AFTER BTV-8 INFECTION IN BOVINE HATCHED *IN VITRO* PRODUCED BLASTOCYSTS
L. Vandaele, W. Wesselingh, K. De Clercq, I. De Leeuw, H. Favoreel, A. Van Soom, and H. Nauwynck

Exotic Species

156 MONITORING SALIVARY TESTOSTERONE CONCENTRATIONS FROM CAPTIVE AMAZONIAN MANATEES (*TRICHECHUS INUNGUIS*): IS THERE A SEASONAL PATTERN?
R. S. Amaral, F. C. W. Rosas, P. Viau, M. Nichi, V. M. F. da Silva, and C. A. Oliveira

157 *IN VITRO* SPERM CAPACITATION IN A MARSUPIAL, *SMINTHOPSIS MACROURA*
N. E. Calatayud, K. N. Cane, M. G. Larman, D. K. Gardner, and L. Selwood

158 DEVELOPMENT OF FIELD ASSAY FOR EVALUATION OF WHITE RHINOCEROS NEUTROPHIL FUNCTION AS A STRESS MARKER
M. Kruger, N. I. Pitts, J. Virgo, E. Betts, K. Delk, and R. A. Fayrer-Hosken

159 COMPARISON BETWEEN EQUINE CHORIONIC GONADOTROPIN AND PORCINE FOLLICLE STIMULATING HORMONE FOR *IN VIVO* PRODUCTION OF EMBRYOS IN ALPACAS (*VICUGNA PACOS*) SHOWING NATURAL LUTEAL PHASE AFTER INDUCTION OF OVULATION
W. Vivanco, E. Huaman, S. Leon, T. Nunez, A. Gregoire, D. Ponce, E. Alvarado, and M. Asparrin

160 SUCCESSFUL PREGNANCY IN ESTRUS-SYNCHRONIZED HIMALAYAN TAHRS (*HEMITRAGUS JEMLAHICUS*) BY TRANSCERVICALLY INSEMINATING FRESH AND EXTENDED-CHILLED SEMEN COLLECTED BY ELECTROEJACULATION
H. Yong, B.-S. Bae, S.-D. Kim, and S.-H. Hyun

Folliculogenesis/Oogenesis

161 DIETARY ENERGY SOURCE IN PRIMIPAROUS DAIRY COWS DURING THE TRANSITION PERIOD: BLOOD METABOLITES AND FOLLICULAR CLASSIFICATION
M. A. T. Artunduaga, S. G. Coelho, A. M. Borges, A. M. Q. Lana, and H. M. Saturnino

162 OVARIAN ULTRASOUND BIOMICROSCOPY IN RABBITS
M. P. Cervantes, J. Singh, J. M. Palomino, D. Li, and G. P. Adams

163 *IN VITRO* CULTURE OF PORCINE OOCYTE-GRANULOSA CELL COMPLEXES
Y. F. Diao, R. X. Han, H. R. Kim, C. S. Park, and D. I. Jin

164 EPIGENETIC ANALYSIS OF GENOMIC DNA IN PREPUBERAL AND ADULT BOVINE OOCYTES
M. Diederich, J. Heinzmann, W. Kues, U. Baulain, T. Haaf, R. Reinhardt, and H. Niemann

165 SHORT-TIME FASTING AFFECTS METABOLIC MARKERS WITHOUT IMPACT ON FOLLICLE AND OOCYTE DEVELOPMENT IN THE RABBIT MODEL
R. M. Garcia-Garcia, P. G. Rebollar, M. Arias Alvarez, O. G. Sakr, P. Ramos Ibeas, G. Brecchia, P. Millan, C. Boiti, and P. L. Lorenzo

166 THE DIFFERENTIAL TRANSCRIPTOME AND ONTOLOGY PROFILES OF MURAL AND CUMULUS GRANULOSA CELLS IN STIMULATED HUMAN ANTRAL FOLLICLES
S. Kõks, A. Velthut, A. Sarapik, S. Altmäe, E. Reinmaa, L. C. Schalkwyk, C. Fernandes, H. Lad, U. Soomets, Ü. Jaakma, and A. Salumets

167 VISUALISATION OF FAT ACCUMULATION IN BOVINE PREANTRAL AND ANTRAL OOCYTES USING 2-PHOTON MICROSCOPY
A. Langbeen, J. L. M. R. Leroy, I. Pintelon, and P. E. J. Bols

168 CHARACTERIZATION AND DIFFERENTIATION INTO OOCYTE-LIKE CELL MASSES OF PORCINE MESENCHYMAL STEM CELLS DERIVED FROM OVARIAN THECA CELLS
Y. M. Lee, B. Mohana Kumar, S. W. Kim, S. L. Lee, and G. J. Rho

169 CHANGES OF PROTEIN PROFILES DURING FOLLICLE DEVELOPMENT AND *IN VITRO* OOCYTE MATURATION IN THE PIG
M. R. Ji, D. M. Jang, Y. S. Lee, H. T. Cheong, B. K. Yang, and C. K. Park

170 NATURALLY OCCURRING CHRONIC MASTITIS COMPROMISES FOLLICULOGENESIS, AFFECTS VASCULARIZATION, AND INTERACTS WITH DIFFERENTIATION FACTOR GDF9 IN BOVINE OVARIAN STROMA
M. M. Rahman, M. Mazilli, G. Pennarossa, T. A. L. Brevini, A. Vanelli, A. Zecconi, and F. Gandolfi

171 Withdrawn

172 REUSE OF AUTOCLAVED INTRAVAGINAL PROGESTERONE DEVICE TO ESTROUS SYNCHRONIZATION IN TOGGENBURG GOATS IN THE BREEDING SEASON
J. M. G. Souza, C. A. A. Torres, M. C. Silva, A. L. R. S. Maia, J. H. Bruschi, F. Z. Brandão, J. H. M. Viana, V. J. F. Freitas, and J. F. Fonseca

173 A COMBINED RECOMBINANT BOVINE SOMATOTROPIN/EQUINE CHORIONIC GONADOTROPIN PROTOCOL IN THE ZEBU BREED TABAPUA AND HOLSTEIN HEIFERS SUBMITTED TO OVUM PICKUP
J. C. de Souza, H. de Morais, R. Spuri, R. C. Andrade, and T. L. C. Pinto

174 EVALUATION OF THE 9-DAY PROTOCOL FOR ESTROUS SYNCHRONIZATION IN SANTA INES EWES
P. Viau, M. B. Paes de Barros, L. M. K. Dias, S. S. Nicolau, C. T. Marino, and C. A. Oliveira

175 METABOLIC STRESS IMPAIRS FOLLICULAR GROWTH IN SUPEROVULATED HEIFERS
H. Aardema, B. A. J. Roelen, B. M. Gadella, and P. L. A. M. Vos

176 EFFECTS OF VEHICLE AND ROUTE OF ADMINISTRATION OF LETROZOLE ON OVARIAN FUNCTION IN CATTLE
M. J. Yapura, R. J. Mapletoft, J. Singh, R. A. Pierson, D. Rogan, and G. P. Adams

Gene Expression

177 GENE EXPRESSION PROFILES OF *IN VITRO*- AND *IN VIVO*-DERIVED BOVINE EMBRYOS
D. Aktoprakligil Aksu, C. Agca, S. Aksu, T. Akkoc, A. Tas Caputcu, S. H. Kizil, H. Sagirkaya, H. Bagis, and Y. Agca

178 DISTINCT EXPRESSION AND REGULATION OF ECTONUCLEOTIDE PYROPHOSPHATASE/PHOSPHODIESTRASE 2 AND ITS POTENTIAL ROLE(S) IN THE UTERUS OF RATS DURING ESTROUS CYCLE
H.-J. Ahn and E.-B. Jeung

179 EFFECT OF SERUM DURING CULTURE ON DAY 14 ELONGATED BOVINE EMBRYOS
J. Angulo, G. T. Gentry Jr., R. A. Godke, and K. R. Bondioli

180 HEAT STRESS INDUCES ALTERATION IN EXPRESSION OF GENES RELATED TO COMPETENCE AND IMPLANTATION IN NELORE BOVINE *IN VITRO*-PRODUCED EMBRYOS
C. F. Silva, A. C. S. Castilho, R. A. Satrapa, R. Z. Puelker, E. M. Razza, H. P. Eduardo, J. Buratini Jr., and C. M. Barros

181 TRANSCRIPTIONAL SEXUAL DIMORPHISM IN AUTOSOMAL GENES ON BOVINE DAY 14 EMBRYOS
P. Bermejo-Alvarez, D. Rizos, P. Lonergan, and A. G.-Adan

182 CALBINDIN-D28K IS PREDOMINANTLY EXPRESSED AND REGULATED BY ESTROGEN IN HUMAN ENDOMETRIUM DURING MENSTRUAL CYCLE
K.-C. Choi, H. Yang, and E.-B. Jeung

183 MITOGEN-ACTIVATED PROTEIN KINASES ARE ACTIVATED BY ADENOSINE TRIPHOSPHATE IN RAT OVARIAN SURFACE EPITHELIAL CELLS
K.-A. Hwang and K.-C. Choi

184 EXPRESSION OF GENES RELATED TO DNA METHYLATION AND GLUCOSE METABOLISM DURING THE PRE-IMPLANTATIONAL STAGE OF BOVINE EMBRYOS
A. R. Ferreira, G. M. Machado, J. M. Azevedo, R. Sartori, M. A. N. Dode, and M. M. Franco

185 HIGH-THROUGHPUT PROTEOMIC ASSESSMENT OF FROZEN-THAWED BOAR SPERMATOZOA
J. M. Feugang, K. Pendarvis, M. Crenshaw, S. T. Willard, and P. L. Ryan

186 LASER CAPTURE MICRODISSECTION FOR GENE EXPRESSION ANALYSIS OF INNER CELL MASS AND TROPHOBLAST FROM BOVINE BLASTOCYSTS
M. Filliers, W. de Spiegelaere, L. J. Peelman, K. Goossens, C. Burvenich, L. Vandaele, P. Cornillie, and A. Van Soom

187 DIFFERENTIAL EXPRESSIONS OF GROWTH AND DIFFERENTIATION FACTOR 9 AND BONE MORPHOGENETIC PROTEIN 15 GENES IN OVARIES OF THE CALF AND COW
M. Hosoe, K. Ushizawa, K.-G. Hayashi, and T. Takahashi

188 CALBINDIN-D28K IS INVOLVED IN THE APOPTOTIC PATHWAY AND PLAYS A ROLE AS AN ANTIAPOPTOTIC GENE IN HYDROGEN PEROXIDE-INDUCED CELL DEATH OF HUMAN ENDOMETRIAL ISHIKAWA CELLS
S.-H. Hyun, E.-M. Jung, and E.-B. Jeung

189 THE CALCIUM EXCHANGERS NCKX3 AND NCX1 ARE DISTINCTLY EXPRESSED AND REGULATED BY STEROIDS IN THE HUMAN ENDOMETRIUM DURING THE MENSTRUAL CYCLE
E.-B. Jeung

190 EXPRESSION OF APOPTOTIC GENES IS MEDIATED BY CALCIUM-BINDING PROTEINS, CALBINDINS, IN THE UTERUS OF CALBINDIN-D9K AND CALBINDIN-D28K KNOCKOUT MICE
E.-M. Jung and E.-B. Jeung

