AETE
Association Européenne de Transfert Embryonnaire
European Embryo Transfer Association

December 2015 AETE Newsletter Issue 44 Editor: Roger Sturmey

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PRESIDENTS LETTER

Dear colleagues and friends,

It is a pleasure and honor for me to write this letter as the new President of AETE. Going back a few years, I remember my first AETE meeting - in Santander, Spain - in 2000. There, I presented my work in the student competition, and was fortunate to get the first prize from Nanke den Daas, the President at that time. From that first moment I felt I was with family. Since then I have not missed a single annual conference and personally I can say that AETE played a significant role in my scientific carrier.

I would like to thank you all for electing me a member of the AETE Board in September 2011. It has been a great experience and it is difficult to decide from where to start! First of all, it has been wonderful being in close contact with all of you, but also getting your feedback and discussions in the Board, helping in the organization of the annual meetings, preparing the Newsletter, and trying to increase the scientific and practical potential of our embryo transfer society. A special thanks to my colleagues in the Board for

sharing their thoughts, concerns and suggestions through this time and of course for giving me this opportunity to be in charge of the fate of the society. A great challenge for me; however, I can promise that we will continue our prosperous activities improving the reputation of our society in Europe and other continents.

Two members of the board step down this year - **Frank Becker** (Germany) and **Serge Lacaze** (France) - and I would like to thank them both for all they have done for the society. **Serge** has served the society as a board member since 2006. He was the main representative for the French authorities for many years and he was the head of the local organizing committee for our meeting in Pau in 2008 and member of the LOC in St Malo in 2012. Serge has also organized several workshops related to embryo transfer, use of sexed semen etc. What to say about **Frank**, current AETE Past-President! A few words for his personality, contribution and leadership of the society are not enough to get the real picture! *Thank you* Frank for the great atmosphere kept between us, your inspiration to members and the board and your strong beliefs. Through your guidance and that of others before you, AETE has become firmly established as the European leader on embryo transfer technologies for practitioners, scientists and of course our new members and future leaders, the students.

At this point, it is my pleasure to announce the two new Board members. Out of the six candidates, Roger Sturmey from Hull York Medical School, UK and Jan Detterer from AI and ET Station Georgsheil, Germany were elected by members of our society at the General Assembly meeting in Ghent. I would like to congratulate and welcome them in the board and I am looking forward to working with them. Roger has already started to take over the responsibilities for the Newsletter from me, in which you will notice the "fresh air" and Jan has been assigned responsibility for International Relations. Good luck to both of you!

Our 31st annual meeting was held in Ghent, Belgium at the Augustijner Abbey, a beautiful medieval conference venue. More than 200 participants came to Ghent, travelling from many European countries as well as Brazil and USA, indicating the scope of our embryo transfer society. The scientific program included 4 invited lectures, 15 short oral presentations selected from the submitted abstracts including the student competition, 2 workshops and 2 poster sessions with 66 posters. This year we had an excellent and very successful pre-conference Workshop organized the day before the main conference at the Faculty of Veterinary Medicine moderated by Prof. Ann Van Soom on "A week in the life of an Equine Embryo".

The presentation of the 2015 AETE Pioneer Award was made to **Dr. Michel Thibier** (France). This was a special event during the conference. Michel received the award of the AETE due to his distinguished contributions worldwide in the field of reproductive physiology and reproductive technologies (AI, ET, embryo sexing, *in vitro* production) regarding applications for the benefit of farmers and the breeding industry. He played a crucial role in establishing new developments in the field of ET activities assuring efficient genetic selection with the best sanitary guarantees. Michel played a key role in the establishment of AETE and served as President from 1986 to 1994. He strengthens the links with many other societies such as IETS as well as with Brazilian Embryo Transfer Society. He is an established

and internationally recognized expert in the field of animal reproduction and reproductive technologies through numerous missions in developing countries. His dedication to health prospects and knowledge led him to reinforce his activities in different panels of experts in biotechnology such as the World Animal Health Organization (OIE), Food and Agricultural Organization (FAO), IETS, and others. Throughout his carrier and his numerous and demanding tasks he never forgot his main passion, the embryo, and of course our society in which he has been constantly active. Many thanks also to **Dr. Patrice Humblot** (Swedish University of Agricultural Sciences, Uppsala, Sweden), a close friend and colleague of Michel Thibier and active member of AETE, for his kind introduction to the award ceremony.

Further invited lectures were given by **Judith Roelofs** from The Netherlands on Estrus Detection Tools and their applicability in Cattle; **Pascale Chavatte-Palmer** from France, on the current understanding of the Developmental Origin of Health and Disease in relation to animal production; and **Roger Sturmey** from U.K., on the reasons for studying Embryo Metabolism and the downstream effects that can cause.

As in previous years, four students were selected, based on their submitted abstracts, to present their work in the student competition. All presentations were scientifically outstanding. However, only one can be the winner and this year **Jessie De Bie** from University of Antwerp, Belgium for her presentation on "The effect of hypo- and hyperglycemia during lipolysis-like conditions on bovine oocyte maturation, subsequent embryo development and glucose metabolism.

As we promised this year in Ghent, the PhD students took center stage. A special breakfast was organized for them where they had the chance to speak and discuss with their colleagues and with senior scientists. Furthermore, we established two more prizes, one for the best poster won, by **Christoph Richard** from INRA, Jouy-en-Josas, France entitled " Embryo Collection in Clone Cattle Offspring" and another one for the best oral presentation won by **Marta De Ruijter Villani** from Utrecht University, The Netherlands entitled " Effect of Asynchronous Embryo Transfer on Glucose Transporter Expression in Equine Endometrium". I congratulate them both and I am sure these activities will stimulate more students to participate and present their results at the AETE annual meeting.

The two workshops, "Equine Assisted Reproductive Technologies" moderated by **Professor Katrin Hinrichs** from Texas A & M University, USA and "Non–Invasive Embryo Quality Assessment" moderated by **Martin Gehring**, Germany, supported by RI-Life Science where very successful based on the activity of the participants. We thank both moderators for their excellent contribution to the scientific program. A short summary of both workshops is included in this newsletter.

A special thanks to the local organizing committee chaired by **Ann Van Soom**, University of Ghent and **Jo Leroy**, Antwerp University who worked hard at creating a memorable event. Their hospitality in Ghent made us all feel at home. They created a special social atmosphere for all participants walking through Ghent center at Sint Pieters Abbey Crypt for the Gala Dinner and dance party and also in the last evening with the live band at the Augustijne Abbey tasting a local beer. Thank you all for putting together such a great event celebrating the

31st annual meeting of AETE in Ghent, Belgium.

At this stage it is worth mentioning that this year our invited papers and all abstracts were published in the Journal of Animal Reproduction, a join collaboration with the Brazilian Society of Embryo Transfer (SBTE). I believe this important step forward improves the scientific outputs of our annual meetings and opens the borders outside of Europe collaborating with other ET societies like SBTE. Many thanks to the efforts made by **Jo Leroy** and **Roberto Sartori**. We are looking forward for more to come in the years a head.

