



**Ellegaard**  
GÖTTINGEN MINIPIGS

Previously published issues are found on [www.minipigs.dk](http://www.minipigs.dk)

# Newsletter 26

January 2007

**DEAR READER,**

I would like to wish all of you a Happy New Year.

2006 was a good year for our company. We achieved our targets for the number of minipigs sold and for annual turnover. The high level of health in both barrier breeding facilities was maintained through the efforts of our talented and dedicated employees, enabling us to continue delivering high quality Göttingen Minipigs. Marshall Bioresources, USA, has also seen an increased demand for the Göttingen Minipig in the North American market, a development we are very pleased with.

We have been contacted by a wide range of research areas and asked to participate in research projects. This will enable us to obtain more background information on the Göttingen Minipig, from which new research models will hopefully evolve.

Together with four public research institutions and three industrial partners, Ellegaard Göttingen Minipigs has been asked to participate in a project where one of its two goals is to develop genetically modified disease models in minipigs. The partners fund half of the project and the Danish Advanced Technologies Foundation funds the other half. This project will open up new perspec-

tives for shortening the development time for new and more effective ways of treating widespread chronic diseases like cardiovascular disease, diabetes and presenile dementia and skin disorders like psoriasis. The results of the early stage of this project are promising and we look forward to a hopefully successful outcome.

Lately we have noticed a significant increase in the demand for older minipigs. Until recently, our supply of older minipigs has been sufficient, but a bottleneck has now developed. Our top priority is to have enough 3–6 month-old minipigs at all times, the age group in greatest demand by our customers. Previously, the number of unsold minipigs at this age was sufficient to meet the demand for older minipigs. If you already know you will be needing older minipigs for an upcoming study, please reserve them with us as soon as possible. We are contemplating the need to introduce a boarding fee for housing “reserved” older minipigs, but this will guarantee you your minipigs at the age you require.

We look forward to the challenges facing our company in 2007, where we will do our best to have the facilities and staff needed for providing the service our customers expect.

Jens Ellegaard, Managing Director

## CONTENTS OF THIS ISSUE

**DEAR READER** ..... 1

**HANDLING AND DOSING DVD** ..... 1

**CLICKER-TRAIN YOUR GÖTTINGEN MINIPIGS: FAQ** 2

**TRAINING THE MINIPIG IN AN OLFACTOMETER** .. 3

**SURGERY AND ANAESTHESIA COURSES AT ELLEGAARD** ..... 4

**THE GÖTTINGEN MINIPIG: HISTOLOGY** ..... 4

**CALL FOR SLIDES** ..... 4

**PRODUCTION STORIES** ..... 5

**HEALTH MONITORING REPORT** ..... 5

**NEW ARTICLES** ..... 5

**NEW BOOK RELEASES** ..... 5

**MEETING CALENDER** ..... 6

### Handling and Dosing DVD – Now ready!

With this DVD you can familiarize yourself with some basic handling and dosing procedures when working with the Göttingen minipig. The DVD covers taking a pig out of a transport box, approaching and carrying, examination on a table as well as blood sampling, oral dosing, placing the minipig in a sling and intramuscular injection.

The DVD is meant as a tool for teaching and demonstrating these procedures but Ellegaard Göttingen Minipigs ApS recommends that people who have not been working with the Göttingen Minipigs before attend a Handling and Dosing Course. For more information on these courses, please contact Ellegaard Göttingen Minipigs at [ellegaard@minipigs.dk](mailto:ellegaard@minipigs.dk)

To order a copy, please contact Ellegaard Göttingen Minipigs at [ellegaard@minipigs.dk](mailto:ellegaard@minipigs.dk) or call +45 5818 5818. The cost is €90 (+ shipping and handling)

Clean pigs for clear results



Minipigs

Biological products

Auxiliary equipment

Training & Courses

## CLICKER-TRAIN YOUR GÖTTINGEN MINIPIGS: FAQ

### What is Clicker Training?

Clicker training is an animal-training system that combines aspects of operant and Pavlovian conditioning to train animals humanely and quickly using a clicker and food rewards.

### Why is Clicker Training better than simply using food rewards?

Although food rewards are an effective motivator, it is difficult for the animal to determine the exact behavior that is being rewarded. Using the clicker allows the trainer to indicate exactly when the desired behavior appears. This precision allows the trainer to “shape” behavior in small increments to eventually train complex tasks. Just think of the tricks performed by marine mammals or by animals on TV: all were trained using clickers.