191 TRANSIENT RECEPTOR POTENTIAL SUPERFAMILY OF ION CHANNELS, TRPV6, IS CONSTITUTIVELY EXPRESSED AND REGULATED BY ESTROGEN IN THE HUMAN UTERUS DURING THE MENSTRUAL CYCLE
Y.-K. Kim, H. Yang, and E.-B. Jeung

192 INDUCIBLE TRANSGENE EXPRESSION IN PIGS
N. Klymiuk, W. Boecker, A. Baehr, T. Radic, A. Wuensch, E. Schilling, M. Kurome, B. Kessler, H. Nagashima, W. Mutschler, M. Schieker, and E. Wolf

193 BOVINE EMBRYO GENOTYPING USING A 50K SINGLE NUCLEOTIDE POLYMORPHISM CHIP
D. Le Bourhis, E. Mullaart, P. Humblot, W. Coppieters, and C. Ponsart

194 EXPRESSION OF STANNIOCALCIN FAMILY GENES DURING PREIMPLANTATION STAGE BOVINE EMBRYO DEVELOPMENT
S. Mamo, A. Al Naib, L. O'Hara, T. Fair, and P. Lonergan

195 SPERMATOZOAL PROTEIN MARKERS FOR ANGUS BULL FERTILITY
X. Wang, A. Kaya, and E. Memili

196 GLUTATHIONE S-TRANSFERASE THETA1 (GSTT1) IS DIFFERENTIALLY REGULATED FROM OTHER GLUTATHIONE S-TRANSFERASES IN GRANULOSA CELLS
M. Muraki, Y. Takahashi, T. Ishii, S. Kyuwa, and Y. Yoshikawa

197 MOLECULAR CLONING AND EXPRESSION OF THE CASHMERE GOAT IZUMO GENE
R.H. Na, L. Liang, and L. Fu

198 THE EFFECT OF SOURCE AND *IN VITRO* MATURATION ON THE ABUNDANCE OF MATERNAL MRNA OF SELECTED GENES IN FOLLICULAR BOVINE OOCYTES AND THEIR INFLUENCE ON *IN VITRO* DEVELOPMENT
T. Somfai, K. Imai, M. Kaneda, S. Akagi, S. Haraguchi, S. Watanabe, E. Mizutani, T.Q. Dang-Nguyen, Y. Inaba, M. Geshi, and T. Nagai

199 Withdrawn

200 *IN VITRO* EMBRYO PRODUCTION IS ASSOCIATED WITH DISTINCT ALTERATIONS IN THE TRANSCRIPTOME BETWEEN THE BLASTOCYST STAGE AND THE INITIATION OF ELONGATION IN CATTLE
M. Clemente, I. Lopez-Vidriero, P. O'Gaora, J. P. Mehta, N. Forde, A. Gutierrez-Adan, P. Lonergan, and D. Rizos

201 SUPPRESSION OF SUZ12 IN BOVINE PREIMPLANTATION EMBRYOS VIA CYTOPLASMIC SMALL INTERFERING RNA INJECTION
G. L. Williamson, J. H. Pryor, K. Tessanne, M. C. Golding, and C. R. Long

202 KNOCK-DOWN AND DEVELOPMENTAL EFFICIENCY OF ARHGAP15 GENE KNOCK-DOWN EMBRYOS
B.-C. Yang, H.-C. Lee, S. Hwang, I.-S. Jeon, D.-K. Lee, J.-H. An, E.-H. Noh, Y.-J. Han, E.-Y. Kim, K.-C. Hwang, and S.-B. Park

203 PLASMA MEMBRANE CA^{2+}-PUMPING ATPASE 1 IS ABUNDANTLY EXPRESSED AND DISTINCTLY REGULATED BY ESTROGEN IN HUMAN ENDOMETRIUM DURING THE MENSTRUAL CYCLE
H. Yang and E.-B. Jeung

204 ALTERED GENE EXPRESSION FOLLOWING EXPOSURE TO BIS-PHENOL A IN HUMAN OVARIAN CANCER CELLS EXPRESSING ESTROGEN RECEPTORS BY MICROARRAY
B.-R. Yi, E.-B. Jeung, and K.-C. Choi

IVF/IVP

205 GLUCOSE-6-PHOSPHATE DEHYDROGENAZE ACTIVITY IN OVINE OOCYTES IS ASSOCIATED WITH PRE-IMPLANTATION EMBRYONIC DEVELOPMENT *IN VITRO*
F. Asghari, M. Shahidi, Y. Chashnidel, H. Deldar, Z. Ansari-Pirsaraei, and A. Mohammadi-Sangcheshmeh

206 THE IMPORTANCE OF CUMULUS EXPANSION FOR MONOSPERMIC FERTILIZATION OF PORCINE CUMULUS–OOCYTE COMPLEXES
J. Beek, J. Bijttebier, D. Maes, H. Nauwynck, and A. Van Soom

207 OOCYTE RECOVERY RATES AND *IN VITRO* BLASTOCYST PRODUCTION IN CATTLE TREATED WITH A SINGLE INJECTION OF FOLLTROPIN-V DILUTED IN A SLOW-RELEASE FORMULATION
F. L. Ongaratto, A. Tríbulo, M. Ramos, P. Rodriguez, and G. A. Bó

208 *IN VITRO* FERTILIZATION UNDER SIMULATED STRESS AND SUBSEQUENT *IN VITRO* EMBRYO PRODUCTION IN THE PIG
R. González and Y. Brandt

209 EFFECT OF HEAT STRESS ON DEVELOPMENT OF *IN VITRO*-FERTILIZED AND PARTHENOGENETIC BOVINE EMBRYOS
F. Paludo, M. M. Pereira, C. C. R. Quintao, L. T. Iguma, M. M. Gioso, J. H. M. Viana, and L. S. A. Camargo

210 CO-CULTURE WITH AUTOLOGOUS CUMULUS CELLS SUPPORTS THE INDIVIDUAL DEVELOPMENT OF SINGLY *IN VITRO*-MATURED AND FERTILIZED BOVINE OOCYTES
I. G. F. Goovaerts, J. L. M. R. Leroy, E. Merckx, S. Andries, and P. E. J. Bols

211 *IN VIVO* MATURATION AND *IN VITRO* FERTILIZATION OF ALPACA OOCYTES
W. Huanca, R. L. Condori, M. A. Chileno, J. Cainzos, J. J. Becerra, L. A. Quintela, and P. G. Herradon

212 EFFECT OF CONSECUTIVE SUPERSTIMULATORY TREATMENT-INDUCED FOLLICULAR WAVE SYNCHRONIZATION TO OPTIMIZE OOCYTE RETRIEVAL AND EMBRYO PRODUCTION BY OVUM PICKUP AND *IN VITRO* FERTILIZATION IN COWS
K. Imai, M. Ohtake, Y. Aikawa, S. Sugimura, M. Hirayama, Y. Hashiyada, S. Kobayashi, and K. Konishi

213 THE EFFECTS OF SERICIN SUPPLEMENTATION IN *IN VITRO* CULTURE MEDIUM ON THE DEVELOPMENT AND CRYOSURVIVAL OF BOVINE *IN VITRO*-MATURED–*IN VITRO*-FERTILIZED EMBRYOS
Y. Inaba, M. Hosoe, H. Teramoto, and M. Geshi

214 EFFECT OF LONG-DISTANCE TRANSPORTATION OF OVARIES ON THE DEVELOPMENT OF *IN VITRO*-MATURED–*IN VITRO*-FERTILIZED– *IN VITRO*-CULTURED BOVINE EMBRYOS
M. Kanae, K. Hisaichi, S. Jaswant, and D. Osamu

215 AN IMPROVED SYSTEM FOR THE *IN VITRO* PRODUCTION OF PORCINE EMBRYOS
J. M. Kelly, A. Weaver, D. O. Kleemann, L. M. Frazer, K. L. Kind, W. H. van Wettere, and S. K. Walker

216 PRONUCLEAR FORMATION AND DEVELOPMENTAL COMPETENCE OF MATURE PORCINE OOCYTES DERIVED FROM SMALL- AND MEDIUM-SIZED FOLLICLES
C. Kohata and H. Funahashi

217 EFFECTS OF PORCINE GRANULOCYTE-MACROPHAGE COLONY-STIMULATING FACTOR ON PORCINE *IN VITRO*-FERTILIZED EMBRYOS
S. S. Kwak, D. Biswas, and S. H. Hyun

218 ANTIBIOTIC-RESISTANT MICROBIAL CONTAMINATION (*ENTEROBACTER CLOACAE*) DERIVED FROM EGG YOLK, FROZEN SEMEN EXTENDER, IN PORCINE *IN VITRO*-FERTILIZED EMBRYOS
S. H. Jang, S. S. Kwak, D. Biswas, and S. H. Hyun

219 *IN VITRO* FERTILIZATION RATE OF MATURED PIG OOCYTES BY FROZEN-THAWED KOLBROEK PIG SPERM CELLS
M. H. Mapeka, K. C. Lehloenya, M. L. Mphaphathi, and T. L. Nedambale

220 RELATIONSHIP BETWEEN FOLLICULAR FLUID METABOLOME AND BOVINE OOCYTE DEVELOPMENTAL COMPETENCE
S. Matoba, K. Bender, L. Brennan, P. Lonergan, and T. Fair

221 EFFECT OF STAGE OF CORPUS LUTEUM DEVELOPMENT ON THE *IN VITRO* PRODUCTION OF BOVINE EMBRYOS
S. Miyashita, K. Miyata, C. Tachibana, Y. Inaba, H. Koyama, and O. Dochi

222 COMPARISON OF COMMERCIAL *IN VITRO* EMBRYO PRODUCTION OF BRAHMAN DONORS UNDER BRAZILIAN VERSUS PANAMANIAN MANAGEMENT
J. R. S. Chen, L. F. Nasser, L. Penteado, M. Mendizabal, A. C. Basso, J. H. F. Pontes, M. Bionaz, and M. B. Wheeler

223 CHANGE IN THE DISTRIBUTION OF RNA IN BOAR SPERM DURING CULTURE IN A CAPACITATION MEDIUM CONTAINING CAFFEINE
Y. Okudaira and H. Funahashi

224 LOCALIZATION OF NITRIC OXIDE SYNTHASE ACTIVITY IN BUFFALO (*BUBALUS BUBALIS*) OOCYTES AND EMBRYOS
K. R. Babu, R. Sharma, K. P. Singh, A. George, M. S. Chauhan, S. K. Singla, R. S. Manik, and P. Palta

225 EFFECTS OF PEDIGREE, MEAT QUALITY, AND MEAT QUANTITY OF SLAUGHTERHOUSE DONOR COWS ON OOCYTE RECOVERY, EMBRYO DEVELOPMENT, AND PREGNANCY AFTER EMBRYO TRANSFER
Y. S. Park and H. D. Park

226 EVALUATION OF *IN VITRO* EMBRYO DEVELOPMENT OF BOVINE OOCYTES EXPERIMENTALLY EXPOSED TO *MYCOPLASMA BOVIS*
D. Pavao, M. Alves, R. Qureiroz, F. Souza, and M. D. Angelo

