SEPTEMBER 2006

The abstract, manuscript review and revision are well underway for the 2007 Annual Conference in Kyoto. Whenever the annual meeting of IETS is held out of USA, except for Brazil in 2002, the number of abstracts submitted has been always lower than those held in USA. But I am pleased to report that we had about 435 abstracts (30 more than that of 2006 Orlando!) submitted for review for our meeting in January. Although, I have not checked where these abstracts are from, I am pretty sure that there are many abstracts from Asian countries close to Japan. I think that internationalization of IETS is well underway! The 2007 Annual Conference organization is in full swing as Carol Keefer and Fulvio Gandolfi, Program Chair and Co-chair, are working very hard on the final program issues and proceedings for the 2007 meeting in Kyoto, Japan. Their very interesting scientific program with the theme of “Embryo Quality and Fetal Development- early determinants of developmental success” is coming together nicely. Also the Local Organizing Committee is preparing not only a post-conference symposium but also one of 2 pre-conference symposia entitled “Assisted Reproductive Technologies and Food Safety in Farm Animals” highlighting cloning, transgenesis and safety of food derived from animals produced by these technologies, because there are many Institutes (more than 40 research labs) working on SCNT in farm animals in Japan. The application of this technology encounters big problems that the products from SCNT animals cannot go into the food chain. This problem is so serious that their activity is becoming so low and some of labs had to give up the research related SCNT in farm animals. Mainly the Japan Embryo Transfer Society (JETS) and National Livestock Breeding Center (NLBC) will support this pre-conference. In Japan 126,230 bovine embryos were collected by 9,213 flushings and 57,584 embryos, mainly collected from beef type “Wagyu” cattle were transferred to the recipients, and 8,109 in vitro produced embryos; more than half of them were frozen, were transferred to the recipients. There are three societies related to ET and the contents of post-conference entitled “Quality Control of Embryos for Embryo Transfer and Related Advanced Technologies in Cattle” was determined after the survey among the members of JETS, and aimed for the practical use of ET in farm animals. Furthermore, the fields of human IVF and animal IVF are so closely related in Japan that many scientists with the back ground of animal IVF are working at the human clinics. Thus another pre-conference entitled “Innovative Techniques in Human and Animal Embryology” will
be timely organized by Jeremy Thompson (Adelaide, Australia) and Gábor Vajta (Tjele, Denmark). Both of them visited Japan many times and are very familiar with Japanese scientists. It should be noted that the world number one human IVF clinic, Kato Ladies Clinic will support the pre-symposium. The main idea of holding these pre and post symposia is to recruit some old friends, from the embryo transfer business that have not being attending our conferences lately, back to the IETS as well as new friends from human clinics. The Board of Governors of IETS has been working with the Local Organizing Committee to make the idea bring a fruitful outcome. We will tell you more about it in the near future. Hiroshi Imai and colleagues at the Kyoto University and Kinki University have worked diligently on behalf of the IETS as the Local Organizing Committee. As the social activity, I am planning to play some songs with my friends for the members to dance at Kyoto International Conference Hall. Also the Local Organizing Committee is planning to have Japanese Tea Ceremony at the same Hall. I encourage you all to attend as many events as possible. In addition to the annual conference planning and the Board’s efforts to ensure a sound financial foundation for the Society, there is one additional item that requires updating and I have described this below.

I hope you all enjoy the remaining portion of your summer (or winter for those in the Southern Hemisphere). I attended the 7th International Ruminant Reproduction Symposium 13-17th August 2006 in Wellington, and suffered from a cold and windy winter, and now I am suffering from a very hot and humid summer in Japan.

I would like to thank the members and the Board of the Brazilian Embryo Technology Society (SBTE) for their gracious invitation to represent IETS at their annual meeting in late August. I asked Gabriel Bo, who was President of IETS in 2004, to attend the meeting as the representative of IETS. I hope many of you have had some time to relax before your busy fall schedule began I encourage all of you to plan to attend the 2007 annual conference in Kyoto, Japan, it will be an exciting one!

Best Wishes,

Takashi (TAKU) Nagai
President, IETS
Bioniche Animal Health USA proudly introduces another major innovation for embryo transfer and reproduction specialists: SYNGRO™ Holding, an embryo holding medium in a non-refrigerated, non-animal origin formulation.

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University of Illinois
Urbana, IL, USA
On-line voting procedure for the Board of Governors Elections

As with the last several years the Governor and Vice President Elections will be done electronically thru the IETS website. The voting will be done between the September newsletter (presentation of the candidates and a call to vote) and the December newsletter (presentation of voting results), prior to the annual conference. You can vote only once and only when you have paid your annual fee for the current year.

When you go to the IETS website to enter the voting system, you have to enter your last name and ID number, same as when you access the newsletter. If you can not remember your ID number, please email Jennifer Gavel, Executive Secretary of IETS (jennig@assochq.org), to refresh your memory.

There are separate pages for new Governors and the new Vice President. Please vote for two candidates for Governor and one candidate for Vice President. There is the possibility to enter other candidates for governor at the end of the page, replacing the option for nominees from the floor in the business meeting. The Governors will serve a three-year term starting in January 2007. The Vice President will serve a three-year term starting in January 2007 succeeding President in January 2008 and to Immediate Past President in January 2009.

If you do not have access to internet, you can fill in the Ballot included in this newsletter and fax it to Jennifer Gavel at 217-398-4119

PLEASE MAKE SURE YOU HAVE VOTED PRIOR TO 1 NOVEMBER 2006

Retiring Governors

Completing their term of service as of January 2007 is Matthew Wheeler (USA, academic), Richard Fayrer-Hosken (USA, academic), David Faber (USA, industry) and Janneke van Wagtendonk (New Zealand, industry). Remaining on the Board as officers will be Takashi Nagai, Immediate Past-President (Japan, academic) and Naida Loskutoff, President (USA, research). Remaining on the Board as governors for the third year of their terms will be Pat Lonergan (Ireland, academic) and Ed Squires (USA, academic). Also remaining on the Board as governors for the second year of their terms will be Peter Farin (USA, academic) and Christine Wrenzycki (Germany, academic).

Responsibilities of Governors

Article VI, Section 1. The Board of Governors shall be the governing body of the Society and it shall have control and management of the affairs and business of the Society. Without limiting the generality of the foregoing, the Board of Governors shall approve the format and guidelines for the conduct of the annual conference and business meeting and that for any other meeting or activity including the approval of documents issued in the name of the Society. It shall have the discretion in the disbursement of its funds and may adopt such rules and regulations for the conduct of its business as shall be deemed appropriate. The Board of Governors shall report its actions to the Members of the Society at the Annual Meeting as well as in its regularly published newsletter.

Eligibility to Hold Office

Article III, Section 3. Only persons holding Regular Membership in the Society and those entitled to the rights of Regular Membership by virtue of their Emeritus status or representing a Sustaining Member are eligible to vote, hold office, or to nominate candidates for office in the Society.

Election Procedures

Article X, Section 1. Election for members of the Board of Governors and for the position of vice-President shall be by mail or electronic ballot, by Regular Members following publication of the names and biosketches of the candidates. Votes shall be counted by the Business Office, which will communicate the results to the Board of Governors. In the event of a tie for the positions of Governor or vice-President, the outcome shall be decided by a ballot among the Board of Governors.

Election of Governors

Article VI, Section 2. The Board of Governors shall consist of Governors elected from and by the Regular Membership of the Society by means of an annual ballot. The Governors shall be divided into three classes, each class consisting of two Governors being elected every third year. Each member of a class of Governors shall be elected and hold office for a
term of three years and until a successor has been elected and qualified or until such Governor’s early death, resignation or removal in a manner hereinafter provided.

In the event that a Governor is serving as Secretary/Treasurer in the third year of his/her term, and designated by the Board in unanimous action to succeed him/herself and if such Governor has committed to serve as Secretary/Treasurer in a succeeding term, such Governor shall not stand for re-election but will continue as a Governor in the class to which such Governor would have been elected. The chairman of the Nominating Committee will include such action in his/her report to the membership.