The preparation of our next AETE meeting in **Barcelona, Spain on the 9th and 10th of September 2016** is under way. The Local Organizing Committee, chaired by **Teresa Mogas**, University Autonoma of Barcelona and the AETE board is already working hard and I am sure that we will have once again an interesting and enjoyable meeting. More information will be placed on the AETE website which is being updated with new functions to make it easy to use by all members and a link for the abstract submission and reviewing process.

Last but not least, I wish you all Happy Christmas and a Happy New Year and I hope to see you soon again in 2016.

Dimitrios Rizos
President A.E.T.E.

Dr Dimitrios Rizos and Dr Frank Becker (Past President)

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ACHIEVE MORE TOGETHER

EQUINE WORKSHOP – AETE 2015

Katrin Hinrichs

A workshop on equine assisted reproductive techniques was held on the first evening of the 2015 AETE conference. The question posed by the AETE scientific committee for the topic of the workshop was "**Do we think equine ART will become as common as bovine ART and human ART?**" To answer this, **Katrin Hinrichs** (Texas A&M University, USA) and **Giovanna Lazzari** (Avantea, Italy) presented information on equine ART; **Erik Mullaart** (CRV, The Netherlands) presented bovine ART, and **Etienne Van den Abbeel** (University Hospital Gent, Belgium) presented human ART.

Katrin posed the workshop participants three questions: 1) How common is equine (bovine, human) ART – how many cycles are done yearly?; 2) How expensive is equine (bovine, human) ART for the owner/patient – per cycle? Per pregnancy/live offspring?; and 3) What are the main reasons that people pay to have (equine, bovine, human) ART done – what are the drivers for the industry?

The workshop started with Katrin giving some background on the current status of equine assisted reproductive techniques. These include oocyte transfer, standard in vitro fertilization (although this is not yet efficient), ICSI, in vitro embryo culture, embryo biopsy, embryo vitrification and nuclear transfer (cloning). For the purposes of this workshop, the focus was on ICSI and in vitro embryo culture.

In vivo-matured equine oocytes can be recovered from the single stimulated preovulatory follicle, or immature oocytes can be recovered from immature follicles, and matured in vitro. Horse oocytes require ~30 h maturation for optimum embryonic development after ICSI, so her laboratory developed a method to hold immature oocytes before maturation. Immature oocytes placed in modified M199 or embryo holding medium and held overnight at room temperature showed no detrimental effect on maturation or blastocyst rates. This allows placement of oocytes in maturation culture in the morning so ICSI can be done the following afternoon. Notably, this also allows shipment of immature equine oocytes overnight at room temperature, which has allowed referring veterinarians to recover immature oocytes at the mare's location, then ship them by overnight courier to the laboratory for maturation and ICSI.

How common is equine (bovine, human) ART - how many cycles are done yearly?

Equine

Katrin presented that there are very few commercial equine ICSI centers with reported results worldwide; she is aware of only five centers effectively performing this commercially for outside clients. Other centers are trying to develop equine ICSI in many countries. She contacted the main centers she is aware of and found that the overall caseload (total of in-house oocyte collections and shipped oocyte collections) at the centers for 2015 was approximately 450, 310, 300, 556, and 176 for about 1800 oocyte recoveries for equine ICSI among these centers.

Giovanna presented results from their program at Avantea, in Italy. The proportion of oocytes being shipped in to that of mares done in-house has increased in the last two years. This year, 80 mares underwent OPU at the clinic and 70 mares had oocytes shipped to the clinic. They see a breed-associated difference in results, with Arabian mares having a lower blastocyst rate per injected oocyte. In 2015, they produced 275 blastocysts from 310 OPU sessions. They freeze

essentially most of the blastocysts produced, with a ~52% ongoing pregnancy rate after transfer.

Katrin presented results from the ICSI program at Texas A&M. The total number of oocyte aspiration sessions used for ICSI has increased from 63 in 2012 to over 450 each year in 2014 and 2015. In 2015, only 40% of the immature oocyte aspiration sessions were in-house. A total of 307 blastocysts were produced from 251 immature oocyte aspiration sessions. In addition, 208 shipments of single in-vivo matured oocytes were received, and 78 blastocysts were produced from these. About 15% of blastocysts are vitrified for later transfer. All blastocysts are shipped to embryo transfer centers for transfer, and the ongoing pregnancy rate is ~52%.

Bovine

Erik presented results in cattle. At CRV (Holstein animals only), by hormone stimulation for multiple ovulation, then flushing, they are recovering ~3250 embryos per year. These are typically frozen then transferred later. They recover ~5-6 embryos per flush and the pregnancy rate is 52%. By OPU and IVP, they are producing ~3750 embryos per year. Of these, 90% are transferred fresh and 10% frozen. They recover ~8 oocytes per session, with a 30% blastocyst development at day 7. The pregnancy rate for fresh transfers is 53%. Katrin presented that the 2013 IETS annual report, collated by Marja Mikkola, stated that the number of sessions reported internationally for Bovine OPU/IVP for Europe was 9710 sessions, with 83,785 oocytes collected and 15,693 embryos produced.

Human

Etienne presented that in Belgium, 25,000 to 30,000 human IVF/ ICSI cycles (oocyte collection cycles) are performed per year, with 500,000 oocyte collection cycles per year in Europe altogether. In some countries, 5% of children born are a result of ART.

How expensive is equine (bovine, human) ART for the owner/patient – per cycle? Per pregnancy/live offspring?

Equine

Katrin presented the fee schedule for oocyte aspiration / ICSI at Texas A&M. Procedures are charged individually. The cost for the follicle aspiration procedure is $1,100. Including this, the total charge for aspiration/ ICSI if no blastocyst is produced is about $2,700. The total charge per aspiration /ICSI with one blastocyst shipped is about $3,200. With an average of 1.2 blasts per immature oocyte aspiration session and a foaling rate of 52% per transferred blastocyst, the cost per foal is about $6346. This is just the cost of producing the embryo that made the ongoing pregnancy/foal -- NOT counting embryo shipping, embryo transfer, recipient, recipient maintenance etc.

Bovine

Erik presented that the cost at CRV was ~250€ per embryo (assuming 2 embryos per session).

Human

Etienne presented that the cost per session and per healthy child produced differ between the USA and Europe. In Belgium, it is about ~7500€ per cycle. In considering the costs per healthy live birth, this depends on patient characteristics (number of cycles needed) and also on the specific treatment(s) offered, such as preimplantation genetic diagnosis, genetic screening, assisted hatching, time lapse imaging, etc. Patients within the social security protection can have a certain number of cycles paid for, within age and other limits.

What are the main reasons that people pay to have (equine, bovine, human) ART done – what are the drivers for the industry?