227 THE EFFECTS OF SEXED SEMEN ON EMBRYONIC DEVELOPMENT TO THE BLASTOCYST STAGE
W. Plummer, D. Beckett, A. Schaffner, B. Layport, J. Norman, C. Grimbleby, P. Wessinger, E. Pace, L. Kirscher, K. Matthews, and T. Dorshorst

228 EVALUATION OF EMBRYO VIABILITY AFTER PROLONGED TRANSPORT IN DIFFERENT MEDIA AND AT DIFFERENT TEMPERATURES
R. Z. Puelker, A. G. R. Pupulim, C. H. O. Constant, M. A. Andreazzi, and I. P. Emanuelli

229 EVALUATION OF OOCYTE QUALITY RECOVERED FROM GIR BREED COWS WITH SYNCHRONIZED FOLLICULAR WAVE ON *IN VITRO* EMBRYO PRODUCTION
L. T. Iguma, J. N. S. Sales, R. I. T. P. Batista, M. M. Pereira, C. C. R. Quintão, R. S. Verneque, L. S. A. Camargo, J. H. M. Viana, and P. S. Baruselli

230 OVUM PICKUP–*IN VITRO* PRODUCTION EFFICIENCY FOR CONSERVATION OF THE FLAMENGA CATTLE BREED
F. C. Zago, S. Gaudêncio Neto, L. H. Aguiar, L. F. Schutz, F. Forell, L. R. S. Marinho, J. Machado Jr., A. Mezzalira, and M. Bertolini

Male Physiology

231 SEMINAL QUALITY IN WHOOPING CRANE (*GRUS AMERICANA*) IS AFFECTED BY STAGE OF BREEDING SEASON BUT NOT BY AGE OF INDIVIDUAL
M. E. Brown, A. Crosier, W. Lynch, S. J. Converse, J. Chandler, G. Olsen, J. French, D. E. Wildt, and N. Songsasen

232 INFLUENCE OF SEMINAL PLASMA ON THE SUSCEPTIBILITY OF DOG SPERM AGAINST DIFFERENT REACTIVE OXYGEN SPECIES
A. Dalmazzo, P. A. A. Góes, M. Nichi, R. O. C. Silva, J. R. C. Gurgel, E. G. A. Perez, C. C. Rocha, R. Simões, M. A. Peres, M. E. O. A. Assumpção, R. C. Barnabe, and V. H. Barnabe

233 EFFECTS OF A LONG-ACTING TRANQUILIZER ON SPERM MOTILITY OF NORTH AMERICAN BISON BULLS
G. Gratton, B. Toosi, M. Anzar, R. McCorkell, and C. Lessard

234 MORPHOLOGICAL CHARACTERIZATION OF TESTES FROM INSULIN RECEPTOR SUBSTRATE (IRS) 2-DEFICIENT MICE
R. J. Griffeth and D. J. Burks

235 MANGALARGA STALLION SPERM IS HIGHLY SUSCEPTIBLE TO THE HYDROXYL RADICAL
J. R. C. Gurgel, M. Nichi, E. G. A. Perez, P. A. A. Góes, A. Dalmazzo, R. O. C. Silva, C. C. Rocha, R. Simões, M. A. Peres, M. E. O. A. Assumpção, V. H. Barnabe, and R. C. Barnabe

236 PROTEIN TYROSINE PHOSPHORYLATION IN BOAR SPERM DURING CO-CULTURE WITH OVIDUCTAL EPITHELIAL CELLS
V. Luño, R. López-Úbeda, J. Gadea, and C. Matás

237 PROTEIN-TYROSINE PHOSPHORYLATION AND CALCIUM UPTAKE IN BOAR SPERM SUBPOPULATIONS AFTER DIFFERENT DISCONTINUOUS PERCOLL GRADIENT CENTRIFUGATIONS
R. López-Úbeda, V. Luño, L. Vieira, J. Gadea, and C. Matás

238 ASSOCIATION BETWEEN SPERM MORPHOLOGY AND *IN VITRO* EMBRYO PRODUCTION IN MICE
M. Vilariño, M. Crispo, A. Pinczak, and A. Menchaca

239 POSSIBLE MECHANISMS OF SPERM DAMAGE CAUSED BY HEAT STRESS IN EUROPEAN BULLS RAISED IN TROPICAL ENVIRONMENTS
M. Nichi, R. P. Bertolla, T. B. Soler, C. N. M. Cortada, R. M. Zuge, P. E. J. Bols, R. C. Barnabe, and V. H. Barnabe

240 FUNCTIONAL TRAITS OF CAT SPERM DURING DISTINCT MATURATION STATUS
E. G. A. Perez, M. Nichi, C. A. Baptista Sobrinho, P. A. A. Góes, A. Dalmazzo, J. R. Gurgel, C. C. Rocha, R. O. C. Silva, R. C. Barnabe, and V. H. Barnabe

241 EFFECT OF MATERNAL PERICONCEPTIONAL UNDERNUTRITION ON MALE OFFSPRING PHYSIOLOGY AND TESTICULAR DEVELOPMENT
A. Roséfort, N. Debus, G. Viudes, S. Camous, E. Pailhoux, P. Hassoun, and P. Chavatte-Palmer

242 EFFECTS OF TWO COMMERCIAL BOVINE SEMEN EXTENDERS FOR SHORT-TERM STORAGE ON MOTILITY PATTERN OF CHILLED BISON SEMEN
B. M. Toosi, G. Gratton, C. Lessard, and G. P. Adams

243 APOPTOTIC-LIKE CHANGES AND FERTILITY OF TRANSGENIC FOR HUMAN α1,2-FUCOSYLTRANSFERASE GENE AND NONTRANSGENIC BOAR SPERMATOZOA
M. Trzcinska, M. Bryla, R. Slomski, and Z. Smorag

Oocyte Activation

244 INVOLVEMENT OF NA^+/H^+ ANTIPORTER 1 IN EMBRYONIC DEVELOPMENT OF RAT OOCYTES ACTIVATED BY ETHANOL
J. Ito, K. Shudo, D. Sano, and N. Kashiwazaki

245 ANALYSIS OF CORTICAL GRANULE EXUDATE OBTAINED BY CHEMICAL OOCYTE ACTIVATION IN PIGS
R. Romar, M. J. Izquierdo-Rico, and H. Funahashi

246 EVIDENCE OF FOCAL ADHESION ASSEMBLY IN BOVINE OOCYTES
B. R. Sessions, H. Rutigliano, C. J. Davies, and K. L. White

Oocyte Maturation

247 ADENOSINE TRIPHOSPHATE CONTENT AND SUPEROXIDE DISMUTASE ACTIVITY IN SINGLE OOCYTES BEFORE AND AFTER *IN VITRO* MATURATION
M. Filioli Uranio, B. Ambruosi, A. M. Sardanelli, M. S. Paternoster, F. Amati, N. A. Martino, and M. E. Dell'Aquila

248 PRODUCTION OF FLAGGED RECOMBINANT BOVINE BMP15 TO IMPROVE BOVINE *IN VITRO* EMBRYO PRODUCTION SYSTEMS
G. Burns, P. F. Suchodolski, A. J. Pearks Wilkerson, and C. Long

249 EXPRESSION OF mRNA ENCODING EPIDERMAL GROWTH FACTOR-LIKE FACTORS IN BOVINE CUMULUS CELLS DURING *IN VITRO* MATURATION: EFFECTS OF TIME AND FOLLICLE-STIMULATING HORMONE
E. S. Caixeta, M. F. Machado, P. Ripamonte, P. F. Lima, A. C. S. Castilho, R. Bueno da Silva, C. M. Barros, C. A. Price, and J. Buratini Jr.

250 HUMAN EXHALED AIR CAN EFFECTIVELY SUPPORT *IN VITRO* MATURATION OF PORCINE OOYCTES AND SUBSEQUENT *IN VITRO* DEVELOPMENT
Z. B. Cao, L. C. Sui, S. F. Ji, J. W. Chen, T. Gui, Y. S. Li, Y. Liu, H. G. Cao, Y. Tao, X. R. Zhang, and Y. H. Zhang

251 SELECTION OF PREPUBERTAL SHEEP OOCYTES USING BRILLIANT CRESYL BLUE TEST
M. G. Catalá, D. Izquierdo, R. Romaguera, S. Hammami, M. Roura, and M. T. Paramio

252 EFFECT OF FOLLICLE-STIMULATING HORMONE ADDITION ON *IN VITRO* MATURATION AND CLEAVAGE OF ALPACA (*VICUGNA PACOS*) EMBRYOS
R. L. Condori, W. Huanca, M. Chileno, J. Cainzo, F. Valverde, J. J. Becerra, L. A. Quintela, and P. G. Herradon

253 OOCYTE PREMATURATION IN THE PRESENCE OF MILRINONE IMPROVES NUCLEAR BUT NOT CYTOPLASMIC MATURATION OF MACAQUE OOCYTES
E. C. Curnow, J. P. Ryan, D. M. Saunders, and E. S. Hayes

254 9-*CIS* RETINOIC ACID INHIBITS CUMULUS CELL APOPTOSIS DURING *IN VITRO* MATURATION OF BOVINE OOCYTES THROUGH INHIBITION OF AP-1 PATHWAY
G. K. Deb, S. R. Dey, J. I. Bang, S. J. Cho, T. H. Kwon, and I. K. Kong

255 SPERM NUCLEAR DECONDENSATION ABILITY OF *IN VITRO* MATURED CANINE OOCYTES
M. De los Reyes, J. Vergara, and J. Palomino

256 SYNERGISTIC EFFECT ON EMBRYO DEVELOPMENT AND EMBRYO QUALITY WHEN BOVINE DENUDED OOCYTES ARE CO-CULTURED WITH CUMULUS–OOCYTE COMPLEXES DURING *IN VITRO* MATURATION
S. R. Dey, G. K. Deb, J. I. Bang, S. J. Cho, B. H. Choi, and I. K. Kong

257 DETECTION OF MICROTUBULES BY POLARIZED LIGHT MICROSCOPY IN SHEEP AND GOAT OOCYTES
J. N. Caamaño, M. Catalá, R. Romaguera, C. Diez, M. Muñoz, D. Martín, R. Morató, S. Carrocera, T. Mogas, M. T. Paramio, and E. Gomez

258 ROLE OF PROGESTERONE AND ITS RECEPTORS ON DEVELOPMENTAL COMPETENCE OF OOCYTES IN CATTLE
I. M. Aparicio, M. Garcia-Herreros, L. C. O'Shea, C. Hensey, P. Lonergan, and T. Fair

259 Cdk7 AND CYCLIN H, BUT NOT Mat1, ARE INVOLVED IN MEIOTIC RESUMPTION OF PORCINE IMMATURE OOCYTE
W. Fujii, T. Nishimura, K. Kano, and K. Naito

260 *IN VITRO* DEVELOPMENTAL COMPETENCE OF PREPUBERTAL GOAT OOCYTES CULTURED IN GROWTH MEDIUM
S. Hammami, R. Romaguera, M. Roura, M. G. Català, R. Morató, T. Mogas, M. T. Paramio, and D. Izquierdo

261 INFLUENCE OF *IN VITRO* MATURATION ON EPIGENETIC MARKS AND GENE EXPRESSION IN BOVINE OOCYTES
J. Heinzmann, T. Hansmann, C. Wrenzycki, U. Zechner, T. Haaf, and H. Niemann