From each annual ballot, a number of Governors equal to that of those whose terms are about to expire, shall be elected for a term of three years. In addition, as deemed necessary by the Board to maintain the number of Governors, one or more replacement Governors may also be elected by the Regular members when a Governor’s position has become vacant prematurely due to resignation, removal or death. In the event that the elected term of a Governor has expired by the time of commencing his/her term of office as vice-president succeeding to president and/or as president succeeding to past president, such officers will continue as members of the Board of Governors until completion of their terms as past president. Any Governor shall be eligible for re-election but may not serve more than two consecutive three year terms as a Governor. A Member of the Society who is elected to the position of vice-President and who is not a current Governor shall become ex officio a member of the current Board of Governors. Board members shall take office at the end of the Annual Meeting.

Candidates put forward

Vice President

Richard Fayrer-Hosken, BVSc, PhD (USA)

Since my first meeting in Colorado Springs in 1986, I have been a consummate supporter of the IETS. I have attended all meetings possible and have made sure it was the one meeting to which I sent all my students each year. I believe that the IETS is one of the top innovative international societies for reproductive issues and assisted reproductive technologies. The IETS remains in this position due to the quality of the members and the dedication of its leadership. The reason the IETS is so dynamic and successful is that it had a nurtured gestation and parturition from an embryonic society. The founders’ beliefs and principles are still upheld and valued today providing a framework for the implementation of new ideas and policies. These aspects have helped make us a successful and vibrant society.

What is it that makes the IETS so successful? The IETS is based on family and an excitement for the quest for new knowledge. When I joined the IETS as a student member, Dr. Brackett was my major professor. At the Colorado Springs meeting, I diligently stood by my first poster and was amazed how the leading scientists of the day who would stop and read the poster, discuss the science as a colleague and then encourage you to keep going. This collegial spirit is still very strong and makes the annual meeting a great success.

For the future of the IETS and its role as an international leader in reproduction we must remain vigilant in several areas. We must balance the need to have innovation in the use of the web for information and interactions, while still remaining a group that can meet annually throughout the world and enjoy scientific friendship/collaboration. We must support our most important tangible asset, the Proceedings, while we strive to ensure our scientific reports have the greatest possible readership. We must survive fiscally as a society, while the global economy ebbs and flows, and we need the quality management of FASS to help us. We must also work diligently to provide “value” to being a member of the IETS.

My service as a Governor has provided me with valuable insight and I believe that my experiences in clinical practice, academia and with the reproductive technology industry will help me support the needs of the IETS members and the society. I believe I can do this while providing innovation for fiscal planning, member services and delivery of information.
Governor

Ciro M. Barros, DVM, MS, PhD (Brazil)

Dr. Barros received his DVM from the University of Sao Paulo State (UNESP), Brazil, and MS and PhD from Sao Paulo School of Medicine (EPM), Sao Paulo, Brazil. He has been actively involved in the IETS meetings and the Brazilian equivalent (Brazilian Society of Embryo Technology) as an attendee and participant since becoming a member of the societies in 1999 and 1995, respectively. As a visiting professor at the University of Florida he designed basic and applied experiments to study bovine reproduction, with Michael J. Fields (1988), and with Peter J. Hansen and William W. Thatcher (1989-1991). Since 1998, Dr. Barros has been a full professor in the Department of Pharmacology in the Institute of Bioscience (UNESP) in Brazil. As an educator, he teaches graduate, undergraduate and extension courses at the Institute of Bioscience and College of Veterinary Medicine. As a scientist, Dr. Barros designs experiments with his graduate students and collaborators from national and international academic institutions to comprehend the basic aspects of ovarian function and oocyte/embryo viability in Zebu cattle. From an applied perspective, he investigates various pharmacological treatments to control the estrous cycle for fixed-time artificial insemination and to improve and advance embryo technologies in Zebu cattle, especially since Brazil is second in the world in numbers of embryo transfers and first in transfers of embryos produced in vitro. As a leader, Dr. Barros has served as a member of the Local Organizing Committee for the 2002 Annual IETS Meeting in Foz do Iguacu, Brazil and currently serves as the coordinator for a consortium of scientist in Brazil dedicated to the study of reproductive biology. With his acquaintances with practitioners and producers and individuals in academia and industry, Dr. Barros will continue to promote the IETS as a unique forum for the exchange of information that will lead to novel technologies and advance our understanding of the nature of animal reproduction.

Rebecca L. Krisher, PhD (USA)

Dr. Krisher is an Associate Professor in the Department of Animal Sciences at Purdue University, where she has worked since 1998. She received her Bachelor’s degree in Biology from Hanover College in 1987, followed by a Master’s degree in Animal Sciences at North Carolina State University in 1989. She then worked for Granada Biosciences for several years before completing her PhD at Virginia Tech in Animal Science/Dairy in 1994. She worked for two years as an embryologist in human clinical reproduction, after which she returned to academia to complete a post doctoral fellowship at the University of Wisconsin-Madison in 1998. Dr. Krisher’s research program focuses on defining the complex processes that occur within mammalian female gametes, which have an enormous influence on the pre- and post-implantation development of the resulting embryo. Dr. Krisher’s laboratory is elucidating changes in oocyte cytoplasm during growth and maturation that are critical components of developmental competence after fertilization, using both agriculturally important species and laboratory models. She is also involved in research to develop assisted reproductive technologies in non-domestic ungulates to assist in species conservation.

Dr. Krisher attended her first IETS meeting in Denver, Colorado in 1990. She has been a member of IETS since 1993, and has attended all but two annual meetings since that time. She was a founding member of the IETS Companion Animal, Non-domestic and Endangered Species (CANDES) committee, and has served as co-chair of the CANDES Research subcommittee from 2002 to the present. She has served as Session Chair three times and Section Editor once for the IETS annual meetings. As an educator, she has taught Advanced Reproductive Physiology, and is currently teaching Zoo Animal Conservation Science. In addition to IETS, she is also a member of the Society for the Study of Reproduction (SSR), and the American Society of Animal Science (ASAS). Dr. Krisher holds multiple leadership positions. She was a member of the LEAD21, Leadership for the 21st Century inaugural class of 2006, and is a 2006/07 faculty fellow in the Committee on Institutional Cooperation (CIC) academic leadership program. She is section leader of the Growth and Developmental Biology group in the Department of Animal Sciences at Purdue. She is currently serving as co-chair of the Diversity Action Team in Agriculture and co-chair of the Women in Agriculture faculty group at Purdue. She serves on the Agriculture Agenda and Policy, the Animal Care and Use, and Academic Progress and Records committees at Purdue. She also serves on the Animal Growth and Development Award Committee of ASAS and has just completed a term on the Public Affairs Committee of SSR.
With her experiences in industry, clinical medicine and academia, Dr. Krisher offers a broad perspective to help maintain IETS as a vibrant, dynamic society. She understands the value of a variety of interests within the society, including clinical medicine and exotic species, as well as the critical importance of the basic science and veterinary base dealing with agriculturally relevant species. As a professor, she is also dedicated to the training and encouragement of future scientists and IETS members, particularly those of under-represented groups, and would bring this enthusiasm to her work with the IETS Board of Governors.

Charles Long, MS, PhD (USA)
Charles Long received his MS in Animal Science at the University of Missouri and a PhD in Veterinary Animal Science under the direction of James Robl at the University of Massachusetts. He then completed a postdoctoral fellowship at the United States Department of Agriculture, Agricultural Research Service at Beltsville, Maryland under the direction of Drs. Larry Johnson and John Dobrinski investigating the utilization of sex sorted livestock sperm for in vitro embryo production. Prior to his current academic appointment, he spent six years managing the commercialization of advanced reproductive technologies in livestock and companion animals in the private sector. Chuck is currently an Assistant Professor in the Department of Veterinary Physiology and Pharmacology at Texas A&M University with appointments to both the Interdisciplinary Faculty of Reproductive Biology and Faculty of Genetics. His research interests remain diverse, but are primarily focused on the epigenetic regulation of mammalian embryonic development and the aberrations brought about by in vitro manipulation of gametes and embryos. Additionally, his interests include the genetic modification of livestock to improve production characteristics, such as disease resistance and muscle enhancement.

