

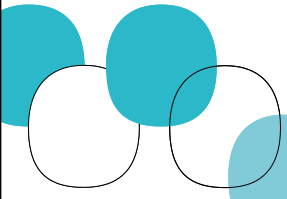
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Optimized housing and care of Göttingen Minipigs

GLP Planet, Saint Petersburg, Russia
5. June 2021

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We enable development of safer and more effective medicines

Ellegaard Göttingen Minipigs A/S



Our ambition and values

We enable development of safer and more effective medicines

- Our values have for decades remained unchanged

Animal Welfare
Quality
Respect
Collaboration

- We believe in the value of scientific validity, research, data and collaboration
- We invest our resources in the development, breeding and accumulation of new knowledge about Göttingen Minipigs, and in networking with scientists working actively with our animals

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Ellegaard Göttingen Minipigs, Denmark



Barrier 2 Barrier 5 Barrier 3
Office

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Our global supply and demands

Our global presence

What drives the demand for Göttingen minipigs?



- Göttingen Minipigs are increasingly being selected for all aspects of biomedical research
 - The smallest of all commercially available mini- and micropigs;
 - available in large uniform groups;
 - well-defined and managed genetics and full genome sequencing;
 - well-defined health status;
 - more and more available background data;
 - easy to fulfill natural needs, socialize and train for scientific procedures;
 - compared to non-human primates and dogs; more accepted by the public and animal welfare NGOs

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Our products, services and customers

Our products and services

Some of our customers

- Barrier-bred Göttingen Minipigs to be used all the way from early discovery studies to regulatory GLP toxicology and safety assessment
- Göttingen Minipigs for juvenile and reproductive studies
- Diet induced models for metabolic diseases
- Surgically prepared Göttingen Minipigs
- Genetically altered Göttingen Minipigs
- Animal model preparation and evaluation
- Supply of biological material
- Currently engaged in 25+ scientific projects including two EU Innovative Medicines Initiative (IMI) projects – LITMUS and ConcePTION with pharma, university and CRO partners

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Göttingen Minipig genetics

Minnesota 3 ♂ + 2 ♀

1960

Vietnamese potbelly 4 ♀
Zoo Berlin

1965

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Göttingen Minipig genetics...

Göttingen Minipig
coloured line (discontinued in 1995)

1965-69

German landrace

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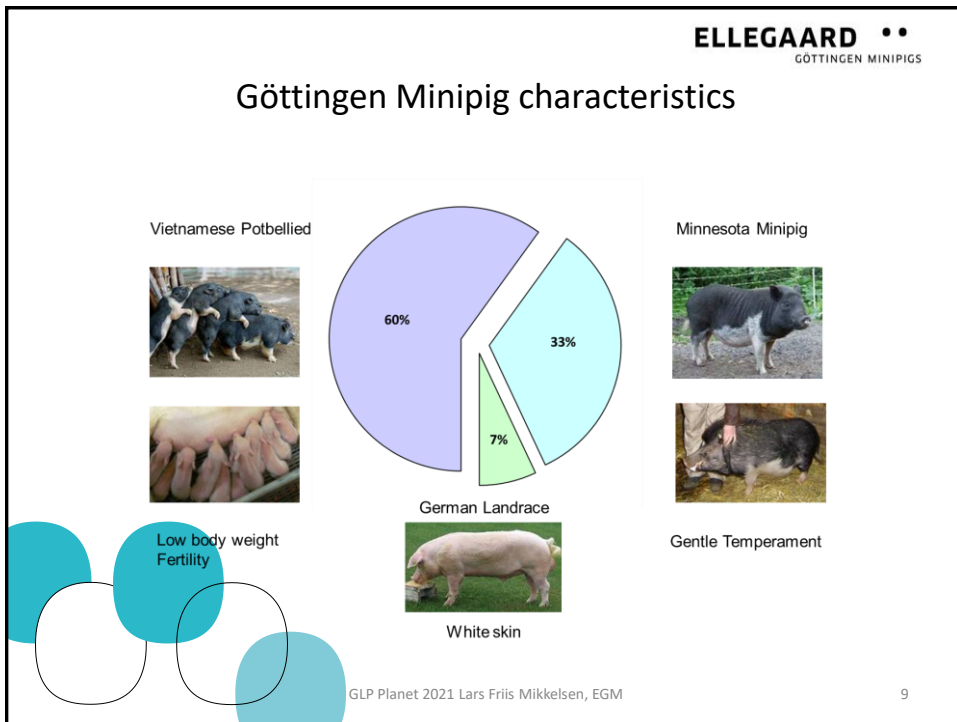
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Today's Göttingen Minipigs