262 ISOBUTYLMETHYLXANTHINE REVERSIBLY SUPPRESSES SPONTANEOUS AND EQUINE CHORIONIC GONADOTROPIN/EPIDERMAL GROWTH FACTOR-STIMULATED MEIOSIS IN FELINE OOCYTES
J. R. Herrick

263 REGULATION OF SEVERAL TRANSCRIPTS DURING *IN VITRO* MATURATION IN PORCINE OOCYTES COLLECTED FROM DIFFERENT SIZE FOLLICLES
M. J. Izquierdo-Rico, R. Romar, C. Kohata, and H. Funahashi

264 MITOCHONDRIAL DNA COPY NUMBER IN OOCYTES OF PREPUBERTAL AND CYCLIC GILTS
P. Pawlak, E. Pers-Kamczyc, and D. Lechniak-Cieslak

265 INHIBITION OF CLASS III PHOSPHATIDYLINOSITOL-3-KINASE, BY 3-METHYLADENINE, REVERSIBLY ARRESTS PORCINE OOCYTES AT GERMINAL VESICLE STAGE
M. R. Park, M. K. Gupta, S. J. Uhm, S. T. Shin, Y. M. Han, and H. T. Lee

266 THE SHORT TIME TREATMENT WITH SODIUM BUTYRATE ON GERMINAL VESICLE STAGE OOCYTES IMPROVES OOCYTE QUALITY AND DEVELOPMENTAL COMPETENCE IN PIGS
L. M. Liu, F. Gao, M. Hua, J. Y. Guan, B. Tang, and Z. Y. Li

267 ULTRASTRUCTURAL CHARACTERISTICS OF NON-MATURED AND *IN VITRO* MATURED OOCYTES COLLECTED FROM FOLLICULAR, LUTEAL, AND INACTIVE OVARIES OF DOMESTIC CAT (*FELIS CATUS*) DURING BREEDING AND NON-BREEDING SEASON
L. R. Martins, C. B. Fernades, B. W. Minto, F. C. Landim-Alvarenga, and M. D. Lopes

268 INFLUENCE OF DONOR AGE ON DEVELOPMENTAL COMPETENCE OF *IN VITRO V. IN VIVO* MATURED BOVINE OOCYTES OBTAINED BY REPEATED OVUM PICKUP FROM FOLLICLE-STIMULATING-HORMONE-STIMULATED AND NONSTIMULATED ANIMALS
M. Matthiesen, H. D. Reichenbach, F. A. Habermann, M. Reichenbach, G. J. Arnold, and E. Wolf

269 EXPRESSION PATTERN OF STRESS MARKER GENES IN BOVINE OOCYTES MATURED *IN VITRO* IN MEDIA WITH DIFFERENT HORMONE COMPOSITION
M. J. Cánepa and A. A. Mutto

270 MITOCHONDRIA AND REACTIVE OXYGEN SPECIES COLOCALIZATION IN *IN VIVO* AND *IN VITRO* MATURED OOCYTES FROM SUPEROVULATED ADULT EWES
B. Ambruosi, N. A. Martino, M. Filioli Uranio, F. Silvestre, F. Binetti, M. Caira, G. M. Lacalandra, and M. E. Dell'Aquila

271 VIABILITY OF OOCYTES FROM CANINE OVARIES GRAFTED IN THE PROXIMAL PORTION OF THE BODY SURFACE
T. Terazono, Y. Kaedei, Z. Namula, V. L. Vien, F. Tanihara, and T. Otoi

272 INTRACELLULAR NITRIC OXIDE LEVEL OF PORCINE OOCYTES IS NEGATIVELY CORRELATED WITH OOCYTE MATURATION RATE AND CUMULUS EXPANSION INDEX IN A CHEMICALLY DEFINED MEDIUM
T. Uozumi and H. Funahashi

273 CONSEQUENCE OF HIGH NONESTERIFIED FATTY ACID CONCENTRATIONS DURING BOVINE OOCYTE *IN VITRO* MATURATION ON mRNA TRANSCRIPT ABUNDANCE OF BLASTOCYSTS
V. Van Hoeck, P. Bermejo-Álvarez, D. Rizos, A. Gutierrez-Adan, S. Andries, P. E. J. Bols, and J. L. M. R. Leroy

274 EFFECT OF HOLDING ASPIRATED FLUID FROM IMMATURE EQUINE FOLLICLES ON OOCYTE MATURATION AND BLASTOCYST PRODUCTION AFTER INTRACYTOPLASMIC SPERM INJECTION
I. C. Velez, J. D. Norris, Y. H. Choi, S. Loux, and K. Hinrichs

275 EFFECT OF REACTIVE OXYGEN SPECIES DURING *IN VITRO* MATURATION ON PORCINE OOCYTE NUCLEAR MATURATION AND DEVELOPMENTAL COMPETENCE
Y. Yuan and R. Krisher

276 FIBROBLAST GROWTH FACTOR 2 PROMOTES BOVINE OOCYTE MEIOTIC MATURATION AND DEVELOPMENTAL COMPETENCE
K. Zhang, P. J. Hansen, and A. D. Ealy

Sexing

277 EFFECTS OF SEMINAL PLASMA ON SEX-SORTING BOVINE SPERM
C. A. Burroughs, R. W. Lenz, K. M. Evans, J. K. Graham, and G. E. Seidel

278 METHYLATION STATUS IN THE INTRAGENIC DIFFERENTIALLY METHYLATED REGION OF THE IGF2 LOCUS IN UNSORTED AND SEX-SORTED SPERM
J. O. Carvalho, V. A. Michalczechen-Lacerda, F. C. Rodrigues, R. Sartori, M. M. Franco, and M. A. N. Dode

279 *IN VITRO* DEVELOPMENT IN THREE CULTURE SYSTEMS OF BOVINE OOCYTES FERTILIZED WITH SEX-SORTED SPERM
B. Trigal, E. Gomez, M. Muñoz, J. N. Caamaño, S. Carrocera, D. Martin, J. Moreno, and C. Diez

280 BOVINE SPERM DNA FRAGMENTATION RATES AND EXTENDER PH: A DYNAMIC EXPERIMENTAL APPROACH
C. González-Marín, A. L. Travis, M. E. Kjelland, J. Gosálvez, C. López-Fernández, R. W. Lenz, and J. F. Moreno

281 EVALUATION OF *IN VITRO* EMBRYO PRODUCTION EFFICIENCY USING SEXED BULL SPERM SORTED WITH TWO TYPES OF CELL SORTER
H. Hayakawa and T.-I. Hirata

282 IDENTIFICATION OF SRY AND STEROIDOGENIC FACTOR-1 (SF1) GENES IN CANINE XY MALE-TO-FEMALE SEX DEVELOPMENTAL DISORDER
G. H. Jang, Y. H. Jeong, I. S. Hwang, Y. W. Jeong, S. H. Hyun, Y. W. Kim, T Shin, E. B. Jeung, and W. S. Hwang

283 DNA FRAGMENTATION DYNAMICS AND POST-THAW MOTILITY OF WHITE-TAILED DEER SPERM
M. E. Kjelland, C. González-Marín, J. Gosálvez, C. López-Fernández, R. W. Lenz, K. M. Evans, and J. F. Moreno

284 *IN VITRO* FUNCTION OF FROZEN-THAWED BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*) SPERM UNDERGOING SORTING AND RECRYOPRESERVATION
G. A. Montano, D. C. Kraemer, C. C. Love, T. R. Robeck, and J. K. O'Brien

Sperm Injection

285 THE EFFICIENCY OF INTRACYTOPLASMIC SPERM INJECTION VERSUS LASER-ASSISTED *IN VITRO* FERTILIZATION WITH FROZEN SPERM FOR RECOVERY TRANSGENIC C57BL/6 MOUSE STRAINS
A. C. Carstea, Z. Polgar, L. Kovacs, and A. Dinnyes

286 PRODUCTION OF NORMAL MICE USING LONG-TERM PRESERVED MOUSE SPERMATOZOA WITHOUT FREEZING
C. Li, E. Mizutani, T. Ono, and T. Wakayama

287 DEVELOPMENT OF DOMESTIC CAT EMBRYOS GENERATED BY INTRACYTOPLASMIC SPERM INJECTION EXPOSED TO IONOMYCIN ACTIVATION AND DIFFERENT CULTURE CONDITIONS
L. N. Moro and D. F. Salamone

Stem Cells

288 INDUCING PLURIPOTENCY IN BOVINE SOMATIC STEM CELLS
M. K. Addison, G. T. Gentry Jr., R. A. Godke, and K. R. Bondioli

289 DERIVATION OF MOUSE EMBRYONIC STEM CELL FROM C57BL/6/EGFP STRAIN WITH FETAL CALF SERUM AND KNOCKOUT SERUM REPLACEMENT SUPPLEMENTATION MEDIUM
B. C. S. Campanha, C. S. Oliveira, D. M. Souza, C. P. Godoi, H. Fernandes, J. T. Ribeiro-Paes, J. M. Garcia, and M. F. G. Nogueira

290 GENERATION OF INDUCED PLURIPOTENT STEM CELLS FROM BOVINE FETAL FIBROBLAST CELLS BY DEFINED FACTORS
H. G. Cao, Y. Liu, H. Q. Yin, X. P. Sun, Y. S. Li, Y. Tao, Y. H. Zhang, and X. R. Zhang

291 ISOLATION AND CHARACTERIZATION OF MESENCHYMAL STEM CELLS DERIVED FROM HUMAN AMNIOTIC FLUID
S.-A. Choi, J.-H. Lee, K.-J. Kim, E.-Y. Kim, K.-S. Park, Y.-B. Park, X. Li, Y.-N. Ha, J.-Y. Park, and M.-K. Kim

292 GENERATION OF MOUSE INDUCED PLURIPOTENT STEM CELLS FROM VARIOUS GENETIC BACKGROUND BY SLEEPING BEAUTY TRANSPOSON-MEDIATED GENE TRANSFER
S. Muenthaisong, O. Ujhelly, E. Varga, A. C. Carstea, Z. Ivics, K. M. Pirity, and A. Dinnyes

293 MASS PRODUCTION OF *Nkx2.5*-POSITIVE CARDIAC PROGENITOR CELLS DERIVED FROM MOUSE EMBRYONIC STEM CELLS IN SLOW-TURNING LATERAL VESSEL FOR CELL TRANSPLANTATION AND DRUG TESTING
S. Rungarunlert, N. Klincumhom, C. Nemes, M. Techakumphu, M. K. Pirity, and A. Dinnyes

294 PRODUCTION AND CHARACTERIZATION OF PUTATIVE NUCLEAR TRANSFER EMBRYONIC STEM CELLS DERIVED FROM HANDMADE CLONED EMBRYOS USING EMBRYONIC STEM CELLS, LYMPHOCYTES, AND ADULT FIBROBLAST CELLS AS DONOR CELLS IN GOAT
R. Dutta, D. Malakar, K. Khate, and J. Akshay

295 THE SHAPE OF PORCINE NEURAL PROGENITOR CELL CELLULAR GENEALOGIES REVEALED BY TIME-LAPSE IMAGING
I. Faerge, A. Egeskov-Madsen, and P. Holm