Founded by pioneering embryo transfer practitioners, the IETS quickly became the international forum for the latest advancements for those interested in gamete and embryo technology development. As the Society has evolved, the IETS represents a unique congregation of scientists and practitioners in the highly specialized field of gamete and embryo technologies. The annual meeting of the IETS continues to provide a unique forum for the interaction of researchers in technology development and basic science to communicate ideas that will better serve each upon returning to the laboratory. This exceptional nature of the IETS makes the annual meeting a high priority on the ever growing list of conferences to attend each year. Chuck has been a member of IETS since 1991 and has regularly attended the annual meetings. He has served as an invited speaker at both the main conference and associated symposia and is a member of the Companion Animal, Non-Domestic and Endangered Species (CANDES) committee. As a member of the Board of Governors, his main objective will be to continue the tradition of diversity in the scientific program for the annual meeting, while promoting an agenda of bringing innovative research, technology development and practical application of science and technology to the podium. He believes it is especially important for students to become involved in the Society and share in the opportunities it can provide. As a member of the Board, Chuck will continue to operate the Society in a fiscally proactive manner and promote increased corporate sponsorship. These resources can then be utilized for the continued recruitment of students in the field of animal reproduction via direct support of research and graduate educational programs.

Ann Van Soom, DVM, PhD, Dipl. ECAR (Belgium)
Ann Van Soom graduated as a DVM in 1988 from Ghent University, Belgium, and started to work some months later as a researcher on bovine in vitro fertilization at the Department of Reproduction, Obstetrics and Herd Health. She obtained her PhD on bovine embryo quality in 1996. Since 1999, she has been appointed a position as Assistant Professor at the Faculty of Veterinary Medicine. She is involved in research on several aspects of animal reproduction, such as bovine and porcine embryo quality, sperm interaction with the female genital tract in cattle and dogs, virus-embryo interaction in cattle and pigs, and in artificial insemination, sperm quality assessment and embryo transfer in domestic species. The main focus of her research is now directed towards using in vitro models for investigating carbohydrate involvement in bovine fertilization and for studying maternal, paternal and environmental contributions to early embryonic development. About 20 graduate students and sabbatical persons have been doing research under her supervision; and this work has led to over 100 research papers.

September 2006
As far as the IETS is concerned, I have been an active member of the International Embryo Transfer Society since 1991, trying to attend most of the annual meetings together with my students, since I think the annual conference is the most important meeting for those of us working in the field of mammalian assisted reproductive technology, with a very good balance of applied and fundamental sciences. I have been a member of the IETS HASAC Research subcommittee since 2005 and recently also became a member of the IETS Foundation. This introduction into the heart of the IETS organization has taught me that the IETS is a very active institute which is very much “alive,” trying to fulfill its promises of improving research on reproduction in both domestic and feral animals. I believe the IETS is the ideal society to stimulate research and support young scientists involved in either veterinary or biomedical research. If I am elected to the Board of Governors, I will actively promote the society and work to increase international cooperation between groups working in the broad field of reproduction. I think that especially young scientists from developing countries must be encouraged and given the opportunity to attend our annual meetings to present their research.

IETS BALLOT

(The use of this ballot is only for those individuals without internet access)
Please print and fax this form to Jennifer Gavel at 217-398-4119

Nominees for Vice President
(Please vote for One)
___ Richard Fayrer-Hosken, BVSc, PhD (USA)
___ ___________________
___ ___________________

Please note the blank lines are for write in candidates.

Nominees for Governor
(Please vote for Two)
___ Ciro M. Barros, DVM, MS, PhD (Brazil)
___ Rebecca L. Krisher, PhD (USA)
___ Charles Long, MS, PhD (USA)
___ Ann Van Soom, DVM, PhD, Dipl. ECAR (Belgium)
___ ___________________
___ ___________________

Please note the blank lines are for write in candidates.

For verification of eligibility to vote please print and sign your name below:

__________________________________________________________________________ Signature
__________________________________________________________________________ Printed Name
Feature Article

Progress of Animal Reproductive Biotechnology in Thailand
Rangsun Parnpai1, Mongkol Techakumphu2 and Yindee Kitiyanant3

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Introduction

The implementation of assisted reproductive technologies have had a beneficial impact on genetic selection of animals and increased the number of their offspring. Artificial insemination (AI), embryo transfer (ET), in vitro fertilization (IVF), ovum pick-up (OPU), somatic cell nuclear transfer (SCNT) and related techniques were developed during the last 50 or more years in our country. The ultimate goal of animal reproductive biotechnology is for agricultural and biomedical applications. This review will discuss the research and development of these technologies in Thailand.

AI, ET and IVF

Bovine

AI was introduced to the farmer during the 1950’s and was mostly carried out in dairy cattle by the Division of Artificial Insemination in the Department of Livestock Development. Recently, several government and private semen processing stations have become actively involved in beef and dairy breeding throughout the country. As a result, AI is widely accepted as producing a major advantage in breeding programs. Infertility denotes a degree of reduced fertility, which results in failure to produce or delay in producing the annual live calf. Therefore, the quality of sperm and optimal period (1) for AI are factors to be ruled out. Morphology of the fertile (2) and infertile (3, 4) bovine sperm has also been studied. The simple, rapid and economic triple-staining technique can be used to detect the acrosome reaction and viability of bovine spermatozoa (5) as well as in buffalo spermatozoa (6).

The first ET calf was born in 1984 on a private farm, which imported frozen Holstein Friesian (HF) embryos from USA. A technician from the USA also performed the transfer. Since that time several institutes have been conducting research to improve superovulation and ET techniques mainly in dairy cattle. A number of ET calves were produced in 1986 at the farm of Dairy Promotion Organization of Thailand in collaborative research with scientists from Faculty of Veterinary Science, Chulalongkorn University (7). ET has become popular in beef cattle particularly in the Brahman breed during the last 3 years. Private companies were established and serve the needs of farmers for both imported embryos and flushing of embryos from elite donors. The initial experiments on in vitro embryo production in the bovine were conducted in the Department of Anatomy, Faculty of Science, Mahidol University under the support of NSTDA in the year 1989. The development of in vitro matured (IVM), IVF bovine embryos in co-culture with an oviductal epithelial cell suspension has been reported (8, 9, 10). The first successful IVP calf born in Thailand was reported in 1990 (11). A numbers of reports have demonstrated that in vitro co-culture with specific somatic cells will enhance embryo growth beyond the critical stage of developmental blockage. Porcine oviductal cells have also been shown to facilitate porcine early embryonic development, but co-culture with cells from heterologous species has received limited attention. The mechanism by which porcine oviductal cells apparently support bovine embryo development in vitro is not known but it can drive bovine embryos to the blastocyst stage better than bovine oviductal cells, 35 % vs. 28 %, respectively (12). The sex determination of in vitro-produced bovine embryos has also been examined by immuno-fluorescence (13) or by PCR at the first cleavage stage (14) and the sex ratio was investigated using chromosome analysis (15). The large-scale production of IVF derived embryos started by the collaborative research between the National Center for Genetic Engineering and Biotecnology (BIOTEC), Embryo Technology and Stem Cell Research Center, Suranaree University of Technology and Prof. J.J. Rutledge, at Department of Meat and Animal Science, Wisconsin University. The IVF derived embryos were produced at the University of Wisconsin University using gender selected and un-selected semen, blastocysts were vitrified and shipped to Thailand (16). The goal of this research is try to evaluate the adaptation in the tropical environment of ET calves born in Thailand where the whole genetics come from USA.

Buffalo

The buffalo in Thailand are the swamp type animal and play an important role in the self-sufficient economy in rural areas. The animals are raised on small farms for draft power and meat. Little research in reproductive biotechnology have been performed one these animals when compared to that of cattle. However, the cattle have served as a model for developing the biotechnology in swamp buffalo. Due to its decreasing population, reproductive biotechnology might help to
preserve a high genetic merit individuals. The semen from a high genetic bull was frozen and young calves were produced (17, 18). Morphology of the fertile and infertile swamp buffalo sperm has also been studied (19). Embryos were collected non-surgically and transferred to synchronized recipients (20, 21) with the first ET swamp buffalo calf born in 1989 (22). With a conventional freezing technique, swamp buffalo embryos can also be frozen successfully (23, 24). The recipient carried a fetus up to 3 months after transferred frozen-thawed embryos (25). A poor ovarian response with a low number of in vivo-produced embryos (1-2 per collection per donor) has hindered the application of ET in swamp buffalo. In vitro maturation of oocytes collected from slaughterhouse ovaries can be performed, however, the maturation rate was low when compare with cattle (26, 27). IVF had been attempted but the success of embryo production was low and there has been no report of pregnancy after transfer (28, 29, 30). The IVF technique combined with ovum pick-up (OPU) can help to obtain embryos from known genetics in live animals. OPU can also be applied in cyclic or non-cyclic animals, during non-productive period such as during the non-pregnant and postpartum periods. Further, it will help to maximally utilize the female during these two periods (31, 32, 33, 34, 35, 36). An average of 5-6 oocytes per animal have been collected, with 40% of oocytes of good quality (33). Alternatively, this technique may be an effective means to study the effect of seasonal, nutritional and management on oocyte quality including a dominant follicle puncture for improvement of superovulation.