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Optimized housing and care of Göttingen Minipigs

Slides prepared and provided by:
Kirsten Rosenmay Jacobsen
Head of Scientific Management
Ellegaard Göttingen Minipigs, Denmark



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The housing environment

- Animals spend most of their time in their home-cage/pen
- Psychological health linked to natural behavior
- Animals may suffer in situations where they are restricted from performing highly internally motivated natural behaviors
- Important to provide a housing environment securing the animals' ethological needs




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Behavioral management

- Social housing is a must for social species
 - If single housing is needed; provide visual and snout contact and extra contact with Animal Caretakers
- Natural behavior should be taken into consideration in relation to both pen/cage design and the provided environmental enrichment
- Socialization with humans is important too – both to facilitate daily handling and use for scientific procedures and mental stimulation



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Stimulating natural behavior

- Natural ethological needs include:
 - Rooting
 - Manipulation
 - Exploration
 - Nest building for sows
 - Shy, but curious and clever

Always remember variation/rotation of environmental enrichment to prevent boredom



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Enrichment room

- Can be modified to any gender, age and group composition
- Dedicated play time (e.g 10-30 min for young minipigs on a weekly basis)
- Stimulates a variety of behaviors – like play, exercise, manipulation, sensory and mental stimulation ...
- Calm and trusting animals



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Refinement of Animal Models

General considerations

- Do literature review and find latest refinements
- Define humane endpoints
- Daily welfare assessment
- Post approval monitoring
- Actively engage Animal Caretakers, Technicians and the Animal Welfare Body



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Refinement of Procedures

- Procedure specific analgesia and anesthesia
- Focus on recovery
- Non-invasive dosing whenever possible (e.g. oral, topical)
- Non-invasive sampling or refined sampling e.g. in a sling or Vascular Access Button
- Habituation
- Training – e.g. for milk collection



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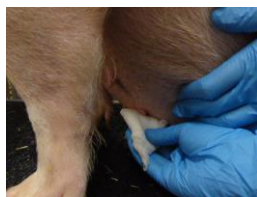
Positive Reinforcement Training for Milking

Training the sows prior to farrowing:

- Target stick
- Stepboard
- Touch
- Disinfection
- Milking simulation

After farrowing:

- Milking according to the training protocol




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Everything matters!


- From birth to euthanasia (or re-homing!)
- Refinement is not difficult – small initiatives matters
- Refined animal models and refined procedures provide better and more reproduceable data
- Positive Reinforcement Training - a valuable tool for refinement and can be the key to study success
- Engage all staff and create a Culture of Care



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Thank you for your attention

Contact information:
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Full barrier facilities



- Breeding herd established by caesarian section
- Strict quarantine regulations for access to facilities
- Decontamination of diet, water, bedding, environmental enrichment and all equipment
- HEPA filtered ventilation and overpressure in facilities
- Shower in/out and full change of dress incl. mask and hair net
- Biannual health monitoring based on FELASA guidelines

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Farrowing and weaning



- Parturition
 - Often during the night
 - Very few complications
 - Duration highly variable
- Weaning
 - 4 weeks postpartum
 - Sows exhibit estrus \approx 5 days after weaning of their offspring