296 PRODUCTION OF HEMIZYGOUS AND HOMOZYGOUS EMBRYONIC STEM CELL-DERIVED NEURAL PROGENITOR CELLS FROM THE TRANSGENIC ALZHEIMER GÖTTINGEN MINIPIG
V. J. Hall, J. Jakobsen, A. Gunnarsson, M. Schmidt, A. Lund Jørgensen, and P. Hyttel

297 DERIVATION AND CHARACTERIZATION OF THE TRANSGENIC SOMATIC CELL NUCLEAR TRANSFER-DERIVED BOVINE EMBRYONIC STEM CELLS
S. H. Jeong, H. S. Kim, H. Lee, K. J. Uh, S. H. Hyun, Y. W. Kim, T. Shin, E.-B. Jung, and W. S. Hwang

298 DIFFERENTIATION OF CANINE AMNIOTIC FLUID MESENCHYMAL STEM CELLS INTO NEURONAL PRECURSORS
E. Y. Kim, S. A. Choi, J. H. Lee, K. J. Kim, K. S. Park, Y. B. Park, Y. N. Ha, X. Li, J. Y. Park, and M. K. Kim

299 EPIGENETIC REPROGRAMMING OF PORCINE FIBROBLAST CELLS INDUCED BY STURGEON'S OOCYTE EXTRACT
S. Y. Kim, S. H. Park, M. R. Lee, H. J. Eun, T. S. Kim, S. B. Park, J. G. Yoo, C. S. Park, and J. H. Lee

300 ESTABLISHMENT AND CHARACTERIZATION OF RAT MESENCHYMAL STEM CELLS
T. H. Kim, B. G. Jeon, S. L. Lee, and G. J. Rho

301 IMPRINTED GENE EXPRESSION PATTERNS IN CULTURED PRIMORDIAL GERM CELLS DERIVED FROM PORCINE EMBRYOS BETWEEN DAY 25 AND 30
C. K. Lee, C. H. Park, K. J. Uh, J. K. Park, and H. S. Kim

302 IMPRINTED microRNA ARE DIFFERENTIALLY EXPRESSED IN ADULT MOUSE TESTES-DERIVED MALE GERM-LINE STEM CELLS
J. Y. Shin, Y. H. Jung, M. K. Gupta, S. J. Uhm, S. T. Shin, Y. M. Han, and H. T. Lee,

303 *IN VITRO* NEURONAL DIFFERENTIATION OF MESENCHYMAL STEM CELLS DERIVED FROM CANINE EAR SKIN
J. H. Lee, Y. M. Lee, G. H. Maeng, S. L. Lee, and G. J. Rho

304 RHYTHMIC BEATING OF HEART MUSCLE GENERATED FROM GOAT EMBRYONIC STEM CELLS
S. Garg, D. Malakar, R. Dutta, M. K. Jena, A. K. De, D. Kumar, and S. Sahu

305 CONSTRUCTION OF TRANSCRIPTION FACTOR GENES FOR REPROGRAMMING OF ADULT GOAT FIBROBLAST CELLS FOR PRODUCTION OF INDUCED PLURIPOTENT STEM CELLS
D. Kumar, D. Malakar, R. Dutta, S. Garg, S. Sahu, J. K. Kaushik, and A. K. Mohanty

306 *IN VITRO* CARDIOMYOGENIC AND NEUROGENIC DIFFERENTIATION OF MINIPIG BONE MARROW MESENCHYMAL STEM CELLS
B. Mohana Kumar, T. H. Kim, Y. M. Lee, G. H. Maeng, B. G. Jeon, S. A. Ock, and G. J. Rho

307 INVOLVEMENT OF THE CALCIUM SENSING RECEPTOR IN GROWTH AND PROLIFERATION OF STEM CELLS FROM EQUINE UMBILICAL CORD MATRIX
N. A. Martino, A. Lange Consiglio, F. Cremonesi, L. Valentini, M. Caira, A. C. Guaricci, B. Ambruosi, G. M. Lacalandra, R. L. Sciorsci, S. J. Reshkin, and M. E. Dell'Aquila

308 ISOLATION, DIFFERENTIATION, AND IMMUNOPHENOTYPIC CHARACTERIZATION OF MESENCHYMAL STEM CELLS DERIVED FROM EQUINE ADIPOSE TISSUE AND BONE MARROW
E. Iacono, B. Merlo, A. Spadari, G. Mari, F. Ricci, and P. Tazzari

309 DEVELOPMENT OF A CULTURE SYSTEM CAPABLE OF LONG-TERM MAINTENANCE OF BUFFALO (*BUBALUS BUBALIS*) EMBRYONIC STEM CELLS
R. Sharma, A. George, N. M. Kamble, K. P. Singh, S. K. Panda, M. S. Chauhan, S. K. Singla, R. S. Manik, and P. Palta

310 EFFECT OF TGF-β1 ON THE SELF-RENEWAL OF BUFFALO (*BUBALUS BUBALIS*) EMBRYONIC STEM CELLS
N. M. Kamble, R. Sharma, A. George, S. K. Panda, M. S. Chauhan, S. K. Singla, R. S. Manik, and P. Palta

311 EXPRESSION OF PLURIPOTENT MARKER NUCLEOSTEMIN IN BUFFALO (*BUBALUS BUBALIS*) EMBRYOS AND EMBRYONIC STEM CELLS GENERATED THROUGH PARTHENOGENETIC ACTIVATION
K. P. Singh, R. Kaushik, R. Sharma, S. Kala, A. George, M. K. Singh, R. S. Manik, P. Palta, S. K. Singla, and M. S. Chauhan

312 ISOLATION, PROLIFERATION, AND CHARACTERIZATION OF MESENCHYMAL STEM CELLS FROM AMNIOTIC FLUID, AMNION, AND UMBILICAL CORD MATRIX IN THE DOG
L. Valentini, M. Filioli Uranio, A. Lange Consiglio, A. C. Guaricci, M. Caira, M. Ventura, A. L'Abbate, F. Cremonesi, and M. E. Dell'Aquila

313 UNSORTED, FRESHLY ISOLATED PORCINE ADIPOSE-DERIVED STEM CELLS ARE MORE EFFICACIOUS IN BONE HEALING COMPARED WITH PURIFIED CD34+ ADIPOSE-DERIVED STEM CELLS
M. Bionaz, T. Jensen, E. Monaco, Z. Dymon, A. J. Maki, W. L. Hurley, and M. B. Wheeler

314 ADIPOSE- AND BONE MARROW-DERIVED MESENCHYMAL STEM CELLS PRESENT LARGE SIMILARITIES IN TRANSCRIPTOME PRIOR TO AND DURING ADIPOGENIC AND OSTEOGENIC DIFFERENTIATION
E. Monaco, M. Bionaz, A. Lima, W. L. Hurley, and M. B. Wheeler

315 MELATONIN EFFECTS ON THE PROLIFERATION AND DIFFERENTIATION OF MOUSE EMBRYONIC STEM CELLS
Y.-M. Yoo and E.-B. Jeung

316 INDUCTION OF PIG INDUCED PLURIPOTENT STEM CELLS BY RECOMBINANT PROTEINS ENCODED BY DEFINED FACTORS
Y. H. Zhang, H. G. Cao, Y. S. Li, H. Q. Yin, X. P. Sun, T. Gui, S. F. Ji, Y. Tao, Y. Liu, and X. R. Zhang

Superovulation

317 PRELIMINARY REPORT ON THE USE OF A SLOW-RELEASE FORMULATION FOR ADMINISTRATION OF FOLLICLE-STIMULATING HORMONE IN 3 ASSISTED REPRODUCTION APPLICATIONS IN GOATS
H. Baldassarre, J. T. Pierson, S. Poulin, L. Sneek, D. Rogan, and D. K. Hockley

318 EFFICIENCY OF PROTOCOL P-36, ASSOCIATED WITH EQUINE CHORIONIC GONADOTROPIN OR LUTEINIZING HORMONE ADMINISTRATION, IN THE LAST DAY OF SUPERESTIMULATORY TREATMENT, IN NELLORE COWS
A. C. Oliveira, M. C. C. Mattos, M. R. Bastos, J. R. S. Gonçalves, L. H. Lunardi, R. S. Surjus, R. Sartori, and C. M. Barros

319 SUPEROVULATORY RESPONSE IN JAPANESE BLACK CATTLE BY A SINGLE SUBCUTANEOUS ADMINISTRATION OF PURE FOLLICLE-STIMULATING HORMONE DISSOLVED IN SALINE
S. Hiraizumi, N. Nishimoto, O. Ishiyama, H. Nishinomiya, T. Oikawa, F. Sano, N. Sakagami, M. Yamamoto, O. Nishino, K. Ooishi, T. Kurahara, and Y. Hashiyada

320 BASELINE AND SUPEROVULATION HYPERANDROGENISM AND FOLLICULAR DYNAMICS IN THE OSSABAW PIG SUGGEST AN ANIMAL MODEL FOR POLYCYSTIC OVARY SYNDROME
A. E. Newell-Fugate, J. N. Taibl, S. G. Clark, M. Alloosh, M. Sturek, and R. L. Krisher

321 OVARIAN SUPERSTIMULATION AND OOCYTE COLLECTION IN WOOD BISON, A THREATENED CANADIAN SPECIES
J. M. Palomino, R. B. McCorkell, M. R. Woodbury, M. P. Cervantes, B. M. Toosi, and G. P. Adams

322 INDUCTION OF SUPEROVULATION IN PROESTRUS DOGS USING SERUM GONADOTROPIN OF PREGNANT MARES AND HUMAN CHORIONIC GONADOTROPIN
K. S. Park, K. J. Kim, S. A. Choi, J. H. Lee, E. Y. Kim, Y. B. Park, Y. N. Ha, X. Li, J. Y. Park, and M. K. Kim

323 EFFICIENCY OF CLOPROSTENOL-INDUCED LUTEOLYSIS IN SUPEROVULATED COWS
J. H. M. Viana, M. S. B. Vargas, L. G. B. Siqueira, B. R. C. Alves, A. P. Oliveira, E. D. Souza, and L. S. A. Camargo

Transgenesis

324 NEGATIVE SELECTION DOES NOT FURTHER INCREASE THE EFFICIENCY OF A PROMOTER TRAP
B. P. Beaton and K. D. Wells

325 GENERATION OF A CLONED GREEN FLUORESCENT PROTEIN (GFP) EXPRESSING TRANSGENIC SHEEP FOR MUSCLE STEM CELL GRAFT EXPERIMENTS
L. Boulanger, P. Chavatte-Palmer, D. Lebouhris, N. Daniel, Y. Heyman, L. Gall, N. Borenstein, and C. Cotinot

326 CONSTRUCTION OF A SPLICING-DEPENDENT SELECTABLE MARKER FOR GENE TARGETTING
S. Cernea and K. Wells

327 HIGH EFFICIENCY SWINE CLONING USING MONOGENIC AND POLYGENIC POOLS OF GENETICALLY MODIFIED CELLS
D. F. Carlson, J. R. Dobrinsky, and S.C. Fahrenkrug

328 ANALYSIS OF FLUOROPHORE-EXPRESSING SPERMATOZOA FROM TRANSGENIC BOARS PRODUCED BY SLEEPING BEAUTY TRANSPOSITION
W. Garrels, S. Holler, C. Struckmann, U. Taylor, C. Ehling, D. Rath, H. Niemann, Z. Ivics, and W. A. Kues