**Pig**

With increasing demands to propagate elite genetic swine and specific pathogen free herds, AI is widely used in commercial pig farms in Thailand. It is estimated that about 60% of piglets are produced by AI with identical or higher results obtained when compared with natural insemination. The first piglets born by using frozen boar semen in the country was reported in 2006 (37), with an average litter size of 8.6. Embryo transfer and related technologies such as embryo culture and freezing have also been developed. Piglets have been born after transfer fresh embryos to recipients with an average farrowing rate of 40-50% (38, 39). Pig embryos can be kept for 24-72 h in culture media (40) and some of them were reported in 2006 (37), with an average litter size of 8.6. Embryo transfer and related technologies such as embryo culture and freezing have also been developed. Piglets have been born after transfer fresh embryos to recipients with an average farrowing rate of 40-50% (38, 39). Pig embryos can be kept for 24-72 h in culture media (40) and some of them developed to term (41). The technique for freezing embryos at blastocyst stage either by conventional or vitrification has been studied. Results from these studies showed that embryo survival with vitrification was higher than conventional freezing methods, 59.8% vs. 47.8% (42). However, presently no piglets have been born from these techniques. IVF in the pig has also developed in 1993 (43), however due to low pregnancy rates, this technique has not been applied in the field. Alternatively, the technique may help investigate the fertilizing ability of different boars (44, 45) or the effect of semen preservation (46).

**SCNT**

**Cattle**

Several attempts had been made to produce SCNT embryos. The subsequent transfer of embryos derived from the adult ear fibroblasts of female Brangus breed led to the first live calf being born in 2000 (47, 48). The valuable genetics of beef and dairy cattle are interesting features to be propagated by SCNT technology. Seven live cloned calves were produced from ear fibroblasts of an 11 year old Brahman bull and 3 live cloned calves were produced from ear fibroblasts of a 7 years old Holstein-Friesian cow (49). Additionally, SCNT using fetal fibroblasts, adult fibroblasts and cumulus cells developed to blastocysts and pregnancy was established, however, there is no report of a live calf being born (50). The proportions of SCNT blastocysts were not different when either cycling or quiescent ear fibroblasts were used as donor cells (47). Bovine blastocysts produced by SCNT have mechanical slits in their zona pellucidae, and therefore initiate hatching earlier than the non-manipulated embryos. The SCNT bovine blastocysts regardless of their hatching stage, were relatively resistant to cryopreservation by vitrification (51). SCNT bovine blastocysts vitrified by using Cryotop and micro-drop technique that had been warmed and transferred to recipients resulting in pregnancy rates similar to those of fresh SCNT blastocysts, however, no live calves produced (51, 52). Several studies have shown that oocyte cytoplasm from bovine, rabbit and sheep can support early development of embryos produced by SCNT (53, 54, 55). SCNT has been applied to conservation of endangered species and the world’s first inter-species SCNT (iSCNT) animal birth reported by Lanza and his colleagues (2000). The Gaur (Bos gaurus) skin cells were injected into enucleated cattle oocyte. The reconstructed embryos were cultured in vitro using the cattle system. The embryos at the blastocyst stage were transferred into the uterine horn of recipient cattle resulting in the first cloned Gaur calf birth from cattle. Unfortunately, the calf died two days later. Moreover, there have been successes in cloning Mouflon (57) and Banteng (58) using iSCNT. In Thailand, iSCNT of gaur embryos using enucleated cattle oocytes as recipient cytoplasts had been studied (59). The in vitro development of iSCNT Gaur and SCNT cattle embryos were equal. The total cell number and the ratio of trophectoderm (TE) and inner cell mass (ICM) cells of iSCNT Gaur blastocysts had 98.5±25.4 cells and 1:3, respectively, which were not different from SCNT cattle blastocysts. There were not significant differences in embryo development when using male and female Gaur skin fibroblasts as donor cells for iSCNT using enucleated cattle oocytes as recipient cytoplasts (60).
**Buffaloes**

To date only 1 live birth of cloned swamp buffalo has been reported from the news (61). Although buffaloes are important animal for beef and milk production, there are not many reports of a SCNT in this species. SCNT in swamp buffalo was first reported using fetal fibroblasts as donor cells to produce SCNT blastocysts (62). Fetal fibroblasts and granulosa cells have been shown to have the same ability to be reprogrammed in enucleated oocytes (63). The efficiency to produce SCNT bovine and swamp buffalo using fetal fibroblasts, ear fibroblasts and granulosa cells was also examined (64). This experiment demonstrated that all three cell types had the same ability to produce SCNT blastocysts within this species and the SCNT blastocyst rates in bovine were significantly higher than those in swamp buffalo. The activation protocols are one of the major steps in achieving high success rate in producing SCNT embryos. The activation of reconstructed swamp buffalo embryos with 7% ethanol followed by culture in the combination of 6-DMAP, cycloheximide (CHX) and cytochalasin D (CD) gave higher morulae and blastocysts yields than culture in 6-DMAP+CD or CHX+CD (65). The parthenogenetic development to blastocyst stage of buffalo oocytes activated by ethanol or calcium ionophore combined with 6-DMAP was higher than that activated by electrical pulses (66). To improve the efficiency of SCNT in swamp buffalo, reconstructed embryos are cultured on mouse fetal fibroblast monolayer. A comparison of producing SCNT swamp buffalo and cattle embryos using of demecolcine in enucleation procedure had been studied (67). Buffalo offspring could potentially be produced but the development to blastocyst does not mean that cloned embryos will develop into viable offspring. Embryo transfer was performed with the recipients receiving cloned blastocysts derived from serum fed and starved fibroblasts. The recipients were pregnant on day 30 as revealed by ultrasonography, confirmed on day 60, unfortunately no recipient could carry the pregnant beyond day 90 (68). In some species, telomere length becomes abnormally shortened following SCNT and embryo failed to develop. The telomerase activity in SCNT buffalo embryos was up-regulated as early as morula stage and reached highest levels at the blastocyst stage, which was similar to the IVF system (69). The blastocysts derived from iSCNT between swamp buffalos and bovines were successfully produced (70, 71, 72). The SCNT swamp buffalo morulae had high developmental rates after vitrified by solid-surface vitrification method (73). SCNT of swamp buffalo oocytes following vitrification before or after enucleation resulted in the first successful development into blastocyst stage in vitro, without developmental loss but with a reduced total number of blastocyst cells (74). Epigenetic modification involves altering gene expression without changing the DNA sequence. DNA methylation and histone acetylation are the key mechanisms of this process. An abnormal epigenetic mechanism is suspected to be the cause of developmental failure particularly in SCNT experiment. The SCNT swamp buffalo embryos are not only hypermethylated and hyperacetylated but are also more heterogenous in DNA methylation and histone acetylation among different cells of the same embryos than those in IVF embryos (75). The expression levels of all DNA modifying genes (DNMT1, DNMT3A, DNMT3B, HAT1 and HDAC1) were higher in SCNT embryos than in IVF embryos at 8-cell and blastocyst stages. The genes HDAC1 and HAT1 were also expressed significantly higher at blastocyst stage in SCNT embryos (76).  

**Felid**

The transplanted cat somatic nuclei into IGF-I promoted matured oocytes resulting in the development of blastocyst stage embryos (77). Further experiments are needed to transfer cloned embryos to the recipients for genetic modified or preservation in endangered species of felid. iSCNT plays important role in multiplying and conserving endangered felid families such as African Wild cat (78). There are also demonstrated that skin fibroblasts of leopard cat (Felis bengalensis) could be reprogrammed in enucleated domestic cat (Felis catus) oocytes (79). Surprisingly, iSCNT in marbled cat (Pardofelis mamorata) using muscle cells injected into enucleated domestic cat oocytes showed limited development not beyond morula stage whereas enucleated rabbit oocytes could promote development to blastocyst stage (80).