Equine

Time became short and this topic was reviewed more briefly. Katrin presented that in the horse, on the mare side, ICSI is performed to obtain foals from mares that cannot provide an embryo for transfer, due to factors such as endometritis/pyometra, uterine adhesions, cervical tear, or idiopathic causes. However, the main driver for the ICSI service at A&M is on the stallion side: for stallions that are dead or are too old to continue breeding, ICSI logarithmically increases the number of foals that can be produced from a limited supply of frozen semen. For example, one aged stallion, no longer fertile, has a stud fee of $22,500. If his stores of frozen semen are used for standard insemination, each mare purchasing a stud fee might use 10 straws and maybe produce 1 foal. If, instead, the semen is used for ICSI, one straw can be thawed, diluted, and re-frozen into ~200 "ICSI dose straws," which could even be sectioned into 5 or more sections, allowing 1,000 attempts at ICSI from one straw. With about 1 blastocyst per ICSI session, and a 50% foaling rate, this might mean 500 foals from one straw. Thus these stallions have declared that they will offer breeding only by ICSI. The sale of a breeding is with a "live foal guarantee," but this only means that the mare can try oocyte aspiration/ICSI again for another season if no foal is produced the first year. The stallion owner retains the stud fee. The continued popularity of these stallions (their foals continue to win in competitions) and the necessity of having the mare undergo oocyte aspiration/ICSI to breed to them is the major driver for the clinical ICSI program at Texas A&M.

Giovanna added that the main driver for their program in Italy is subfertile mares, followed by low fertility stallions. Other reasons are use of expensive semen – ICSI offers more opportunities per straw than does AI, and therefore is cost effective. In addition, an added benefit is having frozen embryos (in vivo-collected equine embryos are difficult to freeze). This makes it much easier for people to use their own recipient at a time that they choose, and it allows the owner the chance to market the embryos.

Bovine

Erik discussed that the main driver in bovine assisted reproduction is to increase the number of embryos produced from high genetic value cows. Embryos can also be tested for genetic value before being transferred.

Human

Etienne stated that the main drivers for human ART are as a treatment for infertility and to allow preimplantation genetic diagnosis in cases in which the parents may carry genetic disease or have an increased risk of chromosomal abnormalities. ART is also used in humans for fertility preservation (storing oocytes) for either medical reasons, such as prior to chemotherapy, or for non-medical reasons ("social oocyte cryopreservation").

WORKSHOP II: NON-INVASIVE EMBRYO QUALITY ASSESSMENT

Martin Gehring

Many different systems to evaluate the quality of embryos have been developed all over the world, all of them with the aim of estimating

the probability of getting a pregnancy after fresh transfer or after freezing, thawing and transfer of an embryo. Non invasive methods are the standard procedure because commercial applications need a quick method, without harming the embryo in the process. The international trade of mainly bovine embryos has made it necessary to develop a standard procedure for the visual evaluation of bovine embryos. This procedure has been published in the manual of the International Embryo transfer Society (IETS) and is now used world wide as a reference method for the visual evaluation of the quality of bovine embryos.

The aim of Workshop II was to give the participants the opportunity to evaluate in vivo derived bovine embryos according to the IETS scoring system and compare their own evaluation with that of other participants as well as with a panel of experienced practitioners and scientists. Each embryo was additionally evaluated for it's suitability to take a biopsy or to be split. Again two experienced practitioners, taking biopsies on a regular basis, gave their opinion on the probability of being able to successfully take a biopsy from each embryo and explained their preference on which cells they would use as a biopsy. **Ian Kippax**, U.K., **Rainer Saner**, Switzerland, and **Peter Vos**, Netherlands, kindly assisted in the workshop as the experts for embryo evaluation, **Mike Diederich**, Germany and **Serge Lacaze**, France, were responsible for the evaluation of the suitability for taking a biopsy.

Ian Kippax gave a very thorough overview of the IETS system for scoring developmental stage and quality of bovine embryos beforehand. Ian not only described the criteria given by the IETS, he also critically discussed a series of pictures from the IETS and a publication of Gabriel Bo and Rueben Mapletoft, clearly showing that his own experience of many years in the embryo transfer business not always reflected the importance of all criteria used in the IETS system. The significance of the shape of the zona pellucida may be mentioned as one of the points he made, as to where his own experience did not reflect the importance the IETS system gives to this criterion. He also emphasized that judging the percentage of extruded dead cells was a difficult part of the procedure which is an important criterion of the IETS scoring System. He clearly confirmed the subjective nature of this scoring system, which is also emphasized in the IETS Manuel.

After Ian's introduction, the practical part of the workshop began. Frozen in vivo derived bovine embryos were put under a microscope with a camera connected to a beamer, so all participants were able to evaluate the same embryo. The participants were given the opportunity to discuss each embryo in small groups. After the group discussion each participant was asked to give his opinion about the developmental stage, the quality and the suitability for biopsy for each embryo with the aid of a voting system. After completing the voting and showing the results, the panel of experts were asked to give their opinion on the the criteria mentioned above.

The voting as well as the expert opinions clearly emphasized the subjective nature of visual embryo evaluation. There was quiet a wide distribution in the results of the voting system, but most votes usually differed between adjacent categories, and only a small number of votes deviated strongly. The experts were also not not always uniform in their evaluation of the same embryo. The opinions on the suitability for taking a biopsy were further influenced by the technique used to get a biopsy. While teams using an aspiration system preferred a compact Morula, teams using a microblade preferred blastocysts. Regardless of the technique used, the experts emphasized the fact, that extruded dead cells are not suitable for a genomic evaluation of the embryo.

At the end of the workshop a short video

kindly provided by Research Instruments demonstrated taking a biopsy from a blastocyst using a laser based biopsy system. The short movie gave Mike Diederich and Serge Lacaze the opportunity to give a few more tips on the technical demands of different biopsy systems, emphasizing the fact, that both aspiration and microblade Systems can successfully be used. Both experts agreed, that more data are necessary to give a clear picture on the success of freezing and thawing embryos after biopsy.

Visual appraisal of the quality of an embryo is a subjective way of judging the biological competence of that embryo. Experience and constant monitoring of the outcome after transfer can help to standardize the method in each team. But a gap remains between what we can see and the "real biological potential" of an embryo.

IETS System of embryo quality assessment

Code for stage of development

1 = 1-cell (day 1)
2 = 2-16 cells (days 2-5)
3 = Early morula (day 5-6)
4 = Morula (day 6)
5 = Early blastocyst (day 7)
6 = Blastocyst (day 7-8)
7 = Expanded blastocyst (day 8-9)
8 = Hatched blastocyst (day 9)
9 = Expanding hatched blastocyst (day 9-10)

Code for embryo quality

Code 1 = Excellent or Good.

Symmetrical and spherical embryo mass with individual blastomeres (cells) that are uniform in size, color, and density. This embryo is consistent with its expected stage of development. Irregularities should be relative minor, and at least 85% of the cellular material should be an intact, viable embryonic mass. This judgment should be based on the percentage of embryonic cells represented by the extruded material in the perivitelline space.
The zona pellucida should be smooth and have no concave of flat surfaces that might cause the embryo to adhere to a petri dish or straw.