329 GENETIC TARGETING OF THE PORCINE α1, 3-GALACTOSYLTRANSFERASE GENE IN FETAL FIBROBLAST CELLS USING ZINC FINGER NUCLEASES
J. Hauschild, A. L. Queisser, J. W. Carnwath, G. Cost, Y. Santiago, E. Rebar, P. Gregory, H. Niemann, and B. Petersen

330 REDUCED HYPERACUTE REJECTION BY TRIPLE TRANSGENIC EXPRESSION OF HUMAN COMPLEMENT REGULATORY FACTORS (hDAF and hCD59) AND H-TRANSFERASE
Y. H. Jeong, G. H. Jang, I. S. Hwang, C. H. Park, H. J. Lee, Y. W. Jeong, S. H. Hyun, Y. W. Kim, T. Shin, E.-B. Jeung, and W. S. Hwang

331 BLOOD ANTIGEN-COMPATIBILITY BETWEEN CLONED BEAGLES AND TRANSGENIC CLONED BEAGLES
G. A. Kim, H. J. Oh, J. E. Park, M. J. Kim, E. J. Park, H. J. Kim, G. Jang, and B. C. Lee

332 INDUCIBLE RED FLUORESCENT PROTEIN (RFP) EXPRESSION IN PORCINE FIBROBLASTS AND TRANSGENIC CLONED EMBRYOS USING PIGGYBAC TRANSPOSITION
S. J. Kim, O. J. Koo, S. J. Park, J. H. Moon, D. K. Kwon, J. T. Kang, M. N. Gomez, M. Atikuzzaman, B. C. Lee, and G. Jang

333 OCT-4 EXPRESSION ANALYSIS IN F_0 AND F_1 PORCINE OG2 TRANSGENICS
M. Nowak-Imialek, W. A. Kues, B. Petersen, A. Lucas-Hahn, D. Herrmann, E. Lemme, M. Oropeza, J. W. Carnwath, and H. Niemann

334 CONSTRUCTION OF A GENETICALLY ENGINEERED PIG EXPRESSING GREEN FLUORESCENT PROTEIN (GFP)-LABELLED PROTEASOMES
C. W. O'Gorman, J. Zhao, M. S. Samuel, E. M. Walters, R. S. Prather, P. Sutovsky, M. Sutovsky, and K. D. Wells,

335 CYTOPLASMIC MICROINJECTION OF EXOGENOUS DNA IN *IN VITRO* AND *IN VIVO* DERIVED SHEEP EMBRYOS
F. Pereyra-Bonnet, A. Gibbons, M. Cueto, R. Bevacqua, L. Escobar, and D. Salamone

336 TRANSGENIC Stra8-EYFP PIGS: A MODEL FOR DEVELOPING MALE GERM CELL TECHNOLOGIES
J. R. Sommer, L. Jackson, S. Simpson, E. B. Collins, J. Piedrahita, and R. M. Petters

337 PRODUCTION OF TRANSGENIC SHEEP USING RECOMBINANT LENTIVIRUS MICROINJECTION OF *IN VIVO* PRODUCED EMBRYOS
K. Tessanne, C. Long, T. Spencer, C. Satterfield, and M. Westhusin

338 BACTERIAL ARTIFICIAL CHROMOSOME (BAC) VECTORS FACILITATE EFFICIENT GENE TARGETTING IN KIDNEY CELLS OF PIG
K. Wallner, A. Wuensch, K. Burkhardt, M. Kurome, B. Kessler, P. Fezert, A. Richter, H. Nagashima, N. Klymiuk, and E. Wolf

339 BIOENGINEERING OF THE MAMMARY GLAND OF LIVESTOCK: INCREASED PROPEPTIDE PROCESSING OF FACTOR IX IN THE MILK OF TRANSGENIC PIGS BY CO-EXPRESSION OF FURIN
J. Zhao, E. Walters, J. Calcaterra, J. Ross, L. Spate, M. Samuel, A. Rieke, C. Murphy, S. Butler, W. Velander, and R. Prather

POSTER SESSION AUTHOR INDEX

Author Index to Volume 23 Issue 1

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The recipient of the IETS Distinguished Service Award is a person who is expected to have made many contributions over a number of years to areas that are fundamental to our society. These areas can be described in different ways, but one good place to look is the IETS by-laws under the heading "Purposes." There it reads, "The Society shall further the science of embryo production, development and transfer," and then a number of specific points are mentioned. There are many ways to fulfill these purposes, and Torben Greve, who is the recipient of this year's Distinguished Service Award, has found his way of doing it. This is why we will honor him today. Greve is from Denmark, and he has been an IETS member almost since the society's start in 1974. He has attended almost every annual conference since then. Furthermore, Greve has been a board member of the IETS and served as president from 1983 to 1984. Through the years Greve has added to the value of the IETS in several of the ways mentioned as the society's purposes. A few of them will be mentioned now. Superovulation, embryo handling, and embryo transfer in cattle was a focus area of Greve's research from his early years at the veterinary university in Copenhagen. Practical problems and considerations were key issues, and Greve's experiments were performed in close collaboration with practice. Greve created a fundament for the introduction and further development of embryo technologies in cattle and other farm animals over the next 20 years. In such a broad field, covering several technologies and most farm animal species, some areas or disciplines become favorites, and for Greve it has always been the clinical and the surgical part and having hands and eyes on the embryos. Practical application and promoting the effective research has thus been a natural part of Greve's focus. A significant part of Greve's work has been to provide scientific and educational information. Greve has contributed to more than 200 articles and book chapters in the scientific literature and to many scientific conferences and meetings where he has been an invited speaker, session chairman, or active participant. Education of veterinary students and veterinary colleagues as well as making more general information available to the public has also taken a fair part of Greve's time. The extent of these activities, in Denmark, the Nordic countries, the European Union, and internationally, reflects both the high level of Greve's scientific knowledge and his high standards in the way he passes on his messages. In all contexts, Greve is respected for his scientific knowledge and for his positive attitude and willingness to discuss difficult issues, such as ethical aspects of the controversy in handling mammalian embryos. Another important aspect of Greve's work has been his involvement in the work of many research students, PhDs, postdocs, or other colleagues who have spent time at the university in Copenhagen under Greve's supervision and guidance. Many used that time to establish their own careers in research—several of you are here today. The fact that Denmark has been so well represented at many of the IETS conferences over the last 20 years can also be credited to Greve. He has encouraged his students to come, has given priority to the necessary funding for their travels, and has offered his students important first contacts with his scientific colleagues and friends around the world—a kick-start for a young student and something never to forget. This is a prime example of Greve's high standards of education. Many people have found Copenhagen and Greve's laboratory to be pleasant places to visit and work, filled with good research and a good atmosphere. The most serious research work can be very well combined with a good laugh. Over the years Greve has received much recognition for his scientific achievements, and he has also been awarded several academic honors, as well as several research prizes. Today, it is my pleasure and honor to add to these achievements on behalf of the IETS. Torben Greve is a true scientist who has made many contributions over the last 20 to 25 years in the areas that are fundamental to our society and that are recognized worldwide. Through his work and way of working, he has committed himself to IETS goals and objectives throughout the years. As such, Torben Greve is a most worthy recipient of the 2011 IETS Distinguished Service Award.

SPECIAL EVENTS

Open Meeting of the Health and Safety Advisory Committee

Sunday, January 9, 2011

18:00 – 20:00

Floral Ballroom

Welcome Reception

Sunday, January 9, 2011

20:00

Wyndham Orlando Resort

The Welcome Reception will take place on January 9, 2011, at 20:00. Wines, cocktails, and hors d'oeuvres will be served at the Palms Ballroom and Palms Ballroom foyer.

Open Meeting of the Domestic Animal Biomedical Embryology Committee

Monday, January 10, 2011

18:00 – 20:00

Floral Ballroom

Open Meeting of the Companion Animals, Non-Domestic & Endangered Species Committee

Monday, January 10, 2011

18:00 – 19:00

Azalea

Practitioners' Forum – Recent Advances in Superovulation and Embryo Production

Tuesday, January 11, 2011

10:30 – 12:30

Floral Ballroom

9th IETS Annual Running Competition

Tuesday, January 11, 2011

16:30 – 17:30

Meet near the registration desk. The course will take participants around the beautiful Wyndham Orlando Resort. We look forward to seeing you participate in this year's fun run.

Closing Party

Tuesday, January 11, 2011

19:00 – 2:00

Come and join us for some delicious food, conversation, and dancing. There will be music for all those wishing to stay late and dance. (Tickets are required.)

EXHIBIT ROOM LAYOUT

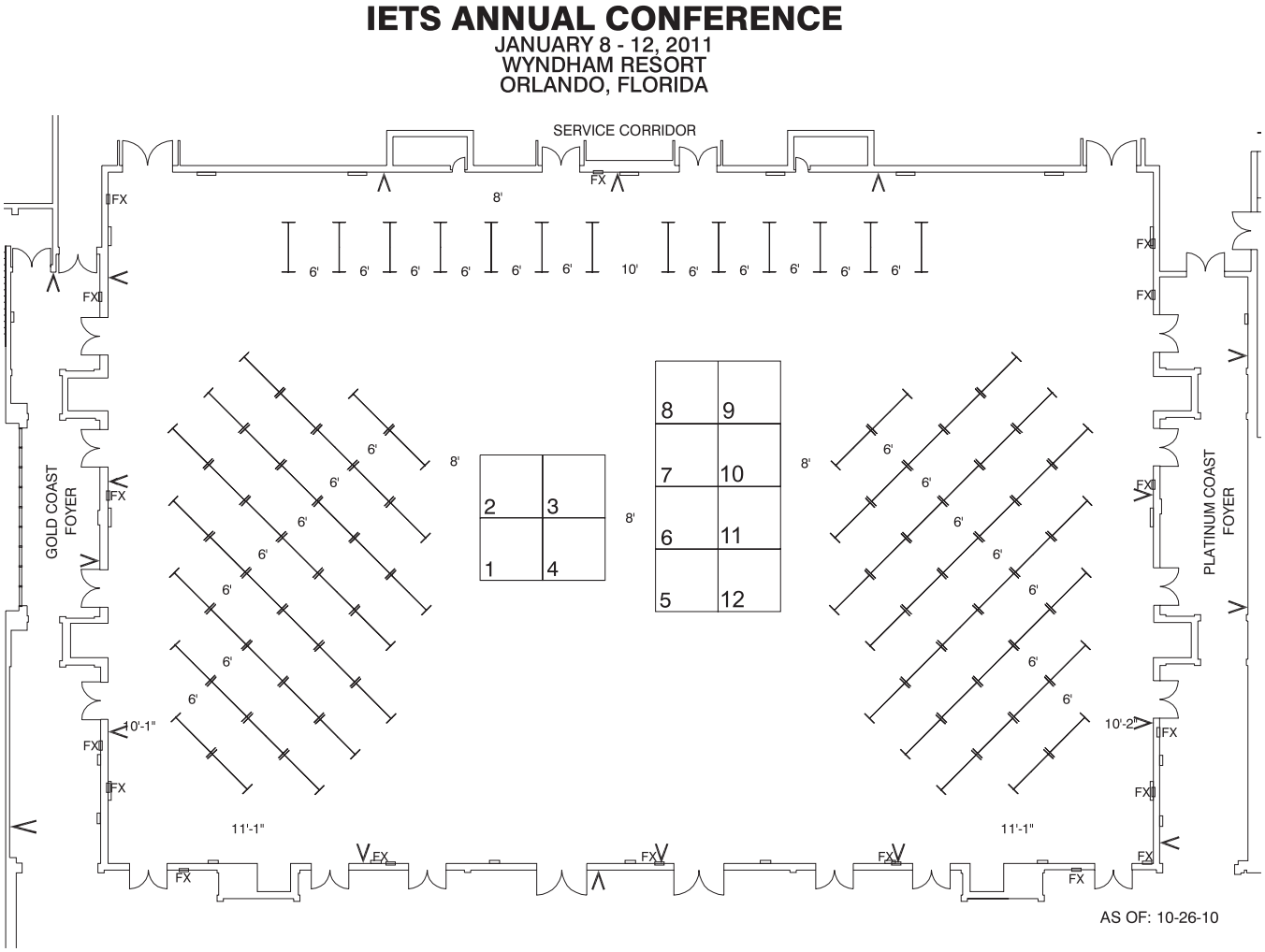

EXHIBIT DIRECTORY

Booth Listing By Number

Booth# ..... Company

#1..... Cryo-Innovation LTD
#2..... IVM Technologies
#3..... ICPbio Reproduction
#4..... Hamilton Thorne Inc.
#5..... Bioniche Animal Health
#6..... IETS