**Pig**

The SCNT has been applied to pigs and has become popular to produce animals with specific genetic modifications. Pigs are excellent models for biomedical research and also potential sources of organs for xenotransplantation. Although, Thailand has a lot of pig ovaries for experiments, there are only two reports of SCNT. Ear and tail fibroblasts were used as donor cells, however, the reconstructed embryos could not develop beyond 8-cell stage (81). The post-slaughter processing may affected the in vitro maturation and subsequent development, due to the need to put the carcass in hot water for few minutes to remove hair, and this may increase the temperature of ovaries. Inter and intraspecies cloning was also explored but also limited development of reconstructed embryos (82).

In conclusion, the application of reproductive biotechnology in animals is still requires further development. In the swamp buffalo, a better understanding of the reproductive physiology is needed in order to have a better ovarian control while in pig, a specific technology such as semen freezing will help to increase the genetic progress. Epigenetic modification in SCNT programs needs to be overcome before nuclear transfer is used in the commercial application.

September 2006


Health And Safety Advisory Committee (HASAC)

Report of the Regulatory Subcommittee

The mandate of this subcommittee is to encourage the safe international movement of embryos under the least constraints. Its accomplishments were briefly dealt with in the first three paragraphs under the title ‘New developments about the animal health issues’ in the HASAC report by Michel Thibier in the June 2006 issue of this newsletter.

To reiterate, our efforts to rectify the inequities between international movement of bovine embryos and movement between Member States of the EU posed by EU legislation were successful. You will recall that the problem arose because of a requirement that fertilization of embryos to be traded within the EU must have been accomplished by insemination of the donor by semen produced in centres meeting the requirements of CD 88/407/EEC while embryos from third countries could be produced from donors inseminated with semen from nationally approved (non 88/407/EEC) centres housing IBR seropositive bulls. An evaluation of the risks involved in the use of semen potentially infected with IBR virus in a statement provided by A. Wrathall of the Research Subcommittee of HASAC was the essential reason the legislation was amended.

Recommendations to the OIE Terrestrial Animal Health Code relevant to ET included chapters on bluetongue, tuberculosis and Rift Valley fever while work continues on caprine contagious pleuropneumonia, lumpy skin disease and scrapie. These have been slow in developing due to a dearth of current knowledge of the diseases although Michel Thibier has provided wording on CCPP based on what is known. Tony Wrathall has agreed to review the literature on mycoplasmas and this is proving to be a challenge. Some recent clinical evidence in live cattle indicates that this review could prove to be important and timely. International trade in small ruminants and their semen and embryos is still very restricted due to a lack of reliable information regarding the transmissibility of TSE diseases in these species. This lack makes the provision of acceptable wording of the chapter on scrapie difficult and gives the veterinary authorities in importing countries little comfort.

Lastly, Dr. George Perry labours on in Australia in his attempts to complete the risk assessment on abattoir derived in-vitro fertilized bovine embryos. Thousands of these are being produced and are much in demand in China and other parts of the world whose animal production is limited due to lack of superior genetics. This work must be completed and published and the results accepted internationally if only to forestall potential illegal movement of embryos so produced. In the words of Dr. Jerry Callis “No matter what it is, somebody somewhere will want it and it is our duty to allow them to get it safely.” When it comes to animal embryos this is what the regulatory subcommittee of HASAC is all about.

J. Larry Delver, chairman

Classifieds

Upcoming Events-Continuing Education Opportunities

57th Annual Meeting of the European Association for Animal Production
September 17 - 20, 2006
Antalya, Turkey
www.eaap2006.gen.tr/

39th Annual Convention of the American Association of Bovine Practitioners
September 21 - 23, 2006
Saint Paul, Minnesota
www.aabp.org

2006 AETA & CETA/ACTE Joint Scientific Convention
October 5-7, 2006
Westin Ottawa Hotel
Ottawa, Ontario, Canada
www.aeta.org or www.ceta.ca

For Sale

- Aloka SSC-210 Ultrasound system w/5.0 mhz linear rectal probe, med-capture computer USB 100 and accessories. Retail $7900, used twice. Will sell for $5590.
- New, never used: Harrogate/Robertson non-electric embryo freezer, with hard case. $590

Please contact:
Vickie Whicker
Advance Veterinary Services/East Coast Genetics
336-998-9696 or avsecg@aol.com
Letter of Invitation from the LOC

To: IETS Members

From: Akira Iritani and Hiroshi Imai, LOC member IETS 2007

On behalf of the Local Organizing Committee, we are pleased to formally invite you to the 33rd Annual Conference of the International Embryo Transfer Society at Kyoto, Japan, in the year 2007. Kyoto city was the formal capital of Japan for more than 1200 years and is gifted with abundant cultural and historical treasures. The city has a very convenient subway system so that it gives a ready access to the meeting venue, downtown, hotels and the major sightseeing locations. We are looking forward to our meeting at the scientific program and the special program in the New Year 2007.

Please check sometime at the IETS web site at www.iets.org/2007 for updates.

Sincerely yours,

IETS 2007 Local Organizing Committee

REGISTRATION INFORMATION NOW AVAILABLE ON THE 2007 IETS MEETING WEBSITE

Additional Program and Meeting information will be posted on the website (www.iets.org/2007) as it becomes available.
**Schedule of Events & Program**

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

**Thursday, January 4, 2007**
9:00–17:00 IETS Board of Governors Meeting

**Friday, January 5, 2007**
9:00–17:00 IETS Board of Governors Meeting
8:00–16:00 Health And Safety Advisory Committee (HASAC)—Research Subcommittee
17:00–20:00 Health And Safety Advisory Committee (HASAC)—Regulatory Subcommittee
16:00–19:00 Registration with pick up of pre-registrations only

**Saturday, January 6, 2007**
7:00–18:00 Registration
8:00–17:00 Pre-conference Workshop: Successful Publishing in an English Language Journal
8:00–17:00 Pre-conference Satellite Symposium I: Innovative Techniques in Human and Animal Embryology
8:15–17:05 Pre-conference Satellite Symposium II: Assisted Reproductive Technologies and Food Safety in Farm Animals
13:00–17:00 IETS Foundation Board of Trustees Meeting
16:30–18:30 W-1171 Research Group
18:00–20:00 Health And Safety Advisory Committee (HASAC)—Forms & Certificates Subcommittee
13:00–18:00 Poster Setup
13:00–18:00 Commercial Exhibit Setup
18:30–21:00 Opening Reception

**Sunday, January 7, 2007**
7:30–8:30 Past President’s Breakfast
7:30–8:30 Student Competition Breakfast with the Foundation Education Committee
7:00–18:00 Registration
8:00–9:30 Health And Safety Advisory Committee (HASAC)—Food Safety Subcommittee
8:00–17:00 Commercial Exhibits
8:00–12:00 Pre-conference Workshop: Successful Publishing in an English Language Journal
8:00–17:00 A/V Library/Speaker Preparation
8:30–10:00 IETS Foundation Education Committee
9:30–10:00 Opening and Welcome
10:00–12:00 Session I: Oocyte Quality

*Evaluation of oocyte quality: Morphological, cellular and molecular predictors.*

Qing-Yuan Sun, State Key Laboratory of Reproductive Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing, China

Mounting evidence that oocyte quality profoundly affects fertilization and subsequent embryo development spurs the continued search for reliable predictors of oocyte developmental competence. We will provide an overall summary and analysis of potential criteria that can be used to evaluate oocyte quality. These criteria are purposively classified as morphological, cellular or molecular predictors. Traditional methods for evaluation of oocyte quality are based on morphological classification of the follicle, cumulus–oocyte complex, polar body (PB) or meiotic spindle. Although the use of morphological characteristics as predictors of oocyte quality is controversial, such a grading system can provide valuable information for preselecting oocytes with higher developmental competence and may therefore maximize embryo developmental outcomes. When compared with morphological parameters, cellular and molecular predictors of oocyte quality are proposed to be more precise and objective. Several intrinsic markers for oocyte quality may be used as indicators for oocyte competence. On the other hand, several extrinsic markers such as apoptosis of follicular cells, concentrations of growth factors in follicular fluid (FF) or serum and gene expression profiles of cumulus cells also have been reported to be tightly correlated with oocyte competence and embryo quality.
Oocyte quality and strategies to improve oocyte cryopreservation in domestic animals.

