

DEAR READER,

In 2007 we achieved our goal for the number of minipigs sold, and we expect our annual report to be satisfactory as well. Our budget for 2008 includes two new significant accounts: one earmarks resources for the construction of a third barrier facility to increase our production capacity by 70–80%; the other for generating more background knowledge of the Göttingen Minipig.

The drawings for Barrier 3 are completed and the groundbreaking will be this spring. We expect Barrier 3 to be completed by late 2008 or early 2009. While the construction is going on, we will select a new herd of breeders in Barrier 2 and prepare them to be moved to Barrier 3 when it is completed. In order to start up production as quickly as possible in Barrier 3, many of the new breeders will be pregnant when moved. In so doing, we will soon have newborn minipigs in the third barrier and will be able to meet the expected rise in demand. Until Barrier 3 is completed and in full production, we have sufficient capacity in the two existing barriers to meet the demand for microbiologically-defined Göttingen Minipigs.

The quality of the minipigs we deliver to you is not just based on our high standard of health, the service we provide or the genetic definition of the minipigs; it is also a matter of how much knowledge about the minipigs we can provide. As we want to increase these data, we have analysed the need for more information in specific minipig areas. We will soon have defined the final areas

of information we need for gathering more information and will invest the resources required for generating more background knowledge. These data will be at your disposal as soon as they are available, thus making the Göttingen Minipig an even better model for your studies.

The EU-funded Rethink project about the use of minipigs in drug development, safety assessment, genomic toxicology, etc., is completed, and the project results will be presented at the Society of Toxicology annual meeting in Seattle, USA, on Wednesday 19 March from 5–7 p.m. at the Sheraton Seattle Hotel. The project has identified the available knowledge about minipigs as toxicity models for testing new medicines and chemicals. Also, the areas where more information about minipigs is needed will be presented. The usefulness and acceptance of this animal model among regulators and biomedical researchers is also a part of the presentation. We look forward to having this project presented to the scientific community, and I hope you will have the opportunity to see the presentation. If you do not, the final report and information about the project will be available at the Rethink website www.rethink-eu.dk

We look forward to providing more background information about the Göttingen Minipig to you, as well as showing you our new facilities once they are completed.

Jens Ellegaard, Managing Director

RETHINK

Presentation of the **EU-funded Project Report** on
**Minipigs as models for the toxicity testing of new medicines and chemicals:
impact assessment**

at SOT-2008 in Seattle, Wednesday March 19th, 5-7PM, at the Sheraton Seattle Hotel,
1400 Sixth Avenue, Seattle, WA.

- Topics are
- Ethics
 - Welfare
 - Safety testing issues
 - Genomics and emerging technologies issues
 - Development of new medicines/chemicals

After this presentation the report will be available at www.rethink-eu.dk

Clean pigs for clear results



Minipigs

Biological products

Auxiliary equipment

Training & Courses

MINIPIG RESEARCH FORUM (MRF)

The use of Minipigs has been increasing steadily over the years and we believe the time is ripe for setting up a forum where people working with Minipigs can meet to exchange ideas and knowledge, so we all may become better at what we do. It is our hope that this forum will become a user-driven entity. We strongly believe that this is the best way to ensure scientific integrity, and we hope that you share this view and will engage in and support this forum wholeheartedly.

The first meeting of the Minipig Research Forum took place in Copenhagen on 5–6 December 2007. Sixty-eight attendees listened to fifteen presentations covering basic biology and behaviour as well as housing, handling and dosing. A wonderful after-meeting dinner gave ample time for attendees to socialise and mingle – an important part of the MRF.

At last year's meeting, a number of people volunteered to join the Steering Committee and help to organize the 2008 meeting. The organization of the 2008 meeting in Copenhagen is already in progress, and we believe we will have an interesting programme, so please reserve the dates of 5–6 November 2008.

For further details, visit: www.minipigresearchforum.org.

See you in 2008!
The MRF Steering Committee

BACKGROUND DATA

The Göttingen Minipig has been used in biomedical research for many years and much is known about its applications in various fields of research. Still there are many areas where more, better or perhaps new and updated information is warranted. Ellegaard Göttingen Minipigs A/S is in the process of collecting background data and has allocated a substantial amount of resources for this purpose in 2008 and 2009.