Booth# ..... Company

#7.....
#8..... PETS Inc.
#9..... Biogenics
#10..... Csiro Publishing
#11..... Minitube of America
#12..... Minitube of America

Alphabetical Listing of Companies

Biogenics
2797 Napa Valley Corporate Drive
Napa, CA 94558
USA
www.biogenics.com
Booth #: 9

A pioneer in product improvement and innovation, Biogenics understands the technical complexities of products used in cryopreservation, cryobiology, and assisted reproductive technology. Because of our long experience with these sophisticated products including IVF and embryo transfer instruments, supplies and equipment, we offer our customers the kind of unparalleled support that is available only from the most trusted expert.

Bioniche Animal Health
231 Dundas Street East
Belleville, ON K8N 5J2
Canada
www.bioniche.com
Booth #: 5

A Canadian Animal Health business which is responsible for researching, developing, manufacturing and marketing animal health biopharmaceutical products worldwide. The Company's animal health products are marketed directly in Canada, the United States, Australia and Europe and through selected distributors in the rest of the world.
Bioniche Animal Health Inc. operates marketing, production and research facilities in Belleville, Ontario; marketing and manufacturing facilities in Athens, Georgia and in Pullman, Washington in the United States; marketing and manufacturing facilities in Armidale, Australia; and a sales and marketing office in Ireland.

Cryo-Innovation Ltd.
25 Uri u.
Budapest, 1014
Hungary
www.cryo-innovation.com
Booth #: 1

Cyro-Innovation Ltd., as a Hungarian R&D company, focuses on accommodating stable innovative solutions into Assisted Reproductive Technologies, both animal and human. Company headquarters and labs are located in Budapest, while research is conducted in co-operations world wide.

CSIRO Publishing
PO Box 1139
Collingwood Victoria 3066
Australia
www.publish.csiro.au/
Booth #: 10

CSIRO Publishing
CSIRO Publishing operates as an independent science and technology publisher with a global reputation for quality products and services. Our internationally recognized publishing program covers a range of scientific disciplines, including agriculture, the plant and animal sciences, and environmental management. Our product range includes journals, books, magazines and CD-ROMs.

Hamilton Thorne Bioscience Inc.
100 Cummings Ctr.
Suite 465E
Beverly, MA 01915
USA
www.hamiltonthorne.com
Booth #: 4

Hamilton Thorne presents the XYClone laser system for assisted reproductive technologies, transgenic animal production, embryonic stem cell excision, and nuclear transfer. We are also introducing the PrimoVision remote time-lapse embryo monitoring system.

ICPbio Reproduction
PO Box 39
Spring Valley, WI 54767
Phone: 877-978-5827
www.icpbio.com
Booth #: 3

ICPbio Reproduction is a global supplier of embryo transfer products including flushing and embryo handling media for the equine, bovine and ovine embryo transfer industry and veterinarians. ICPbio also manufactures and distributes the Ovagen brand FSH for super ovulation of ovine and bovine for embryo transfer procedures.

IETS
2441 Village Green Place
Champaign, IL 61822
www.iets.org
Booth #: 6

The International Embryo Transfer Society was formed in 1974 in Denver, Colorado, USA to serve as a professional forum for the exchange of information among practitioners, scientists, educators, regulatory officials, livestock breeders, suppliers of drugs and equipment, and students. The purpose of the IETS is to further the science of animal embryo transfer by promoting more effective research, disseminating scientific and educational information, fostering high standards of education, maintaining high standards of ethics, and cooperating with other organizations having similar objectives

IMV Technologies
11725 95th Avenue North
Maple Grove, MN 55369
www.imvusa.com
Booth #: 2

Known worldwide for the quality of its craftsmanship and manufacture, IMV Technologies has for many years been taking up the most noble of challenges in the field of assisted reproduction biotechnologies. Through artificial insemination techniques for animals and the application of our technology we both contribute to and participate in the improvement of species and the preservation of our genetic heritage.
Innovators by nature, we constantly develop new know-how for artificial insemination techniques, embryo transfer, bio-repositories and blood banking, all of which have multiple applications for human kind.

Minitube of America
PO Box 930187
419 Venture Ct.
Verona, WI 53593
www.minitube.com
Booth #: 11 & 12

Minitube is the leader in research, development, manufacturing and distribution of products and services for assisted reproduction in bovine, porcine, equine, and other species. Supported by a staff of engineers and software developers, Minitube continues to advance the capabilities of automated laboratory equipment for embryo and semen evaluation, procession, and preservation.

PETS, Inc
Box 188
Canton TX 75103
USA
www.pets-inc.com
Booth #: 8

PETS has been a world leading embryo transfer supply company for the bovine and equine industries for over 2 decades. Our goal all this time has been your success and we work every day to achieve this with quality service and quality E.T. supplies and equipment such as emCare, Vigro, emCon, EZ Way, Wesco, ECM and many more. Come visit with us for more details.

PRECONFERENCE SYMPOSIUM

Advances in Bovine Reproduction and Embryo Technology

Wyndham Orlando Resort, Orlando, Florida

January 8, 2011
8:00 – 17:00

Introduction
Jose Santos, University of Florida; Cliff Lamb, University of Florida

Understanding the relationship between the follicle and embryo
Jo L. Leroy, University of Antwerp

Mechanism of uterine defense and control of uterine disease in cattle
Stephen Leblanc, University of Guelph

Controlling the dominant follicle
Milo Wiltbank, University of Wisconsin

Timed ET programs for management of donor and recipient cows
Pietro Baruselli, University of São Paulo

Influence of pregesterone on oocyte quality and embryo development in cows
Pat Lonergan, University College Dublin

The role of cytokines and growth factors to improve pregnancy in IVF-ET programs
Jeremy Block, University of Florida

Dietary manipulations to improve embryonic survival in cattle
William Thatcher, University of Florida

What technologies are needed in the future of bovine reproduction and ET—Roundtable
Don Bennink, North Florida Holsteins; Brad Stroud, Embryo Service; Mel DeJarnette, Select Sires Inc.

Conclusion
Jose Santos, University of Florida; Cliff Lamb, University of Florida

2ND DABE WORKSHOP

Plasticity, Fate Control, and Therapeutic Safety of Stem Cells

Wyndham Orlando Resort, Orlando, Florida
January 8, 2011, 13.00 h

13.00 – 13.15: Fulvio Gandolfi
Welcome and opening remarks

13.15 – 13.45: Fausto Cremonesi and Anna Lange-Consiglio

Equine amniotic derived stem cells: Progress and perspectives
Fetal adnexa such as umbilical cord, amnion, and amniotic fluid have been recently suggested as ideal sources of different stem cell lineages, due to the noninvasive nature of the isolation procedure, the large tissue mass to harvest cells with high efficiency, and the differentiation potentials. Moreover, especially in human medicine, the low ethical implications make these sources of stem cells very attractive for regenerative therapies and biotechnological applications. In the complexity of stem cell origin and definition, a background of the fundamental processes of initial embryo development is illustrated, because the peculiar fitting of the fetal extraembryonic-derived stem cells on the continuum of stem cell ontogeny suggests that these cells may preserve some of the characteristics of the primitive embryonic layers where they originate from. Indeed, many studies reported so far indicate that these stem cells exhibit several features of embryonic stem cells: expressing embryonic markers, sharing similar proliferation capability, and displaying a negligible immunogenicity. However, their differentiation potential, either *in vivo* or *in vitro*, is intermediate between the pluripotent embryonic stem cells and the multipotent adult stem cells. Nonembryonic but plastic stem cells have opened new perspectives for developmental biology and for regenerative medicine, not only in humans but also in animals. In this update, we report the state of the art of fetal adnexa-derived stem cells from domestic animals and analyze applications and expectations in veterinary medicine.

13.45 – 14.15: Heiner Nieman

Production of Oct4/GFP transgenic pigs: A new large-animal model for reprogramming
The domesticated pig has emerged as an important tool in biomedical research, including the development of novel surgical techniques, advancement of xenotransplantation, creation of important disease models, and preclinical testing of novel cell therapies. However, germline-competent pluripotent porcine stem cells have not yet been derived from any origin. This is a major drawback for using the pig as a model in regenerative medicine. The transcription factor Oct4 is essential for maintenance of pluripotency and critical for reprogramming somatic cells to a pluripotent state. We have produced transgenic pigs carrying the 18 kb genomic sequence of the murine Oct4 gene fused to the enhanced green fluorescent protein (EGFP) cDNA to allow monitoring of Oct4 expression by EGFP fluorescence. Eleven viable transgenic piglets were produced by somatic cell nuclear transfer (SCNT), and germline-specific expression of the EGFP reporter construct was confirmed. Enhanced green fluorescent protein fluorescence was detected in the inner cell mass and trophectoderm of blastocysts, and germ cells and testicular cells. Reprogramming approaches of fibroblasts from these animals by (i) SCNT and (ii) fusion with pluripotent murine embryonic stem cells and by (iii) viral

transduction with human OCT4, SOX2, KLF4 and cMYC cDNA resulted in Oct4-EGFP reactivation and was compatible with monitoring the kinetics and maintenance of pluripotency in porcine cells. Results indicate that these Oct4-EGFP transgenic pigs facilitate studies on derivation and characterization of pluripotent cells in this important domesticated animal and will improve efficiency and safety of cell therapies.