Code 2 = Fair.

Moderate irregularities in overall shape of the embryonic mass or in size, color and density of individual cells.
At least 50% of the cellular material should be an intact, viable embryonic mass.

Code 3 = Poor.

Major irregularities in shape of the embryonic mass or in size, color and density of individual cells.
At least 25% of the cellular material should be an intact, viable embryonic mass.

Code 4 = Dead or degenerating.

Degenerating embryos, oocytes or 1-cell embryos: non viable.

It should be remembered that visual assessment of embryo quality is subjective and thus there may be inherent variation in grades assigned.

2015 PRIZE WINNERS

STUDENT COMPETITION

Chosen by Members of the AETE Board

Winner: Jessie De Bie
University of Antwerp

Email: Jessie.DeBie@uantwerpen.be

THE EFFECTS OF HYPO- AND HYPERGLYCEMIA DURING LIPOLYSIS-LIKE CONDITIONS ON BOVINE OOCYTE MATURATION, SUBSEQUENT EMBRYO DEVELOPMENT AND GLUCOSE METABOLISM

DE BIE J.[1], MAREI W.F.[1,2], DESMET K.L.J.[1], ANDRIES S.[1], STURMEY R.G.[3], BOLS P.E.J.[1], LEROY J.L.M.R[1]

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Elevated follicular NEFA concentrations, commonly present in cattle in NEB or women suffering obesity or type 2 diabetes, are known to disrupt oocyte and embryo development and alter subsequent embryo metabolism. However, these lipolytic metabolic conditions can be associated with both hypo- and hyperglycemia. Both metabolic features may affect oocyte development. Little is known about whether elevated NEFA concentrations in combination with hyper- or hypoglycemic conditions influence oocyte viability. In this study, we hypothesized that glucose interacts with high NEFA concentrations during *in vitro* oocyte maturation to affect developmental capacity and metabolism of the resulting blastocysts.

In total, 647 bovine COCs were matured (3 repeats) under 4 conditions: 1) physiological NEFA (72µM; palmitic, stearic and oleic acid) and routine IVM glucose (GLUC) concentrations (5.50mM) (CNTRL), 2) pathophysiological NEFA (420µM) and routine GLUC (HI NEFA), 3) HI NEFA and high GLUC (10mM) (HI NEFA+HI GLUC) and 4) HI NEFA and low GLUC (2.75mM) (HI NEFA+LO GLUC). Subsequently, matured oocytes were routinely fertilized and cultured for 7 days. At day (D) 7 post insemination (pi) all blastocysts were individually cultured for 24 hours in 4µl drops of modified SOF medium under oil after which droplets were analyzed on GLUC concentrations as described by Guerif *et al.* (PLOSone, 8, e67834, 2013). Cleavage (48h pi), blastocyst rates (D8 pi) and the rates of D8 blastocysts from cleaved zygotes were recorded. Developmental competence and GLUC consumption data were compared between 4 treatments using a binary logistic regression model and mixed model ANOVA, respectively. Replicate, treatment and the interaction of both factors were taken into account (IBM SPSS Statistics 20).

Significant lower cleavage rates were observed for HI NEFA+LO GLUC (56%) compared with CNTRL (73%; P=0.006) and HI NEFA+HI GLUC conditions (70%; P=0.048). At D8 pi, blastocyst rates of HI NEFA+LO GLUC exposed oocytes (18%) were significantly lower compared with CNTRL (38%, P<0.001), whereas development of HI NEFA+HI GLUC D8 blastocysts (25%) tended to be reduced compared with CNTRL (P=0.066). The capacity of cleaved zygotes to develop to blastocyst stage by D8 showed a similar profile: HI NEFA+LO GLUC (32%) significantly reduced and HI NEFA+HI GLUC (35%) tended to reduce development compared with CNTRL (53%; P=0.024 and P=0.066, respectively). Interestingly, with no significant difference in developmental stage at D7, these HI NEFA+LO GLUC blastocysts consumed significantly less GLUC from D7 to D8 (12.14 ± 4.10 pmol/embryo/h) compared with CNTRL (25.53 ± 2.96 pmol/embryo/h; P=0.020), whilst GLUC consumption of blastocyst originating from HI NEFA+HI GLUC exposed oocytes (22.35 ± 3.13 pmol/embryo/h) was similar to CNTRL.

In conclusion, low GLUC concentrations seem to be more deleterious than high GLUC concentrations in the presence of elevated NEFAs in terms of embryo development and the lower ability of the surviving D7 embryo to consume GLUC as an energy source for its further development. Additionally, most recent research pointed out that the successful developed D8 blastocysts originating from HI NEFA+HI GLUC exposed oocytes showed an increased trophectoderm/inner cell mass ratio, indicating lower blastocyst quality, which was not evident in surviving blastocysts from HI NEFA+LO GLUC treated oocytes.

These data are part of a PhD thesis in which strategies are being explored to neutralize this maternal metabolic stress on oocyte and embryo physiology. For updates in this research field, please visit https://www.uantwerpen.be/en/rg/vpb/

Jessie wins €750 plus free registration to our next annual meeting.

Best Oral Presentation

Chosen by: Giovanna Lazzari, Andrea Lucas-Hahn, Sybrand Merton

Winner: Marta de Ruijter Villani
DVM, PhD, Dipl. ECAR, KNMvD Specialist Equine Reproduction
Assistant Professor in Equine Reproduction
Department of Equine Sciences, Section Reproduction and Obstetrics
Faculty of Veterinary Medicine, Utrecht University
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Email: M.Villani@uu.nl

Marta wins €250 plus free registration for our next annual meeting

Best Poster Presentation

Chosen by: Christine Wrenzycki, Hiemke Knijn, Joana Peippo

Winner: Christoph Richard
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Christoph wins free registration for our next annual meeting