### How do I learn to train using a clicker?

One of the most important steps in this whole process is to *train the trainers!* It is best to have a good “clicker trainer” train and certify the trainees before they work with the pigs.

The most important skills are patience and the ability to click EXACTLY when the desired behavior is observed – delays of even a split second can cause confusion in the animal and prevent effective training.



Clicker

A useful exercise for trainers:

designate one person to be the trainer and one to be the “pig”, and have the “pig” leave the room. The trainers then decide on a behavior they want the “pig” to perform (having the “pig” crawl under a table, for instance). The trainers then call in the “pig” and attempt to get the “pig” to the desired endpoint (under the table) only by using the clicker. As you can imagine, the exercise is a lot of fun, but it also accelerates the learning process. The “pig” often comments afterwards that it is difficult to determine exactly which behavior the clicker is being used for – was it looking in a particular direction or moving the body? Precision with that click is everything!

### What tools do I need?

Tools for clicker training are simple and inexpensive. We recommend starting with a clicker and a target stick (see photo). Clickers are available at most pet shops or online, and target sticks are readily fabricated from plumbing supplies and black electrical tape.

### What general principles do I need to know?

- Prepare a plan before you start. You can modify the plans as you go along, but you need clear goals for each session.
- Training sessions need to be short – 5 to 10 minutes is optimal.
- “Ask” for a new behavior by withholding the click-reward until another behavior is offered.
- Don’t move on to the next goal until the current one is really solid.
- ALL interactions with the trainer must be positive.

### What are the training stages?

- Find a food reward the animal likes. You may need to offer it for several days if it’s a new food. Pigs like marshmallows



Target stick, clicker and food reward

and cheerios, but too many of these will make them fat! We prefer to use raisins, but the pigs’ normal diet is also a possibility.

- Associate the reward with the click. Repeat the click-treat process 30 or 40 times in a row. It doesn’t take long for pigs to start looking for the reward when they hear the click!
- Target train. Use shaping to get a pig to touch its nose to the target (i.e. reward small increments: first for looking at it, then moving towards it, then touching the stick, then touching the black target). Wait for the pig to accidentally move towards the target, then click and reward!
- Once pigs are target trained, you can use the target to “shape” them by getting them to move where you want them to, such as another cage for sanitation purposes.
- More difficult tasks, such as standing still for handling, can be shaped using a rapid click-reward sequence so long as they keep all 4 feet in one spot.

### How long does it take?

This greatly depends on the skill of the trainer and the age of the pig. Pigs are pretty smart, however, so it doesn’t take long. We started out by using adult Göttingen Minipigs and new trainers – the slowest combination. Even so, 8 out of 10 pigs were trained to associate the click with the treat in one training session. Nine out of 10 pigs were target-trained in 2 sessions, and all 10 pigs could be moved to a new cage using the target after nine 5 to 10-minute training sessions.

### Where can I get more information?

Put “Clicker Training” into your search engine and you’ll find a plethora of articles and videos on the internet. Although many of the sites are dog-related, the principles are exactly the same for your Minipigs. Good luck! Dr Julie Watson, MA, VetMB, Dipl. ACLAM. [Julie.watson@jhu.edu](mailto:Julie.watson@jhu.edu)



### TRAINING THE MINIPIG IN AN OLFACTOMETER:

Development of a smell test for evaluating Alzheimer-related behavioural changes in the minipig

Alzheimer's disease (AD) is the most common type of dementia seen in people over the age of sixty. People diagnosed with AD or other types of dementia have been shown to suffer from decreased olfactory capacity compared to people at the same age who were not suffering from AD or other dementia illnesses. Decrease in olfactory function is a normal feature in elderly people, but dementia accelerates this decrease.

Special tests to investigate olfactory function have been developed for use in patients suffering from Mild Cognitive Impairment. These tests make it possible to identify patients who will develop AD later on.

At present, no treatment has been developed to combat AD, which inevitably leads to dementia and death. Transgenic rodent models have been developed, but none has developed all of the characteristic neuropathological lesions and behavioural changes.