Sergio Ledda, Department of Animal Biology University of Sassari, Italy

Despite significant progress in cryopreservation of mammalian oocytes and embryos, many of the molecular and biochemical events that underlie this technology are poorly understood. In recent years, researchers have focused on obtaining viable oocytes that are developmentally competent. Even in the most favorable conditions, experimental approaches have obtained only limited success as compared with fresh oocytes used in routine in vitro embryo production. Chilling injuries and toxic effects of the cryoprotectants are the major adverse consequences following cryoprocdures. Different strategies have been developed to improve cryopreservation results. These strategies have included reducing container volumes, increasing the thermal gradient, changing the cell surface/volume ratio, enhancing cryotolerance by supplementation with various additives, or modifying the lipid–lipid composition of the oocyte membrane. To develop new strategies for reducing the various forms of stress associated with oocyte cryopreservation, it is fundamental to gain a better understanding of the major changes responsible for poor post-thaw survival. With this knowledge, we hope that oocyte cryostorage will become a fully reliable reproductive technique in the near future.

12:00–13:30 Lunch Break
12:30–14:00 Poster Session I
14:00–16:00 Session II: Early Embryo Development

Maternally derived transcripts: Identification and characterization during oocyte maturation and early cleavage.

Nam-Hyung Kim, National Research Laboratory of Molecular Embryology, Chungbuk National University, Cheongju, Chungbuk, Korea

Identification and characterization of differentially regulated genes in oocytes and early embryos are required to understand the mechanisms involved in maturation, fertilization, cleavage and early embryonic development. Improved RT-PCR-based differential display, real-time RT-PCR, cDNA microarray and in silico mining have been applied to identify maternal effect genes in mammalian oocytes. Moreover, conventional gene knockout and RNA interference techniques have been used to characterize the specific functions of maternally derived genes. The regulatory mechanisms of the activities of maternally derived genes in mammals are currently under investigation. These findings may subsequently be applied to animal biotechnology procedures, such as improvement of culture systems for in vitro maturation, in vitro embryo production, cloning by nuclear transfer and IVF in the clinic. The present talk focuses on the identification and functions of maternally derived transcripts during oocyte maturation, fertilization and early cleavage.

Temporal and spatial control of gene expression in early embryos of domestic species.

Tiziana A.L. Brevini, Istituto Anatomia Animal Domestic, Milano, Italy

A gradual transition from oocyte-derived mRNA and proteins to full embryonic transcription characterizes early embryonic development. Messenger RNAs and proteins of maternal origin accumulate in the oocyte throughout its growth in the ovary. This presentation will describe some of the mechanisms activated upon fertilization in early embryos of domestic species that control the appropriate use of such material and prepare for the synthesis of new ones. Data will be presented on the control of gene expression by the 3’ untranslated regions and their interaction with specialized sequences at the 5’ cap end. The process of RNA sorting and localization, initially demonstrated in different cell types and in oocytes of lower species, will also be discussed, particularly in relation to its possible role in regulating pig early development. Finally, specific genes involved in the activation of cattle embryonic transcription will be described. This brief overview will provide some suggestions on how these different mechanisms may be integrated and how they cooperate to ensure the correct initiation of embryonic development.

16:00–16:30 Break
16:30–18:00 IETS Foundation: Student Competition Presentations
18:00–19:30 Bioniche Think Tank

Monday, January 8, 2007

7:30–15:30 Registration
8:00–18:00 Commercial Exhibits
8:00–17:00 A/V Library/Speaker Preparation
Session III: Long-Term Consequences on Development

*Embryo culture and long-term consequences.*
Jeremy G. Thompson, The University of Adelaide, School of Paediatrics and Reproductive Health, Adelaide, Australia

There is now clear evidence that conditions used during mammalian embryo culture can cause variation in the phenotype of the resulting fetus and offspring, especially in relation to growth characteristics and possibly other characteristics, such as mental development. This appears to be an adaptive response to the environment encountered. The well characterised adaptive responses by the developing fetus to environmental perturbations which lead to fetal programming can now be extended to the concept of “embryonic programming.” This presentation will examine some of the phenotypic changes that occur following embryo culture under different environments, especially the work in our own laboratory which targets specific environmental perturbations during embryo culture. None of these cause reduced early development to the blastocyst stage in vitro, but following transfer there are consequences for both pregnancy establishment and subsequent development. In particular, we will examine the link between embryo physiology and the induction of cellular stress by these specific environmental stressors. We will also examine mechanisms of how this may occur, primarily by investigating the interaction between energy production mechanisms of the early embryo and subsequent development.

Long-term effects of nutritional programming of the embryo and fetus: Mechanisms and critical windows.
Michael E. Symonds, Academic Division of Child Health School of Human Development, Queen’s Medical Centre, Nottingham, United Kingdom

The maternal nutritional and metabolic environment is critical in determining not only reproduction but also long-term health and viability. One key nutrient that may modulate these types of effects is the supply of glucose from the mother to the fetus. The maintenance of a balance and appropriate supply of glucose from the mother to the fetus may be pivotal in ensuring optimal embryonic, placental and fetal growth. An increase or decrease in maternal plasma glucose, either alone or in conjunction with other macro- or micronutrients, may result in offspring with an increased risk of a range of adult diseases. Large animals, such as sheep, provide a valid model for maternal–fetal nutritional studies owing to the similarities to humans in fetal development, number and maturity at birth and outcomes following nutritional manipulation. In this review, the effects of maternal nutritional manipulation in large animals at defined stages of gestation coinciding with embryo development, maximal placental or fetal growth will be discussed.

10:30–11:00 Coffee Break/Exhibition
10:30–13:30 Tea Ceremony
11:00–12:30 Poster Session II
11:00–12:30 IETS Data Retrieval Committee Meeting
12:30–13:30 Lunch Break
13:30–15:30 Session IV: Implantation and Gestation

*Pregnancy recognition and conceptus implantation in domestic ruminants: Roles of progesterone, interferons and endogenous retroviruses.*

Thomas E. Spencer, Texas A&M University, College Station, Texas, USA

New information on pregnancy recognition and conceptus development and implantation in sheep with respect to regulation by progesterone, interferons and endogenous retroviruses will be discussed. After formation of the corpus luteum, progesterone acts on the endometrium and stimulates blastocyst growth and elongation to a filamentous conceptus (embryo/fetus and associated extraembryonic membranes). The envelope of endogenous viruses related to Jaagsiekte sheep retroviruses (enJSRVs) appears to intrinsically regulate trophoblast cell proliferation and differentiation into giant binucleate cells. The mononuclear trophoderm cells of elongating sheep conceptuses secrete interferon tau (IFNT), which acts on the endometrium to prevent development of the luteolytic mechanism. Progesterone downregulation of its receptors (PGR) in luminal and glandular epithelia correlates temporally with induction of secreted galactin 15 (LGALS15) and secreted phosphoprotein one (SPP1), which are proposed to regulate trophoderm proliferation and adhesion. IFNT acts on the endometrial luminal epithelium to induce WNT7A and to stimulate LGALS15, cathepsin L (CTSL), and cystatin C (CST3), which are candidate regulators of conceptus development and implantation. The number of potential contributors to maternal recognition and establishment of pregnancy continues to grow and highlights our limited appreciation of the complexity of the key molecules and signal transduction pathways that intersect during these key developmental processes.
Gene expression and maintenance of pregnancy in the bovine: Roles of trophoblastic binucleate cell-specific molecules.
Kazuyoshi Hashizume, Department of Veterinary Medicine, Iwate University, Morioka, Iwate, Japan
Various molecules participate in implantation and maintaining endometrial function during gestation. Advances in molecular biological technologies, such as microarrays, contribute to clarifying the intricate dialogue between the fetus and dam, because microarrays enable changes in the expression levels of thousands of genes to be monitored simultaneously. Cell-to-cell interaction plays a pivotal role in the regulation of placentogenesis and the exchange of stage-specific developmental signals between the fetal and maternal units. These interactions are paramount for programmed fetal growth, maternal adaptation to pregnancy and coordination of parturition. However, little is known about the precise regulation of placentation and maintenance of gestation in cattle. In the ruminant, the binucleate cell plays a central role in forming the structures and secretions at the feto-maternal interface that are crucial in establishing and maintaining pregnancy. We summarized differences in the abundance of specific RNA transcripts in the bovine cotyledon and caruncle using global gene expression profiling, and further investigated the relationship of mRNA abundance for select pregnancy-specific genes of interest (identified from microarray studies) across pregnancy that were exclusively localized to the binucleate cell, such as placental lactogen, prolactin-related proteins and pregnancy-associated glycoproteins. Our results suggest that a well-orchestrated transcriptional command from the binucleate cells is pivotal to the establishment and progression of pregnancy in cattle.