If you think that important background data may be missing in your field of research, please let us know by sending an e-mail to ncg@minipigs.dk, stating why this information is important and how it could improve the use of the Minipig in biomedical research. We will then include this information when deciding on our areas of focus.

FEEDBACK ON ANAESTHESIA AND SURGERY COURSE

In September 2007 a colleague and myself attended the Ellegaard Anaesthesia and Surgery of Minipigs course. Ellegaard lies inconspicuously in the Danish countryside and has a relaxed and friendly atmosphere where the staff were warm, welcoming and openly enthusiastic about having visitors to attend their course.

During the morning of day 1 we were offered the opportunity to learn about the handling and dosing of Minipigs both in theory and practise, while in the afternoon we covered theory of surgery and anaesthesia. Jette Jensen, our tutor for the handling session put not only the Minipig but also ourselves at ease and demonstrated just how amiable these animals are to work with.

Tony Webb, whose vast experience as a veterinary surgeon was apparent, led the afternoon session. He covered aspects ranging from pre and post-operative management of the Göttingen Minipig to physiological recording and telemetry. Some time before the course Tony invited us to suggest particular techniques or areas of interest we wished to cover in addition to the core skills covered by the course, which was an excellent way of ensuring specific questions arising from our own work were addressed.

Day 2 was devoted to putting the theory into practise and our small group size allowed for a very "hands on" approach which for me was the best aspect of the course. We covered preparation of the Minipig for surgery, pre-med administration, endotracheal intubation and maintenance of anaesthesia then care and welfare of the anaesthetised animal.

With our expert tutor we learned about the anatomy of the Minipig and covered various surgical procedures including implantation of catheters, vascular access ports and telemetry devices then moved on to some specific surgical procedures that we had included in our wishlist before the course. The influence of this part of the course was to "learn by doing" in a friendly and fun atmosphere where we were invited to ask questions, make mistakes and more importantly gather invaluable experience to take home.

Certain aspects of this course were directly transferable to our current work and allowed for refinement of our current practise. Other techniques will be applicable as we move further with our studies such as the benefits of habituation, particularly when using an amenable species such as the Minipig.

Specifically tailored to our needs this course was run by professional, enthusiastic and gracious hosts with whom we have forged a relationship that offers their invaluable experience as a very useful resource for our future work.

*By: Anika Stewart, Principal Scientist
at a British Biotechnology Company*

SURGERY COURSE DATES 2008	■ 9-10 April	For further information or if you would like to sign up for a course, please visit www.minipigs.dk .
	■ 21-22 May	
	■ 3-4 September	Please contact Ellegaard Göttingen Minipigs at ellegaard@minipigs.dk if you need further details on the course programme, or if you have any specific questions.
	■ 12-13 November	

SUPPLYING SURGICALLY PREPARED ELLEGAARD GÖTTINGEN MINIPIGS

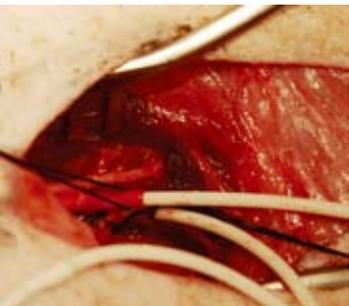
Surgical implantation of intravenous catheters and vascular access ports (VAPs) is often necessary to facilitate experiments requiring frequent blood sampling or intravenous dosing in minipigs. Many of our customers perform the operations in their own laboratories but from time to time Ellegaard Göttingen Minipigs A/S receives enquiries about the supply of surgically prepared minipigs. During the last year we have been exploring ways to meet requests for minipigs with pre-implanted venous catheters and VAPs.

This aim is simultaneously an act of "Refinement" according to the 3R Principle in the biomedical research.

We gave careful consideration to performing the surgery within our barrier breeding units but early on decided that while this was an attractive proposition, the additional movement of personnel through the barrier along with the items of equipment and materials required for an operating theatre would compromise the microbiological integrity and efficiency of the barrier buildings. Next we explored the possibility of performing surgery at a third party facility before finally shipping pigs to the end user after completion of surgical recovery. This more complex approach is expensive and also carries a significant risk of compromising pigs' health status and welfare by the additional journey and facility moves.