The minipig is an attractive alternative to the rodent, since minipig anatomy and physiology are in many areas more similar to that of humans, and the minipig is also useful when using techniques such as positron emission tomography (PET), measurements of event-related potentials and acoustic startle reflex. A model for Parkinsonism has also been developed in the minipig.

It is unknown whether the pig develops AD spontaneously. Pigs rarely live beyond the age of 4 or 5 years in Denmark and dementia in pigs has not been described.  $\beta$ -amyloid (A $\beta$ ), the main component of senile plaques causing AD in humans, has been found to accumulate in the brains of pigs after diffuse brain damage.

As animals cannot verbalise olfactory perception, olfactory-guided behaviour is used for quantifying the olfactory sense.

It is possible to train pigs to detect and discriminate between different odours by using operant conditioning procedures.

The aim of the project by Lene V. Østerballe, at the Institute for Human Genetics, Aarhus University, is to investigate whether the relatively simple procedures used to train and evaluate the olfactory sense in rodents can be easily modified for use with pigs.

The pigs will be trained and tested in an olfactometer consisting of eight different lines presenting different odours. Ethyl acetate is used for training the pigs, and different dilutions of well defined odours are used to investigate the olfactory threshold and investigate the pigs' ability to discriminate between odours.

For training, a pig is placed in the olfactometer chamber. The pig is presented to a (+)-stimulus, which is a specific odour in different concentrations, or to a (-)-stimulus, which is an unscented gust of air.

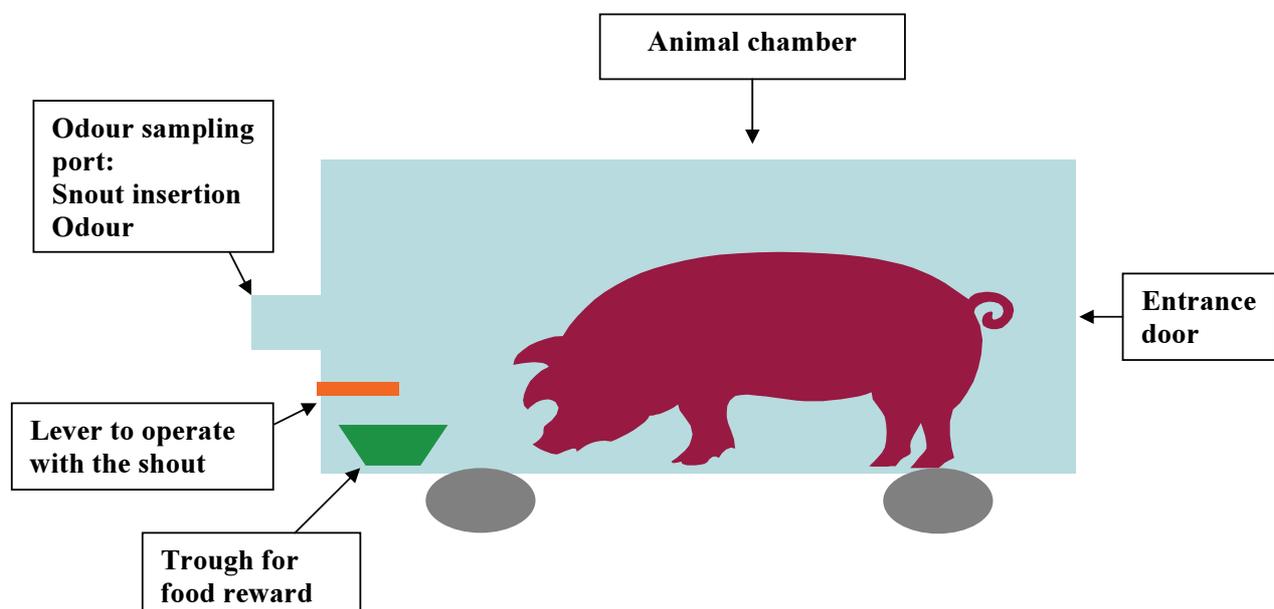
This is a go/no-go assignment: in the case of a (+)-stimulus, the pig should press a lever to receive a small food ration as reward. For a (-)-stimulus, the pig should not press the lever.

When a certain amount of the odour is introduced, the detection threshold for the (+)-stimulus odour is reached and the minipig will react to the test as if it was presented with a (-)-stimulus.