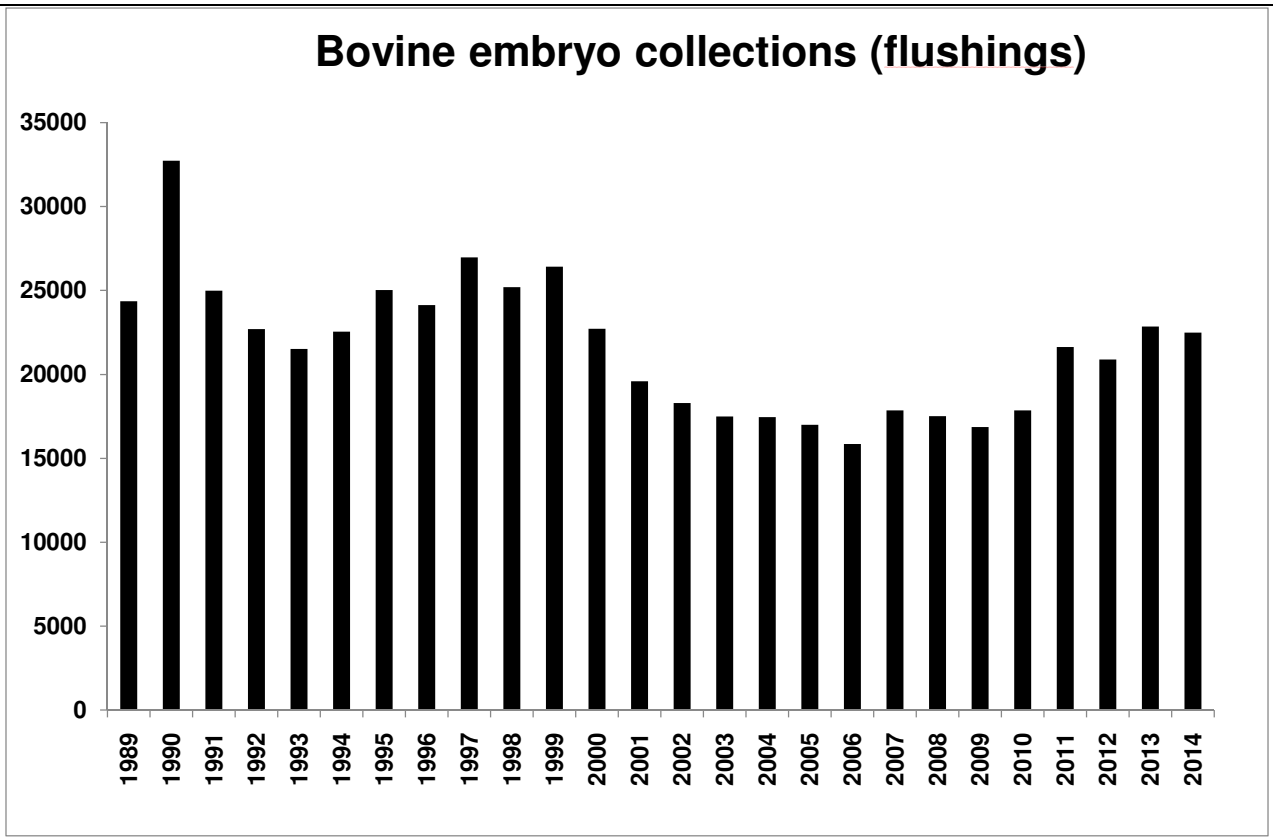
European statistical data on Bovine Embryo Transfer Activity 2014

Marja Mikkola

The embryo transfer activities in Europe, as presented during the 31st AETE meeting in September 2015 in Ghent, Belgium, are summarised in this report. The presented data are based on embryo transfer activities for breeding and commercial embryo production reported by 31 European countries (countries that have at least part of their territory in Europe). The presented data include numbers on embryo production (MOET and OPU-IVP) and transfers for bovine and other species (sheep, swine, goat and horse). These data are included in the report of the International Embryo Transfer Association (IETS Data Retrieval Committee) on embryo transfer activities worldwide. Also, data concerning embryo sexing and genotyping is included in this report.

Embryo production

The total number of embryo collections from superovulated donors was 22,490. Of all collections, 80% were performed on dairy breeds, 15% on beef breeds and 5% on dual purpose breeds. This resulted in production of 138,418 transferable embryos, an increase compared to last year. The mean number of transferable embryos per collection was 6.15. The results of embryo collections on 2014 and previous years are shown in Figure 1.



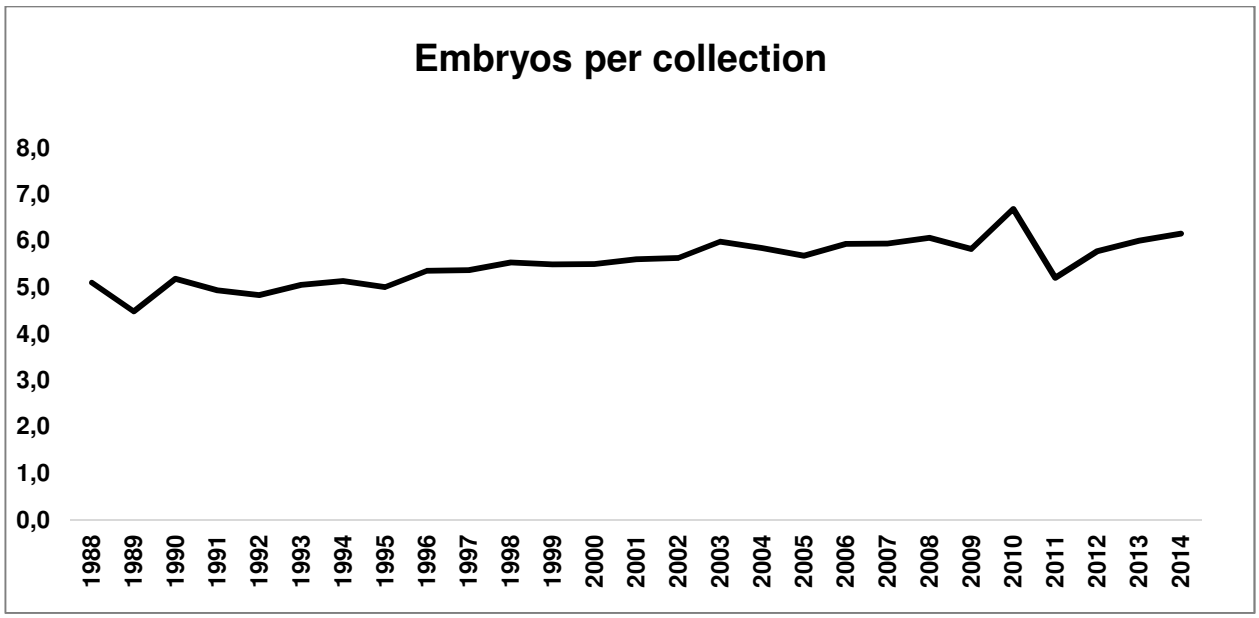
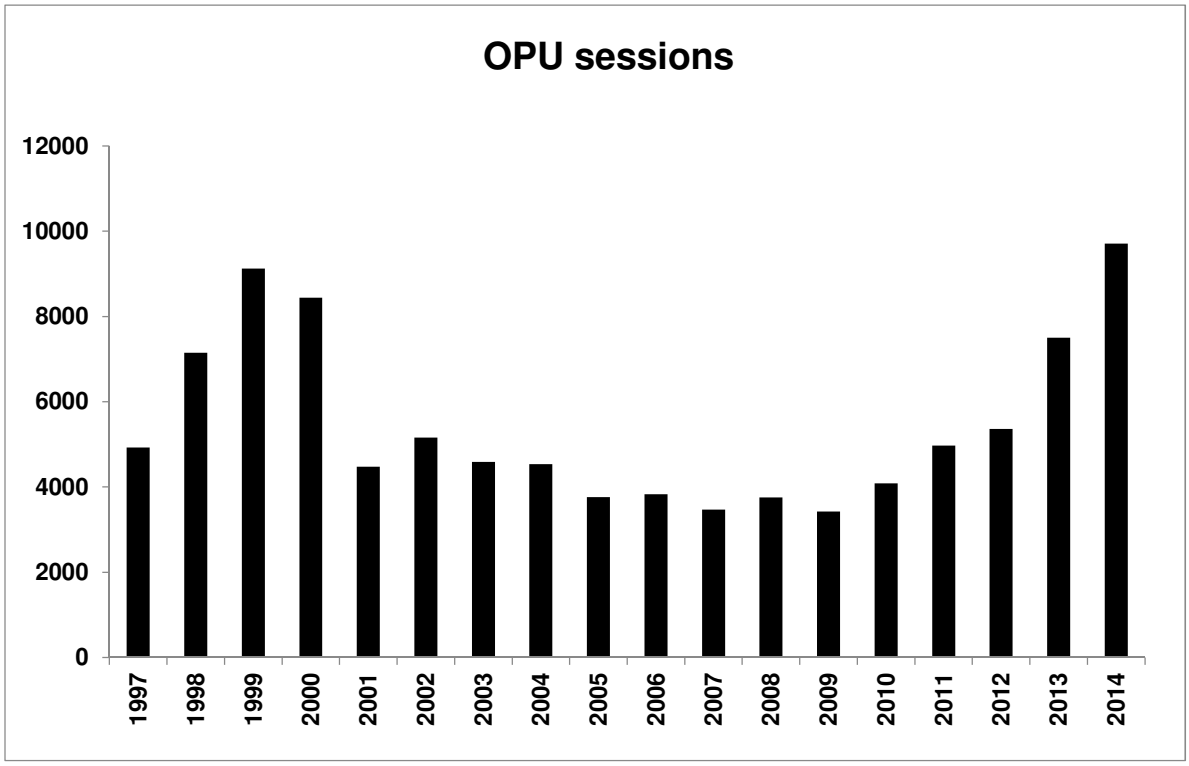