14.15 – 14.45: Catharina De Schauwer and Ann Van Soom

Markers of stemness in equine mesenchymal stem cells: A plea for uniformity

Mesenchymal stem cells (MSC) represent a promising population for cell-based therapies in veterinary medicine. In spite of the advances in the knowledge of adult stem cells during the past few years, the identification of MSC still remains a difficult issue. In human medicine, the Mesenchymal and Tissue Stem Cell Committee of the International Society for Cellular Therapy (ISCT) has proposed three criteria to define MSC. First, these cells must be plastic-adherent when maintained in standard culture conditions. Second, MSC must express CD73, CD90, and CD105 and lack expression of CD34, CD45, CD14 or CD11b, CD79α or CD19 and MHC class II antigens. Third, MSC must differentiate into osteoblasts, adipocytes, and chondroblasts *in vitro*. The successful culture and differentiation of equine MSC from different sources such as bone marrow, fat tissue, umbilical cord blood, or Wharton's Jelly has been reported by several research groups, but a complete characterization of these equine MSC by means of immunophenotypic markers, as advocated by the ISCT, remains very difficult. The lack of a single specific marker for MSC and the present limited availability of monoclonal anti-horse antibodies are major complicating factors for the progress of this type of research. Because commercial antibodies that recognize the equine epitopes are at present only available for CD44 and MHC-II, different clones of antibodies need to be tested for all other markers in a search for cross reactivity. Furthermore, the expression of some markers for adult stem cells may differ between species, so we propose to define a set of CD markers that can be uniformly applied for the identification of equine MSC.

14.45 – 15.15: Randall Prather and Mingtao-Zhao

The multipotentiality of skin-derived stem cells in pigs

Multipotent skin-derived progenitor (SKP) cells can generate both neural and mesodermal progeny, representing neural crest-derived progenitors during embryogenesis through adulthood. The SKP cells develop into spheres in suspension and can differentiate into fibroblast-like cells (SFC) in adhesive culture with serum. Concomitantly they gradually lose the neural potential but retain certain mesodermal potential. Transcriptional characterization of porcine SKP spheres and SFC found the down-regulated genes are mostly involved in intrinsic programs such as the *Dicer* pathway and asymmetric cell division, whereas up-regulated genes are likely to participate in extrinsic signaling pathways such as ErbB signaling, MAPK signaling, ECM-receptor reaction, Wnt signaling, cell communication, and TGF-beta signaling pathways. We speculate that these potential signaling pathways may play an important role in regulating the cell fate transition between SKP spheres and SFC *in vitro*. Further experiments evaluating the stemness of neural/progenitor cells showed that the differentially expressed genes between SKP spheres and neurospheres are mainly involved in ECM-receptor interaction and the TGF-β signaling pathway and that leukemia inhibitory factor (LIF) or MEK inhibitors result in a distinctive effect on the stemness and differentiation genes of SKP spheres and neurospheres. Thus the cell-intrinsic genetic program may contribute to the innate stemness of SKP spheres and neurospheres in a similar local microenvironment. Finally, chimeras with porcine SKP cells can produce both neural and mesodermal progeny *in vivo*. Further studies will be needed to determine if these cells can contribute to the germline. If they can contribute to the germline, then they might be used in a manner similar to mouse embryonic stem cells, i.e., for use in genetic modification of pigs or to test the ability of these cells to be used therapeutically.

15.15 – 15.45: Coffee break

15.45 – 16.15: Caroll Keefer

Mechanical phenotyping of embryonic stem cells

Elasticity and visco-elasticity are mechanical properties of cells that directly reflect cellular composition, internal structure (cytoskeleton), and external interactions (cell–cell or cell–surface). A variety of techniques involving probing, pulling, or deforming cells have been used to characterize these mechanical properties. With continuing advances in the technology, it may be possible to establish mechanical phenotypes that can be used to identify cells at specific points of differentiation and dedifferentiation with direct applications to therapeutics and diagnostics.

16.15 – 16.45: Vanessa Hall and Poul Hyttel

Development of porcine neural progenitor stem cells for studying and treating Alzheimer's disease

The pig is an excellent biomedical model that can be used to study human disease due to its similar physiology, anatomy, and size to humans. We have recently developed porcine neural progenitor cells that display multipotent characteristics and can be cultured for an extended period *in vitro*. These cells form both neurons and glia upon directed differentiation. Furthermore, we are developing *in vitro* differentiation protocols that may be useful for future cell transplantation into animal models of Alzheimer's disease. We are also establishing neural progenitor cell lines from the transgenic Alzheimer pig, which may provide a useful *in vitro* cell tool for studying mechanisms relating to amyloid precursor protein accumulation. The development of both wildtype and transgenic cells provides a unique opportunity for studying both disease mechanisms and for potential future treatment of the disease.

16.45 – 17.15: Matt Wheeler

Strategies for regeneration of the bone using porcine adult adipose-derived mesenchymal stem cells

Regeneration and reconstruction in the craniofacial region must satisfy the cosmetic needs as well as the functional requirements of the patient. The craniofacial structures protect vital organs, such as the brain and the eye, and provide support to the masticatory apparatus. Mesenchymal stem cells from bone marrow are one current source of adult stem cells for craniofacial therapeutic purposes; however, the magnitude and accessibility of subcutaneous adipose tissue in humans make it an attractive alternative source for mesenchymal stem cells. Numerous *in vitro* studies have been conducted to determine how these cells act *in vitro*, but it is imperative to determine the vast abilities of these cells *in vivo*. The objective of this study was to evaluate *in vivo* migration and bone healing ability after transplanting adipose-derived stem cells in a swine model. The clinical implications of such results are significant for treating many diseases in which inflammation or defects exist, such as cardiac disease, neurological disease, or traumatic injuries to both soft and hard tissue. If the adult stem cells can be harvested from fat and encouraged to produce bone or cartilage and then be reinserted into defects, treatment protocols for trauma victims can be developed that would reduce the need for alternate harvesting techniques for bone.

17.15 – 17.45: Fulvio Gandolfi and Tiziana Brevini

Porcine cardiac progenitor cells: A promising biomedical model

Different cardiac stem/progenitor cells have been recently identified in the postnatal heart. In particular, cardiac mesoangioblasts are self-renewing progenitors with high spontaneous cardiac differentiation that

can be expanded *in vitro* to numbers suitable for systemic delivery, and, upon transplantation, regenerate the infarcted heart and new myocardium. Most of the information available is confined to the mouse, the clinical relevance of which is limited by the enormous diversities between the mouse and the human. Considering the potential future application of these cells for human regenerative therapy, we propose the pig as a complementary model, due to its well-known morphological and functional affinity with the human. We describe the isolation, expansion, and *in vitro* proliferation ability of pig mesoangioblasts. We performed their molecular characterization and assessed their differentiation plasticity. The results obtained indicate that cardiac mesoangioblasts can be isolated in the porcine species, can stably proliferate in culture for many passages, and represent a relevant animal model for cadiac regenerative medicine.

17.45 – 18.00: Concluding remarks

INTERNATIONAL REGULATIONS AND REQUIREMENTS FOR THE IMPORT/ EXPORT OF REPRODUCTIVE BIOMATERIALS: EMBRYOS, SEMEN, AND TISSUES

Sponsored by
The IETS Committee on Companion Animals, Non-Domestic and Endangered Species (CANDES)

Wednesday, January 12, 2011, Wyndham Orlando Resort, Orlando, Florida

The goal of this workshop will be to present and discuss the current status of biosafety issues when transporting biomaterials from CANDES as well as humans and livestock for use in biomedical research, embryo production in vivo and in vitro, and artificial insemination. Members of IETS and experts working at regulatory agencies and in relevant research will provide presentations that will cover a variety of topics that will include tissues used for cloning and, eventually, stem cell research. The workshop will cover issues such as the potential for disease transmission via reproductive biomaterials and methods to reduce those risks, the current status of international regulatory agencies in their biosafety guidelines for the import/export of these biomaterials, and suggestions for research or actions to overcome some of the hurdles that currently hamper use of reproductive biomaterials in biomedical and conservation science research. No proceedings articles will be provided; however, the IETS Committee on CANDES will prepare a publication summarizing the results of the workshop in a 2011 issue of the Embryo Transfer Newsletter. The proposed topics and suggested speakers for the program are listed as follows:

Introduction: *Dr. Nucharin Songsasen, Smithsonian's National Zoological Park, IETS CANDES Secretary*

Moderators: *Dr. Gabriela Mastromonaco, Metro Toronto Zoo, IETS CANDES Subcommittee Chair and Dr. Jason Herrick, University of Illinois, IETS CANDES Research Subcommittee Co-Chair*

Session I: International regulations for the transport of embryos, semen, and tissues from domestic and non-domestic livestock

08:00 – 08:45: USDA-APHIS guidelines and regulations regarding the transport of reproductive tissues versus live animals

Dr. Linda Penfold, White Oak Conservation Center, IETS CANDES Subcommittee Co-Chair and Dr. William White, USDA-APHIS, Foreign Animal Disease Diagnostic Laboratory

08:45 – 09:00: Discussion

09:00 – 09:45: OIE and international guidelines and regulations regarding the transport of reproductive tissues versus live animals

Dr. Larry Delver, VM Agriculture Consulting Ltd., Canada, IETS Health & Safety Committee (HASAC) Regulatory Subcommittee Chair and Dr. Pascale Chavatte-Palmer, INRA, France, IETS HASAC Chair, OIE Representative

09:45 – 10:00: Discussion

10:00 – 10:30: Break

10:30 – 11:15: Biosafety issues and mitigations regarding the use of tissues for cloning

Dr. Irinia Polejaeva, Viagen Inc., IETS HASAC member; Dr. Keqin Gregg, Viagen Inc.; and Dr. Duane C. Kraemer, Texas A&M University, IETS CANDES member

11:15 – 11:30: Discussion

11:30 – 12:15: Risks and methods for reducing risks of transmitting infectious pathogens when transporting reproductive biomaterials

Dr. Ann Van Soom, Ghent University, IETS HASAC Research Subcommittee Chair and Dr. Naida Loskutoff, Omaha's Center for Conservation and Research, IETS CANDES Chair

12:15 – 12:30: Discussion

12:30 – 14:00: Lunch

Session II: International guidelines and regulations for the import/export of reproductive tissues from rare or endangered livestock breeds and non-domestic species

14:00 – 14:45: Current trends and disease risk assessments for the development of biobanks for tissues from a diverse array of taxa, including rare domestic and non-domestic livestock

Dr. Bill Holt, Zoological Society of London, IETS CANDES Health & Safety Co-Chair

14:45 – 15:00: Discussion

15:00 – 15:30: Convention on International Trade in Endangered Species (CITES) and US Endangered Species Act (ESA) regulations regarding the transport of tissues from listed species

Dr. Mike Carpenter, US Fish & Wildlife Service, Division of Management Authority (CITES), Branch of Permits

15:30 – 16:00: Break

16:00 – 17:00: Panel discussion with representatives from USDA-APHIS, IETS HASAC, US Fish and Wildlife Service and CITES

Panel:

Dr. William White, USDA-APHIS, Foreign Animal Disease Diagnostic Laboratory;

Dr. Larry Delver, VM Agriculture Consulting Ltd., Canada, IETS Health & Safety Committee (HASAC) Regulatory Subcommittee Chair;

Dr. Pascale Chavatte-Palmer, INRA, France, IETS HASAC Chair, OIE Representative;

Dr. Ann Van Soom, Ghent University, IETS HASAC Research Subcommittee Chair;

Dr. Mike Carpenter, US Fish & Wildlife Service, Division of Management Authority (CITES), Branch of Permits

The focus will be on suggestions as to how to approach regulatory agencies for guidance to standardize regulatory requirements for reproductive biomaterial transport and for possible methods needed for relaxing certain regulations that currently affect biomedical and conservation research programs—similar to the OIE's acceptance of the Embryo Appendices in the Animal Health Code based on the efforts of the IETS HASAC.

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