Our solution to providing surgically prepared pigs is to perform the surgery at the customer's facility following delivery, acclimation and training of the pigs. Ellegaard Göttingen Minipigs A/S will assist customers with setting up the necessary facilities to carry out surgery if required, perform the surgery, provide education and training for personnel and provide follow up advice on the care and use of animals. We have now completed our first project to supply minipigs with VAPs for blood sampling in pharmacokinetic and pharmacodynamic studies by performing surgery at the customer's laboratory. This has allowed our customer to access a new animal model to enhance their research effectiveness. Ellegaard Göttingen Minipigs A/S can either continue to carry out surgical preparation on a regular basis at the customer's laboratory or train users in VAP implantation if required in their own facilities.

If you are interested in obtaining Göttingen Minipigs with VAPs implanted, or other surgical preparation, please contact Ellegaard Göttingen Minipigs A/S. Remember also that implantation of venous catheters and VAPs is taught in our "hands on" courses on anaesthesia and surgery at the breeding facility in Dalmose on a regular basis.



HANDLING AND DOSING COURSES

Jette Jensen, who has been running the handling and dosing courses at Ellegaard for the past few years, has chosen to seek new horizons. Therefore Ellegaard has found a replacement to continue her fine efforts to train our customers and other interested parties in how to work with Minipigs. The choice fell on Adrian Zeltner, who has been employed at Ellegaard for the past three years, where he has been working as an animal caretaker in the barriers and has been in charge of the daily maintenance of the animal rooms. This work has given Adrian extensive experience in the daily handling of the Minipigs as well as in solving practical tasks inside the facility. You will benefit from both capabilities when participating in a handling and dosing course or having Adrian visit your facility to give advice on practical aspects of using Minipigs.

Adrian was born in Switzerland, where he became a qualified laboratory technician at Ciba Geigy (Novartis). From 1990 to 2004 Adrian lived in New Zealand, after which he and his Danish wife settled in Denmark. Adrian speaks fluent English, Danish and German and also has a fine command of French and Italian. His linguistic skills will definitely be a great advantage when communicating with our customers.

After an intensive training period, Adrian has been running handling and dosing courses at a pharmaceutical company and two CROs in January and February 2008, and the feedback from each course was very positive. These courses can either take place on your premises or at Ellegaard in Denmark. If you are interested in learning more about our free handling and dosing courses, please send an e-mail to ellegaard@minipigs.dk.

Besides running the handling and dosing courses, you will also be able to meet Adrian at some of the major conferences in laboratory animal science around Europe. If you plan to attend one of these conferences, please take the time to visit Ellegaard's stand and have a talk with Adrian.



ELLEGAARD GÖTTINGEN MINIPIGS DVDS AVAILABLE

The Göttingen Minipig – Handling and Dosing

This DVD is now available in a German language version as well as in French and English. It is a unique tool for those who work with the Göttingen Minipig. Price each € 90 excl. shipping and handling.

The Göttingen Minipig – Histology

This DVD allows users to familiarize themselves with the normal histology of the Göttingen Minipig. Price each € 65 excl. shipping and handling.

Please do not hesitate to contact us for further information at ellegaard@minipigs.dk or phone +45 5818 5818.



MEETING CALENDAR	NAME	DATE	PLACE
	SOT ToxExpo	17 – 19 March 2008	Seattle, USA
	Swine in Biomedical Research Conference (NSRRC)	2 – 3 April 2008	San Diego, USA
	BTS (British Toxicology Society)	7 – 9 April 2008	Guildford, Surrey, UK
	Scand-LAS	8 – 11 May 2008	Tartu, Estonia
	AFSTAL	4 – 6 June 2008	Strasbourg, France
	GV-SOLAS	14 – 17 September 2008	Dresden, Germany
	ETS (European Teratology Society)	21 – 24 September 2008	Edinburgh, Scotland
	SPS (Safety Pharmacology Society)	22 – 25 September 2008	Madison, WI, USA
	ESTP (European Congress of Toxicologic Pathology)	24 – 26 September 2008	Edinburgh, Scotland
	EUROTOX	5 – 8 October 2008	Rhodes, Greece
	ACT (American College of Toxicology)	9 – 12 November 2008	Tucson, Arizona, USA
	LASA	19 – 21 November 2008	Scotland

HEALTH MONITORING REPORT

The latest test results can be found at www.minipigs.dk Quality HMR. No changes have been recorded since the previous Newsletter.