Fig. 1: In vivo embryo production in Europe (number of collections and number of embryos per collection).

Seven countries applied OPU on cattle for commercial reasons in 2014 (France, Germany, Italy, The Netherlands, Portugal, Russian Federation and Spain). The total number of OPU sessions was 9,710, a 29% increase compared to last year. This resulted in a production of 15,693 transferable embryos. The mean embryo production was 1.6 embryos per session. In addition to bovine OPU, there was one country, Italy, reporting activity in equine OPU, with 195 OPU-ICSI sessions. Bovine OPU-IVP results from 2014 and previous years are shown in Figure 2.



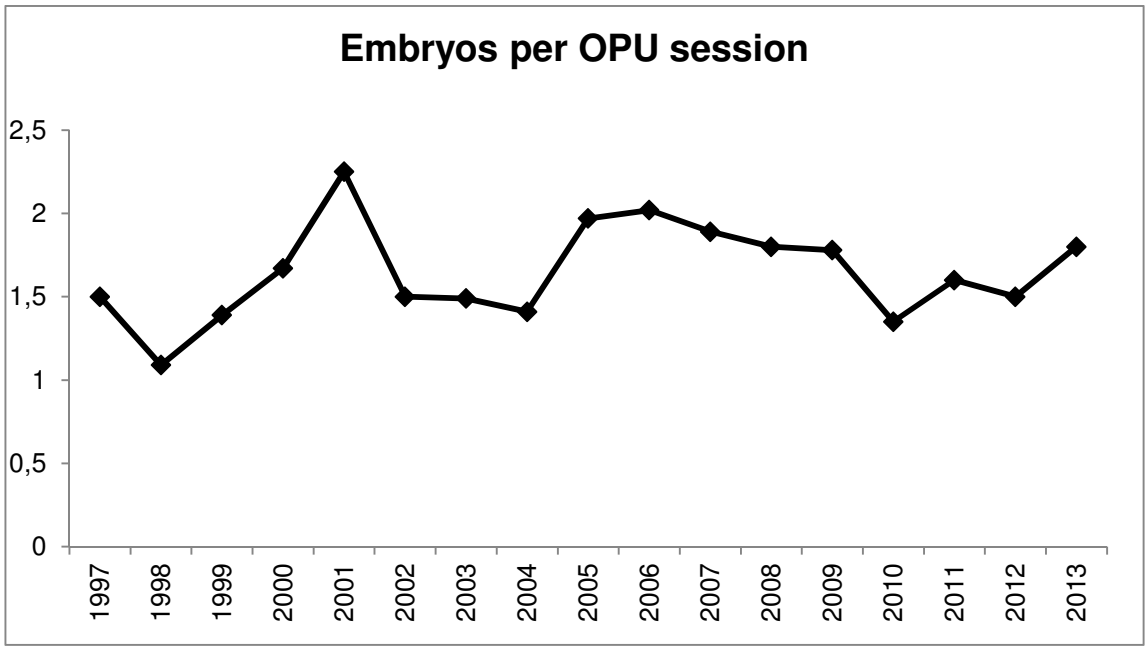


Fig. 2: In vitro embryo production in Europe (number of OPU sessions and number of embryos per session).

Embryo transfers

The number of embryos transferred amounts to 137,802, an increase compared to last year (Figure 3). The proportion of IVP embryos of all transfers was 10.5%. The proportion of frozen embryos was 52% and 21% for *in vivo* and *in vitro* embryos, respectively. More *in vivo* embryos were transferred fresh compared to previous years, as there was an increase of 10 percentage points in the proportion of fresh embryos.