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Natural mating



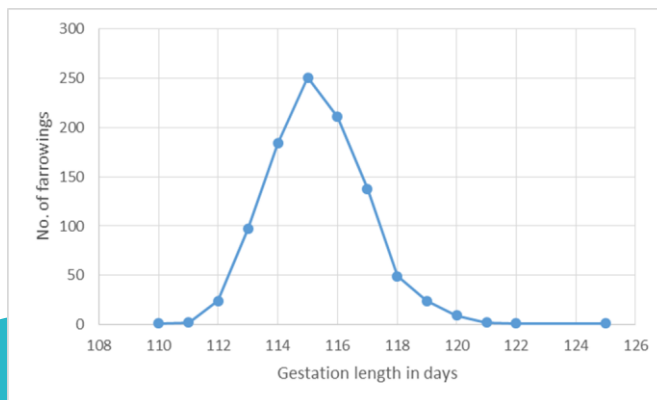
- The breeding sows are mated for the first time at around 7-8 months of age
- Fertilization is by natural mating

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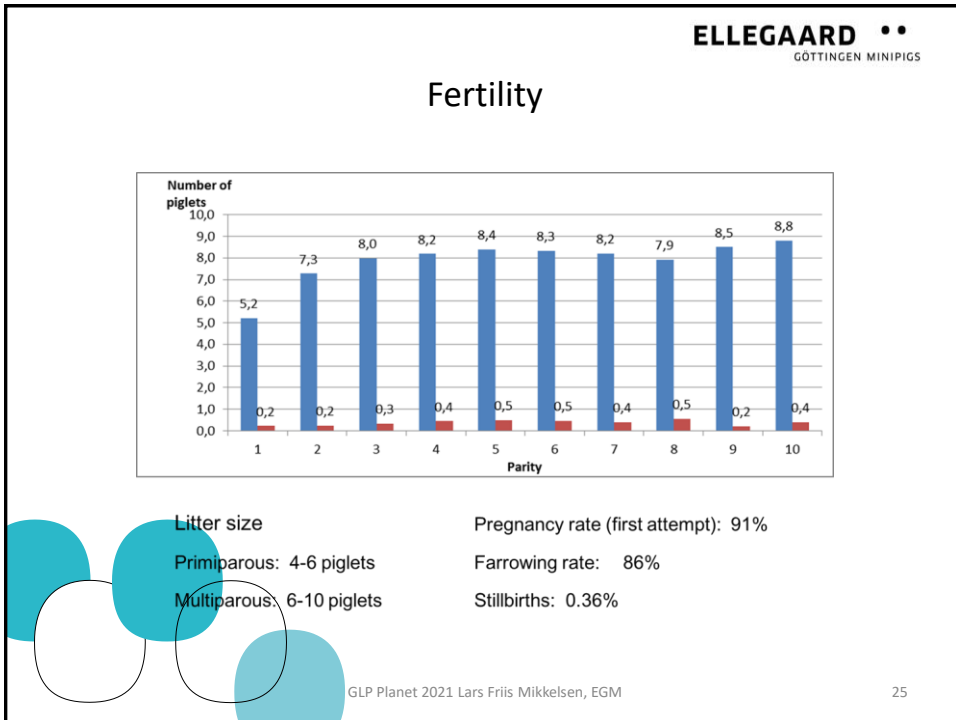
Gestation Length