As several factors could interfere with the test result, habituation to the transport box and chamber, the test situation, response to odour detection, and the reward situation as well of the induction of motivation are of utmost importance. Inducing motivation is done in this case by reducing the amount of food presented at the normal feeding time the day before the training starts. After the training period, the animals should achieve a success ratio of at least 85%.

For minipigs to successfully learn the task, the duration of the training period is believed to be 50 days.

When the training period is over and the results have been published, the Ellegaard Newsletter will provide a more detailed protocol for its readers to be used when minipigs are used in olfactory testing.



## SURGERY AND ANAESTHESIA COURSES AT ELLEGAARD [SIGN UP NOW]

Ellegaard Göttingen Minipigs is happy to announce that we will be offering regular anaesthesia and surgery courses at our facility in Dalmose, Denmark. We have entered into a partnership with Mr. Tony Webb, who will be providing consultancy services associated with experimental surgery involving Göttingen Minipigs.

Mr. Tony Webb has worked in veterinary practice as well as in the pharmaceutical industry. He has long time experience with experimental surgery in the minipig and other species and has been teaching in courses demonstrating a wide range of surgical techniques and surgical procedures, as well as anaesthesia and perioperative management.

### Services now offered:

- Regular bi-monthly hands-on courses in anaesthesia and surgery in small groups.
  - assistance and advice with surgical procedures in Göttingen Minipigs.
- Advanced and/or specialised surgery training arranged on request.

### Course Description Outline

- Pre-medication
- General anaesthesia
- Tracheal intubation
- Monitoring of anaesthesia
- Blood vessel catheterisation
- Vascular access port implantation

- Telemetry implants
- Laparotomy and abdominal surgery
- Suturing techniques
- Post-operative care, including analgesia

Courses are tailored to the specific needs of the participants. When registering for a course, you will be asked to fill out a questionnaire so we can ensure that course content and pace match your training requirements.

### Surgery and Anaesthesia Course Plan 2007

Month	Dates
February	21 – 22
April	18 – 19
June	6 – 7
September	5 – 6
October	10 – 11
November	28 – 29

Registration is based on a first come, first serve basis. Please visit [www.minipigs.dk](http://www.minipigs.dk) for complete course descriptions as well as costs and other useful information, including a registration form. The completed form can be faxed to Ellegaard Göttingen Minipigs at +45 5818 5880 or e-mailed to [ellegaard@minipigs.dk](mailto:ellegaard@minipigs.dk).

It is also possible for us to tailor courses to any special requirements you might have. Please inquire for details and costs concerning special arrangements.

### “THE GÖTTINGEN MINIPIG: HISTOLOGY”

DVD-set is completed and can be ordered. This set contains 45 slides on three DVD's and covers all major organ systems. The software needed to view the images is included.

To order a copy, please contact Ellegaard Göttingen Minipigs at [ellegaard@minipigs.dk](mailto:ellegaard@minipigs.dk) or call +45 5818 5818.

The cost is €65 (+ shipping and handling)

### CALL FOR SLIDES:

With the release of the triple DVD set describing the normal histology of the Göttingen Minipig, we want to establish a library of digital slides describing spontaneous lesions observed in Göttingen Minipigs. We are only interested in lesions observed in control animals and, thus, not compound-related lesions. If you can contribute to this project, please contact Niels-Christian Ganderup ([ncg@minipigs.dk](mailto:ncg@minipigs.dk)). Due credit will be given, and glass slides will be returned after scanning.

## PRODUCTION STORIES:

Sometimes we have unique pigs that develop a special relationship with our caretakers. Below are the stories of two such special animals.

### UFO

UFO is a pig born in 2003. From birth, she stood out from the other pigs because of her snout. As it was longer than the standard snouts we encounter at Ellegaard, we couldn't use her for breeding. But we didn't want to sell her, either. As the caretakers thought that she looked like an alien, she was named "UFO". It soon became apparent that she was good-tempered, so we decided to use her as a blood donor. She was good at donating blood, as she was relaxed for blood sampling. She never gave us any trouble because she knew she would receive a treat after sampling. Many of our customers have received blood products from UFO.

As UFO grew older, she was sometimes put in a pen with new young sows whenever we needed to integrate them with the rest of our pigs. UFO helped to establish the hierarchy more quickly and would put the youngsters in their place if they fought too much.