NEW ARTICLES ABOUT MINIPIGS

- Kurome M, Ishikawa T, Tomii R, Ueno S, Shimada A, Yazawa H, Nagashima H, 2008. Production of Transgenic and Non-Transgenic Clones in Miniature Pigs by Somatic Cell Nuclear Transfer. *Journal of Reproduction and Development*, Feb 25 [Epub ahead of print].
- Edwards JM, Alloosh MA, Long XL, Dick GM, Lloyd PG, Mokolke EA, Sturek M, 2008. Adenosine A1 receptors in neointimal hyperplasia and in-stent stenosis in Ossabaw miniature swine. *Coronary Artery Disease*, 19(1), 27-31.
- Mai R, Reinstorf A, Pilling E, Hlawitschka M, Jung R, Gelinsky M, Schneider M, Loukota R, Pompe W, Eckelt U, Stadlinger B, 2008. Histologic study of incorporation and resorption of a bone cement-collagen composite: an in vivo study in the minipig. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics*. 105(3):e9-14
- Evans RA, Jakubowski EM, Muse WT, Matson K, Hulet SW, Mioduszewski RJ, Thomson SA, Totura AL, Renner JA, Crouse CL, 2008. Quantification of Sarin and Cyclosarin Metabolites Isopropyl Methylphosphonic Acid and Cyclohexyl Methylphosphonic Acid in Minipig Plasma Using Isotope-Dilution and Liquid Chromatography-Time-of-Flight Mass Spectrometry. *Journal of Analytical Toxicology* 32(1), 78-85.
- McGuire JM, Byers CE, Hulet SW, Jakubowski EM, Thomson SA, 2008. Rapid and Sensitive Technique for Assessing Exposure to VX via GC-MS-MS Analysis. *Journal of Analytical Toxicology* 32(1), 63-7.
- Byers CE, McGuire JM, Hulet SW, Burnett DC, Gaviola BI, Jakubowski EM, Thomson SA, 2008. Gas Chromatography-Tandem Mass Spectrometry Analysis of Red Blood Cells from Göttingen Minipig(R) following Whole-Body Vapor Exposure to VX. *Journal of Analytical Toxicology* 32(1), 57-62.
- Roldán JC, Kneuppel H, Schmidt C, Jepsen S, Zimmermann C, Terheyden H, 2008. Single-stage sinus augmentation with cancellous iliac bone and anorganic bovine bone in the presence of platelet-rich plasma in the miniature pig. *Clinical Oral Implants Research* Feb 6 [Epub ahead of print].
- Köhn F, Sharifi AR, Täubert H, Malovrh S, Simianer H, 2008. Breeding for low body weight in Goettingen minipigs. *Journal of Animal Breeding and Genetics* 125(1), 20-8.
- Liu Y, Zheng Y, Ding G, Fang D, Zhang C, Bartold PM, Gronthos S, Shi S, Wang S, 2008. Periodontal Ligament Stem Cell-mediated Treatment for Periodontitis in Miniature Swine. *Stem Cells* Jan 31 [Epub ahead of print].
- Okumi M, Fishbein JM, Griesemer AD, Gianello PR, Hirakata A, Nobori S, Moran S, Samelson-Jones E, Shimizu A, Sachs DH, Yamada K, 2008. Role of persistence of antigen and indirect recognition in the maintenance of tolerance to renal allografts. *Transplantation* 85(2), 270-80.
- Wimmers K, Kumar KG, Schellander K, Ponsuksili S, 2008. Porcine IL12A and IL12B gene mapping, variation and evidence of association with lytic complement and blood leucocyte proliferation traits. *International Journal of Immunogenetics* 35(1), 75-85.
- Wimmers K, Ngu NT, Jennen DG, Tesfaye D, Murani E, Schellander K, Ponsuksili S, 2007. Relationship between myosin heavy chain isoform expression and muscling in several diverse pig breeds. *Journal of Animal Science* Dec 21 [Epub ahead of print].