15:30–16:00 Coffee Break/Exhibition
16:00–16:30 IETS-Pioneer Award Presentation
16:30–17:30 IETS Annual Business Meeting
17:30–19:30 Health And Safety Advisory Committee (HASAC)—Open Meeting

Tuesday, January 9, 2007
7:30–8:30 Organizational Meeting of the IETS Foundation
8:00–15:00 Registration
8:00–13:30 Commercial Exhibits
8:00–17:00 A/V Library/Speaker Preparation
8:30–10:30 Session V: Sperm Evaluation and Physiology

State of the art in farm animal sperm evaluation.
Heriberto Rodriguez-Martinez, Faculty of Veterinary Medicine SUAS, Uppsala, Sweden
Our ability to screen the structural and functional integrity of the spermatozoon in vitro has increased dramatically over the past decades, but not our capacity to estimate the fertility of a semen sample, or of the sire from which it has been collected, especially in selected farm animal breeders. Estimation of fertility is constrained by several factors, e.g., type of cell, analysis strength, sperm deposition strategies, recordings of fertility, and so on, including the fact that the ejaculate is composed of a diverse sperm population. Such cell heterogeneity is not only reflected in differences in the persistence of attributes needed for fertilization, such as motility, but also in the relative ability of spermatozoa to remain fertile over time, and to endure exogenous selection steps and stimuli, all of which account for innate variations in fertilizing ability among doses, ejaculates and sires. Determination of the concentrations and conditions required to maintain a sperm population with competence for fertilization would allow for a better estimation of fertility. The value of these analyses is hereby discussed.

Interactions of sperm with the female reproductive tract: Inspiration for assisted reproduction.
Susan Suarez, Cornell University, Ithaca, New York, USA
Interactions of sperm with the female tract prepare them for fertilization in ways that are different from methods used to prepare sperm for AI, IVF and ICSI. After natural mating, bull sperm are rapidly removed from seminal plasma when they enter the cervical mucus, in contrast to the slower dilution of seminal plasma that sperm experience in vitro in preparation for AI, IVF and ICSI. Sperm passage through the uterotubal junction involves interactions of sperm surface proteins with the junction, which could modify the sperm, oviduct or both. In the oviduct, binding of sperm to the epithelium stabilizes them for storage and enables them to live longer than they do in vitro. As the time of ovulation approaches, unidentified factors in the oviduct initiate capacitation and hyperactivation in the sperm. Although capacitation and hyperactivation can be induced in vitro, the inducers used may be less efficient or effective than those in vivo, thereby accounting for the need to use thousands of sperm to achieve fertilization of an oocyte in vitro. Finally, evidence indicates...
that chemotactic factors guide sperm to the oocyte in vivo, whereas successful fertilization in vitro may depend on random collisions of sperm with the oocyte.

10:30–11:00 Coffee Break/Exhibition
11:00–11:30 IETS-Distinguished Service Award
11:30–12:00 IETS-Foundation Student Competition Awards, CANDES & HASAC Updates
12:00–13:30 Lunch Break
12:00–13:30 5th IETS Annual Running Competition
13:30–15:00 Practitioner’s Forum: The Use of Embryo Transfer for Improvement of Fertility in Dairy Cows
Moderator: Prof. O. Dochi
In recent years, the fertility of dairy cows has gradually decreased everywhere around the world. The cause of the low fertility may vary considerably across countries. In this Practitioner’s Forum, we will focus on and discuss on the use of embryo transfer for overcoming the low fertility in dairy cows.

Relationship between endometrial epidermal growth factor (EGF) and fertility after embryo transfer in repeat-breeder cows
Dr. S. Katagiri (Graduate School of Veterinary Medicine, Hokkaido University, Japan)

Improved pregnancy after embryo transfer of frozen–thawed embryos in repeat-breeder Holstein cows
Mr. K. Takahashi, DVM (Genetics Hokkaido Assoc., Japan)

Improvement of fertility after embryo transfer in dairy cows under heat-stress conditions
Dr. Vasco celos, JLM (Faculdade de Medicina Veterinaria e Zootecnia, UNESP, Botucatu, SP, Brazil)

15:00–15:30 Coffee Break/Exhibition
13:30–15:00 Commercial Exhibit & Poster Teardown
15:30–16:30 Session VI: Keynote Address
Stem cells and lineage development in the mammalian blastocyst.
Janet Rossant, The Hospital for Sick Children, Toronto, Ontario, Canada
The mammalian blastocyst is the source of the most pluripotent stem cells known—embryonic stem (ES) cells. However, ES cells are not totipotent: In mouse chimeras they do not contribute to extraembryonic cell types of the trophoderm and primitive endoderm lineages. Understanding the genetic pathways that control pluripotency versus extraembryonic lineage restriction is key to understanding not only normal embryonic development but also how to reprogram adult cells to pluripotency. The trophoderm and primitive endoderm lineages also provide the first signals that drive patterned differentiation of the pluripotent epiblast cells of the embryo. My laboratory has produced permanent mouse cell lines from both the trophoderm (TE) and the primitive endoderm (PrE), termed trophoblast stem (TS) and eXtraembryonic ENdoderm (XEN) cells. We have used these cells to explore the genetic and molecular hierarchy of lineage restriction and identify the key factors that distinguish the ES cell versus the TS or XEN cell fate. The major molecular pathways of lineage commitment defined in mouse embryos and stem cells are probably conserved across mammalian species, but more comparative studies of lineage development in embryos of nonrodent mammals will likely yield interesting differences in terms of timing and details.

16:30–17:00 Closing Ceremony
17:00–18:00 Organizational Meeting of the IETS Board of Governors
18:00–21:30 Banquet & Dance Party

Wednesday, January 10, 2007
8:00–18:00 Post-conference Satellite Symposium: Quality Control of Embryos for Embryo Transfer and Related Advanced Technologies in Cattle

Thursday, January 11, 2007
9:00–17:00 Post-conference Tour: Excursion to see the world-famous Japanese Black cattle (Wagyu) and to taste their marbled beef with Sukiyaki

September 2006
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Pre-conference Satellite Symposium I
Innovative Techniques in Human and Animal Embryology
January 6, 2007
Organizers: Jeremy Thompson (Adelaide, Australia)
Gábor Vajta (Tjele, Denmark)

Timetable
8:00   Introduction
8:05   Keynote Lecture by Stanley Leibo
8:30   Section I—Maturation and Culture
       • Oocyte maturation: Emerging concepts and technologies to improve developmental potential. Robert Gilchrist
       • Alternatives to culture in the petridish. Jeremy Thompson
       • Quantification of embryo quality by respirometry. Henrik Callesen, Ana Lopes
       • Metabolic profiling of human embryos in culture: Improving selection for transfer. Daniel Brison
10:10  Coffee Break
10:30  Section II—Stem Cells
       • Derivation of human embryonic stem cell lines. Teija Peura
       • Maintaining epigenetic and genetic integrity of human ES cells. Maisam Mitalipova
       • Embryonic stem cells and animal models of early human development and adult disease. Kevin Sinclair
       • Isolation and characterization of pluripotent cell lines from pig embryos of different origins. Fulvio Gandolfi
12:10  Lunch
13:00  Section III—Cryopreservation
       • Analysis of oocyte physiology to improve cryopreservation procedures. David Gardner
       • Highly efficient vitrification for cryopreservation of human oocytes and embryos: The Cryotop method. Masashige Kuwayama
       • Toward verification of vitrification parameters—What is really important for oocyte cryopreservation. Amir Arav
14:20  Coffee Break
14:40  Section IV—Embryo Manipulation
       • Oocyte-induced enucleation reveals spindle-associated regulators of cytoplast developmental competence. Eric Overstrom
       • Comparative approach to nuclear transfer with the zona free method in cattle, horse, pigs and sheep. Cesare Galli
       • Artificial gametes: When and how? Zsolt Peter Nagy
       • The porcine epidermal stem cells as a biomedical model for wound healing and normal/malignant epithelial cell propagation. Jan Motlik
16:20  General Discussion and Conclusion
Pre-conference Satellite Symposium II
Assisted Reproductive Technologies and Food Safety in Farm Animals
January 6, 2007
Organizers: Dr. H. Kochhar, Dr. M. Thibier, and Dr. H. Imai