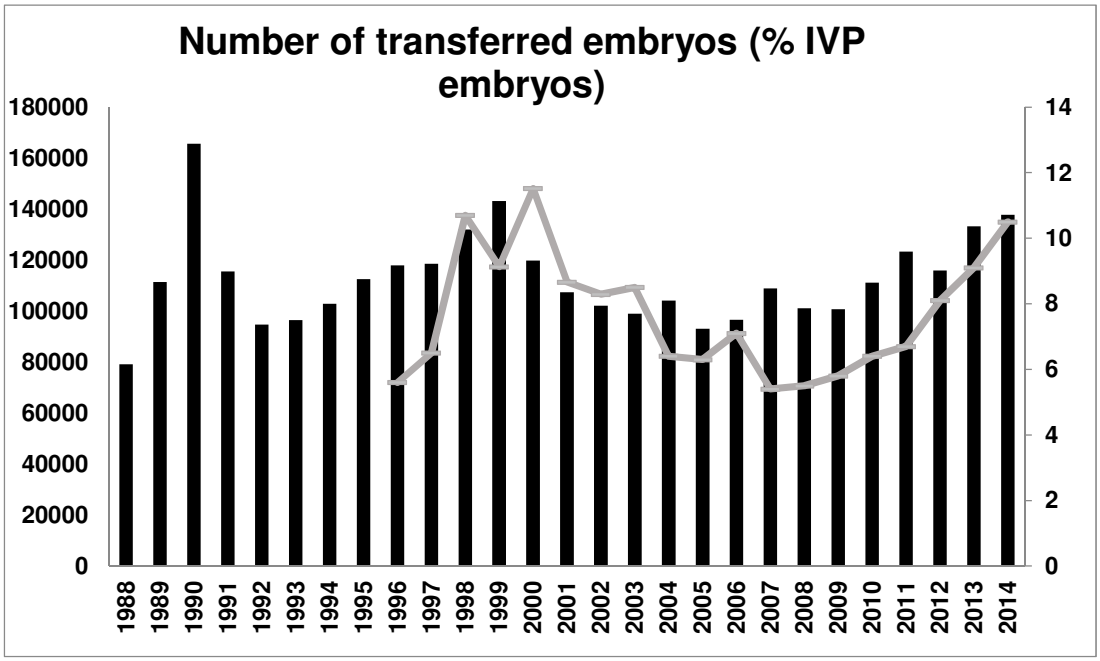


Fig.3: Total number of embryos transferred in Europe with the percentage of IVC embryos.

The European countries that transferred more than 1000 embryos in 2014 are listed in Table 1 together with the number of transfers in 2013.

Table 1: The European countries with more than 1000 embryos transferred in 2014.

Country	Transfers 2014	Transfers 2013
The Netherlands	37,923	36,964
France	37,347	35,205
Germany	21,897	21,502
Italy	7,573	5,996
Belgium	6,751	4,876
Russian Federation	4,171	2,148
Denmark	3,712	3,581

Spain	3,710	3,209
Finland	3,283	2,973
Switzerland	2,929	2,210
Ireland	2,231	no data reported
Austria	1,456	998
Luxemburg	1,430	no data reported

Other data

In the yearly survey questions concerning the use of sexed semen in embryo production, as well as the number of genotyped embryos are included. Eleven countries reported the use of sexed semen in MOET. The use of sexed semen represents 4.3% of donors. Embryo sexing by biopsy was applied in three countries (France, Germany and The Netherlands). A total of 1782 embryos were sexed and from those 1472 embryos genotyped.

Other species

Data for embryo transfer activities in sheep, swine, goat and equine are shown in Figure 4. This year only 5 countries reported embryo activities in species other than bovine. Embryo activities were reported in sheep, horses and swine. No activities were reported in goats. There are large fluctuations in activities over the years probably caused by incomplete data collection.

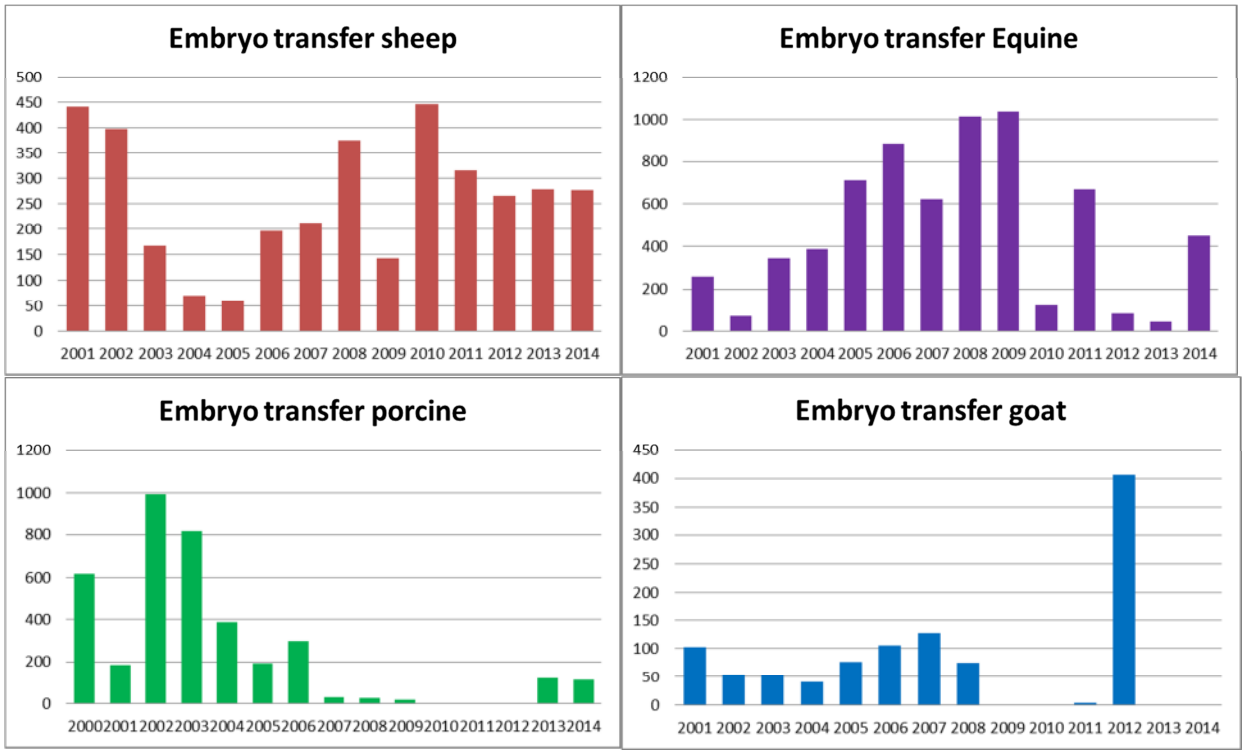


Fig. 4: Number of embryos of other species transferred in Europe.

Summary

- This year the data were collected in 31 countries, of which 27 reported activity.
- The number of embryos transferred in Europe has been increasing the last years both for in vivo as in vitro embryos.
- Number of OPU-sessions has been increasing markedly, as well as the proportion if IVP embryos of all embryo transfers.
- The activities in other species than bovine that are reported to AETE fluctuate a lot. It is very challenging to collect the data of other species. AETE members having contact information in their countries to persons performing ET in other species are encouraged to contact either their national data collector or AETE data collector to share their contact information.

Acknowledgements:

I would like to thank all participants who made the effort to collect the embryo transfer statistics for their country and helped AETE to make an overview of the activities in Europe. If you have any suggestions or questions concerning data collection please do not hesitate to contact AETE data collector (marja.mikkola@ faba.fi)

INVITATION TO BARCELONA 2016!