At one point, she was put in a pen with two other pigs also used for blood sampling. These two were named "Sofie" and "Little foot". Time passed and the trio grew bigger and bigger. They were put on a diet and would be let out into the corridors for exercise.

One corridor had a food bucket for weaning pigs, but Sofie and UFO learnt how to push open the bucket and eat the

food intended for the young pigs! After this, the bucket was always removed when the two ladies were exercising!

UFO has now been moved to our conventional unit and will be kept there until old age.

### OSCAR

In our units, we select our breeders based on certain criteria. Today, although much of the selection process is computerized, the phenotypic evaluation of the animals is done by our staff. Before breeders were selected using a computerized model, genetic management was performed by using a modified line-breeding programme.

Some years ago, when this line-breeding management was still in use, the caretaker in the breeding unit was to select some boars for breeding. As is still the case today, good temper was an important factor in deciding which animals to use. One of the selected boars was very friendly. It took him a little while to learn how to mate with the sows, but after a while he became quite good at it. He was also very good at detecting sows in heat, ready for mating. The caretakers were certain to find all sows in heat whenever they used Oscar as the boar. Oscar's offspring are also good-tempered, and now that Oscar has retired from the "mating profession", one of his sons has been selected as a breeding boar. He is just as friendly and good at detecting sows in heat as his father was.

## HEALTH MONITORING REPORT, AUTUMN 2006:

The Health Monitoring Report, autumn 2006, has no new findings.

### NEW ARTICLES:

Gavira, J.J., Perez-Illarbe, M., Abizanda, G., Garcia-Rodriguez, A., Orbe, J., Paramo, A., Belzunce, M., Rabago, G., Barba, J., Herreros, J., Panizo, A., de Jalon, J.A., Martinez-Caro, D., Prosper, F.A., 2006, *A comparison between percutaneous and surgical transplantation of autologous skeletal myoblasts in a swine model of chronic myocardial infarction*, *Cardiovascular Res.*, 71, (4), pp. 744-753

Henkel, K.O., Gerber, T., Lenz, S., Gundlach, K.K., Bienengraber, V., 2006, *Macroscopical, histological and morphometric studies of porous bone-replacement materials in minipigs 8 months after implantation*, *Oral Surg Oral Med Pathol Oral Radiol Endod.*, 102, (5), pp. 606-613

Maratea, K.A., Snyder, P.W., Stevenson, G.W., 2006, *Vascular lesions in nine Göttingen minipigs with thrombocytopenic purpura syndrome*, *Vet Pathol*, 43, (4), pp. 447-454

### NEW BOOK RELEASES:

The second edition of: Swindle, M.M.: *Swine in the Laboratory: Surgery, Anesthesia, Imaging, and Experimental Techniques*, will be available April 2007 from CRC Press in Boca Raton, Florida.

This is an updated and expanded version of the 1998 textbook by the same author, M. Michael Swindle, DVM, of the Medical University of South Carolina. The section on anaesthesia and perioperative care has been greatly expanded and updated. All of the organ and system chapters have been updated with new techniques. The second edition includes new chapters ("Toxicology" and "Radiobiology"), a DVD with angiographic, ultrasound, MRI, CT, and PET images and many tables (in the appendix) containing normal biological data, organ sizes and measurements.

## MEETING CALENDAR

NAME	DATE	PLACE
Deutsche Gesellschaft für experimentelle und klinische Pharmakologie und Toxikologie	13-15 March	Mainz, Germany
Society of Toxicology	26-28 March	Charlotte, NC, USA
The British Toxicology Society	15-18 April	Guildford, Surrey, UK
European Course on Toxicologic Pathology	23-27 April	Nantes, France
Scand-LAS	10-13 May	Tromsø, Norway
FELASA	11-14 June	Lake Como, Italy
International Congress of Toxicology XI	15-19 July	Montreal, Canada
European Teratology Society	1-5 September	Bratislava, Slovakia
European Congress of Toxicologic Pathology	16-19 September	Basel, Switzerland
Safety Pharmacology Society	19-21 September	Edinburgh, Scotland
EUROTOX	7-10 October	Amsterdam, The Netherlands
AALAS	14-18 October	Charlotte, NC, USA
American College of Toxicology	11-14 November	Charlotte, NC, USA
AFSTAL	21-23 November	Lyon, France
LASA Winter Meeting	21-23 November	UK