8:45 Opening address—Dr. Michel Thibier, France

Section I: Newer Assisted Reproductive Technologies
9:00 Animal clones and methodology of cloning—Dr. Keith Campbell, UK
9:30 Transgenic animal production and animal biotechnology—Dr. Jim Robl, USA

Section II: Newer Assisted Reproductive Technologies and Impacts on Food Safety
10:00 Comparison of cloned and noncloned cattle and their product evaluation over a 3 year period—Dr. Yvan Heyman, France
10:30 Health Break
11:00 How healthy are animal clones and their progeny? Five years of field experience—Dr. Martin Panarace, Argentina
11:30 Food safety of products derived from cattle clones—Dr. Seiya Takahashi, Japan
12:00 Safety and nutritional data on clones and the effects of introducing a specific transgene on a complex biological fluid and important food—Dr. Goetz Laible, New Zealand
12:30 Lunch
14:00 Meat composition of offspring derived from cloned boars—Dr. Irina Polejeava, USA
14:30 Normality of pig clones and their offspring—Dr. Jin-Hoi Kim, South Korea
15:00 Health Break

Section III: Regulatory Considerations in Animal Biotechnology
15:30 Regulatory considerations in transgenic livestock from the aspect of Cartagena Protocol in Japan—Dr. Kazuhiyo Yamanouchi, Japan
16:00 Current status for regulating biotechnology-derived animals in Canada—Animal health and food safety considerations—Dr. Harpreet Kochhar and Dr. Brian Evans, Canada
16:30 The US Food and Drug Administration (FDA) and animal cloning: Risk and regulatory approach—Dr. Larisa Rudenko or Dr. John Matheson, USA.
17:00 Concluding remarks—Dr. Takashi Nagai, Japan
17:05 Adjournment.

Features of the program
Genetically modified livestock in agriculture are already an experimental reality and can rapidly become a commercial reality. The challenge is to see whether the existing science based safety-assessment model will work and whether the current marketing practices will be up to this challenge. The acid test of industry practices will be their capacity to build consumer confidence. On the other hand, scientists engaged in the development of transgenic livestock intended to supply food must recognize that regulators and the general public consider the transgenic technology as a considerable shift from the traditional animal breeding practices. Livestock breeding is and will continue to be a balancing act of multiple trait selection, and it is naïve to believe that transgenes will become so important as to monopolize the selection process. Food safety and regulatory requirements for transgenic livestock are not yet definitive, but clearly have the potential to affect important areas such as trade certifications, animal identification, product identity and traceability. Hence, this symposium will be an effort to flush out the issues pertaining to the science, food safety data from experiments in animal cloning and transgenesis, regulatory initiatives in this direction and the public perception of this technology. The program will have three components:

1. Newer Assisted Reproductive Technologies—Cloning, Transgenesis, etc.: The presenters will provide an overview of the technologies and show how we are at a stage at which there is a potential to market the food and products derived from these animals.
2. Food Safety Components: The presenters in this subtheme will provide valuable data in terms of safety of food derived from animal clones or transgenics as well as the parameters and strategies used to generate the data.
3. Regulatory Considerations: A tough decision to approve or not to approve the food based on the scientific information guides the regulations (which at present time are unclear for the biotechnology-derived animals). The presenters will look at the specific approaches of assessment by different countries and the public perception of the food derived from such animals.
Post-conference Satellite Symposium
Quality Control of Embryos for Embryo Transfer
and Related Advanced Technologies in Cattle
January 10, 2007

8:00 Opening address: Local Organizing Committee Chair, Dr. A. Iritani (Japan)
8:15 Introduction: Dr. Y. Izaike (Japan)

Session I: Oocyte collection following superstimulation and ovum pick-up (OPU)
8:30 Superovulation in the cow: Effects of gonadotrophins and follicular wave status. Dr. R. J. Mapletoft (Canada)
9:00 The efficiency of embryo production by OPU. Dr. K. Imai (Japan)
9:30 Application of ultrasound-guided follicular aspiration (OPU) in prepubertal and adult cattle. Dr. H. Niemann (Germany)
10:00 Coffee Break

Session II: Quality control of oocytes and embryos for in vitro production systems
10:30 The role of growth factor signaling on oocyte quality and maturation. Dr. K. P. McNatty (New Zealand)
11:00 Embryo quality in bovine embryos: Influence of oocyte origin and culture environment on gene expression and developmental competence of IVF embryos. Dr. P. Lonergan (Ireland)
11:30 Noninvasive quality assessment of IVP embryos. Dr. H. Abe (Japan)
12:00 Lunch Break

Session III: Embryo cryopreservation and commercial application of frozen embryos
13:30 Cryopreservation of manipulated embryos. Dr. S. P. Leibo (USA)
14:00 Essential methods of freezing embryos for application in animal reproduction management. Dr. O. Dochi (Japan)
14:30 Vitrification and direct transfer of bovine embryos. Dr. G. Seidel (USA)
15:00 Mass production of cattle from IVM, IVF and cryopreservation of in vitro-produced embryos in Japan. Dr. Hamano (Japan)
15:30 Coffee Break

Session IV: Early embryonic-loss and maintenance of early pregnancy with manipulated embryos
16:00 What drives the formation of trophectoderm during early embryonic development? Dr. R. M. Roberts (USA)
16:30 Interaction between fetal and maternal environments during early pregnancy in domestic species. Dr. T. Ezashi (Japan)
17:00 Failure of uterine-conceptus interactions in cattle. Dr. T. R. Hansen (USA)
17:30 Improving pregnancy maintenance in dairy cows. Dr. W. W. Thatcher (USA)
17:30 Adjournment
Pre-conference Workshop
Workshop for Authors
Publishing Scientific Papers in English

Presented by
John P. Kastelic, DVM, PhD, Co-Editor-in-Chief, Theriogenology
Rose M. Kastelic, BA (French), MA

Many manuscripts are delayed or rejected because of poor experimental design, analysis and presentation of data, and writing. This workshop is an overview of how to plan and conduct research, analyze and present your data, write a paper and interact with editors and reviewers. In addition to presentations of principles and common errors, there will be exercises and interactive discussions.

This workshop is primarily designed for those for whom English is a second language. Therefore, English syntax, grammar and punctuation will be reviewed. However, this workshop will also be valuable for those for whom English is their native language, especially students and young scientists.

This is a Pre-conference Workshop (in association with the 2007 IETS Conference). The workshop will be held in the Kyoto International Conference Hall (IETS Conference location) in Kyoto, Japan, on Saturday, 6 January (8:00 to 17:00) and Sunday, 7 January (8:00 to 12:00).

Class size is limited to the first 20 participants. Registration fees are payable to IETS via the registration form. The reduced early registration fee (US$200 for IETS members listed in current membership directory; US$300 for nonmembers) must be received before 15 November 2006. The on-site registration fee is US$250 for IETS members and US$350 for nonmembers (if space is available). Student registration is US$150 prepaid, or US$200 at the door. The registration fee does not include meals.

Information about the workshop: therio@shaw.ca or 403-317-2236
Registration and fees: iets@assochq.org or 217-398-4697
The 3rd Edition of the IETS Manual is available in French, Spanish, and English.

The IETS publishes a manual with guidelines for general procedures for bovine embryo transfer, minimum standards for hygienic handling of embryos, an updated summary of results on embryo-pathogen interactions, and recommended standardization methods of labeling of containers of frozen embryos. To order your copy, please send this completed form with payment to:

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