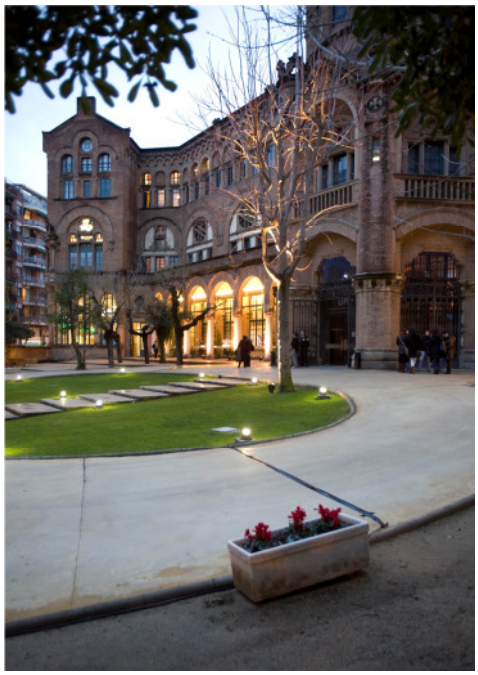
On behalf of the European Embryo Transfer Association, the local organizing committee cordially invites you to the 32nd scientific meeting in Barcelona, Spain, from the 9th to the 10th of September 2016.

Panoramic view of Barcelona
Author: Espai d'Imatge
Copyright: Turisme de Barcelona

The Local Organizing Committee will be chaired by **Dr. Teresa Mogas**, Universitat Autònoma de Barcelona, Spain.

The Conference Location

In 2016, the meeting will take place in Barcelona, at the "Casa de la Convalescència-UAB". The Casa de Convalescència, one of the last great works of Catalan Modernism, forms part of the complex of the Hospital de la Santa Creu i Sant Pau. The complex was designed in the late 19th century to alleviate the shortage of hospital space in Barcelona. The building, which was used for convalescent patients, with a maximum capacity for 100 residents, featured stunning glazed solariums and a chapel, which split the building into two wings, one for men and one for women. The whole hospital complex, including the Casa, was declared Historical Artistic Monument in 1978 and World Cultural Heritage Site by UNESCO in 1997.
http://www.uab-casaconvalescencia.org/en/index.php?lg=en



Main entrance of the Casa de la Convalescència.

Aula Magna of the Casa de la Convalescència

Welcome to Barcelona: Some reasons to come to Barcelona.

Barcelona is one of the most visited cities in Europe, both by tourists who travel for pleasure

or for business visitors who travel for conferences, meetings or all kinds of cultural exhibitions. Barcelona is a great city that it is worth visiting. But, what is so special about Barcelona? Here there are some reasons to visit Barcelona.

Weather

The weather in Barcelona is always mild all year around so do not matter if you're coming in the summer or toward the coldest seasons, so you can always enjoy the sun and its beautiful beaches. Its average annual temperature is 21 °C during the day and 14 °C at night. The coldest temperatures during the year are usually from December to February, in which the average temperature is between 10 and 12°C. The warmest month is usually August, with temperatures around 29°C. In September, the temperature usually ranges from 26 °C during the day to 18°C at night.

Architecture and Cultural Exhibitions

Barcelona is as the capital of Modernism and you can find many monuments built and designed by famous architect **Antoni Gaudi.** The most impressive Gaudi's works to visit are: the **Sagrada Familia, La Pedrera, Casa Batlló** and **Park Güell**. In addition, it is worth visiting the Gothic quarter where you can still visit parts of the Roman walls, Las Ramblas street, the Barcelona cathedral and the famous gothic Santa Maria del Mar church.

Moreover, you can also enjoy some of the many art galleries and museums in Barcelona like MACBA (Museum of Contemporary Art of Barcelona), the Picasso Museum, the Miró Foundation and the MNAC (Museu Nacional d'Art de Catalunya).

http://www.barcelonaturisme.com/wv3/en/

Gothic Quarter
Author: Espai d'Imatge
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Gastronomy

Barcelona's food scene is creative and eclectic, fusing Catalan and Spanish traditions with worldwide and cutting-edge techniques and flavors. You will find both Spanish favorites such as P*aella* and *Tapas*, along with innovative takes based on the Mediterranean diet with a lot of **vegetables, seafood, fresh fruits, bread and olive oil**. There are many food markets around the city (the Boqueria Market, among others) as well as great restaurants with typical cuisine.

These are some of reasons to visit Barcelona, but for sure you will find more reasons to come to Barcelona. We look forward to meeting you in Barcelona next September. Don't hesitate and start planning your trip because the AETE meeting, the social events and the city are worth it!

The scientific program of the AETE meeting will soon be available on the website (http://www.aete.eu/)

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How to travel to Barcelona?

By plane, car or train… even by boat!

Plane

Barcelona-El Prat international airport, with two large passenger terminals, is 16 kilometers south of the city. Different airlines offer direct flights all over Europe. Intercontinental flights usually stop over Madrid or other European capitals but there are direct connections with various cities around the world. Barcelona can also be reached by transport links from other three regional airports: Girona-Costa Brava, Reus and Lleida -Alguaire.

Train

Barcelona has direct railway links with the rest of Spain and several major European cities. The high-speed train service connects the city with Madrid, the southern and eastern Spain and France

Car

Barcelona has an extensive road and motorway network linking it to the rest of Spain. The border with France is only 150 kilometers away.

Bus

You can easily get to Barcelona by bus from Europe, North Africa and the rest of Spain. The bus station in Barcelona that has the most national and international connections is Barcelona Nord Bus Station. Buses also depart from Barcelona Sants station and other areas of the city.

Boat

Barcelona has become the Mediterranean's foremost cruise ship harbor. It has connections with the Balearic Islands and the main Mediterranean harbors.

http://www.barcelonaturisme.com/wv3/en/page/31/how-to-get-there.html

We look forward to seeing you in 2016 in Barcelona

Local Organizing Committee

UPCOMING EVENTS

IETS

23-26 January 2016

42nd Annual Conference of the International Embryo Transfer Society

Galt House, Louisville, Kentucky, USA

www.iets.org/2016

Programme: http://www.iets.org/2016/2016_Program.pdf?v3

EPICONCEPT 2016

18-19 May 2016

Cross-species Epigenetics, Gametogenesis and Embryogenesis

Velingrad, Bulgaria

http://cost-epiconcept.eu/workshop_2016.html

ICAR

26-30 June 2016

18th Annual Congress of Animal Reproduction

Tours, France

http://www.icar2016.org/events.php?IDManif=880&IDModule=71&IDRub=1583

Satellites

10th Biennial Conference **Association for Applied Animal Andrology**

June 24-26, 2016

Tours, France

www.animalandrology.org

The **8th Quadrennial INTERNATIONAL SYMPOSIUM ON CANINE AND FELINE REPRODUCTION**

June 26-30, 2016 Tours, France

http://www.ivis.org/iscfr/2016/

The International Equine Embryo Transfer Symposium

July 1-3, 2016; Ghent, Belgium

The 3rd Camelid reproduction satellite meeting of the 18th International Congress of Animal Reproduction

1-3 July 2016; Tours, France

SBTE

August 25-28 2016 – No further details; keep checking: www.sbte.org.br

AETA & CETE/ACTE JOINT CONVENTION

2016 AETA & CETA/ACTE Joint Convention
September 29 - October 1, 2016
Marriott St. Louis Union Station
St. Louis, Missouri, USA

http://ceta.ca/future-conventions.html

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