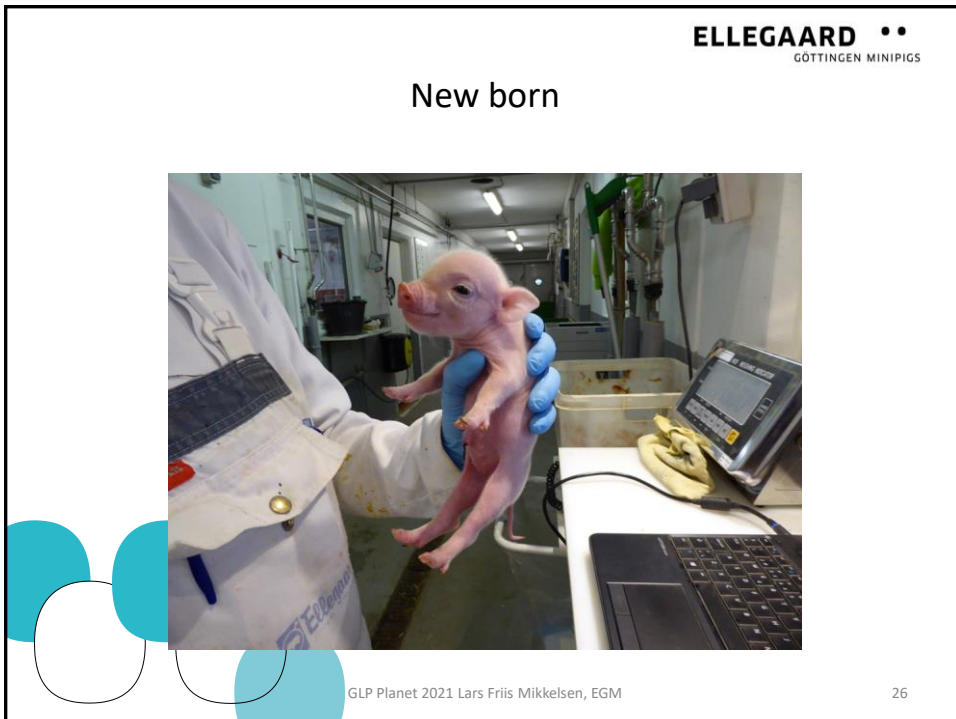
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Suckling new borns



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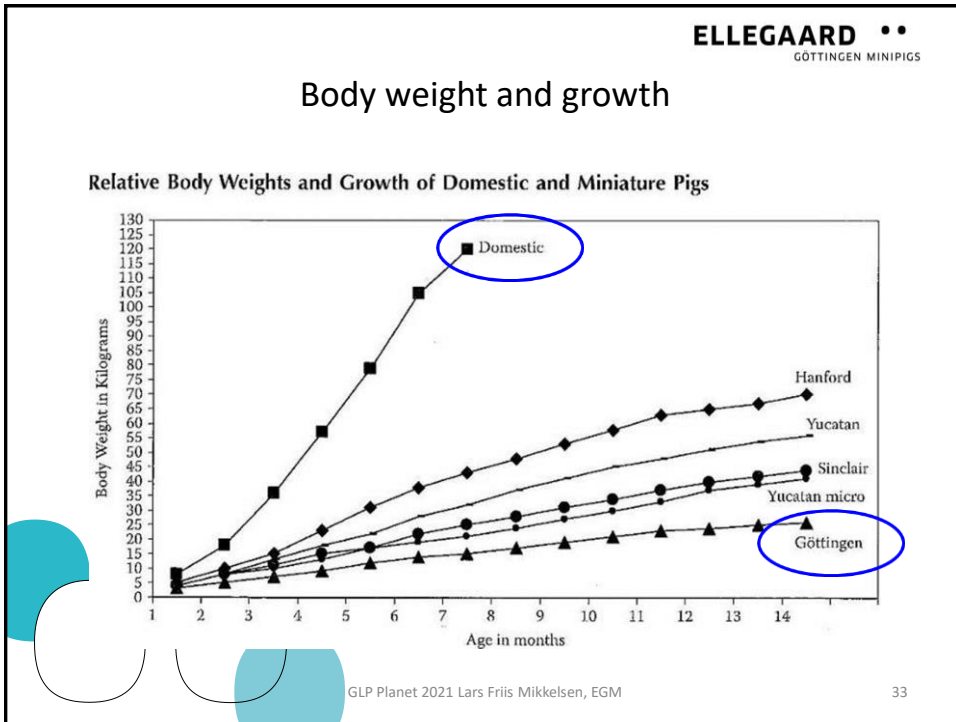
Before weaning



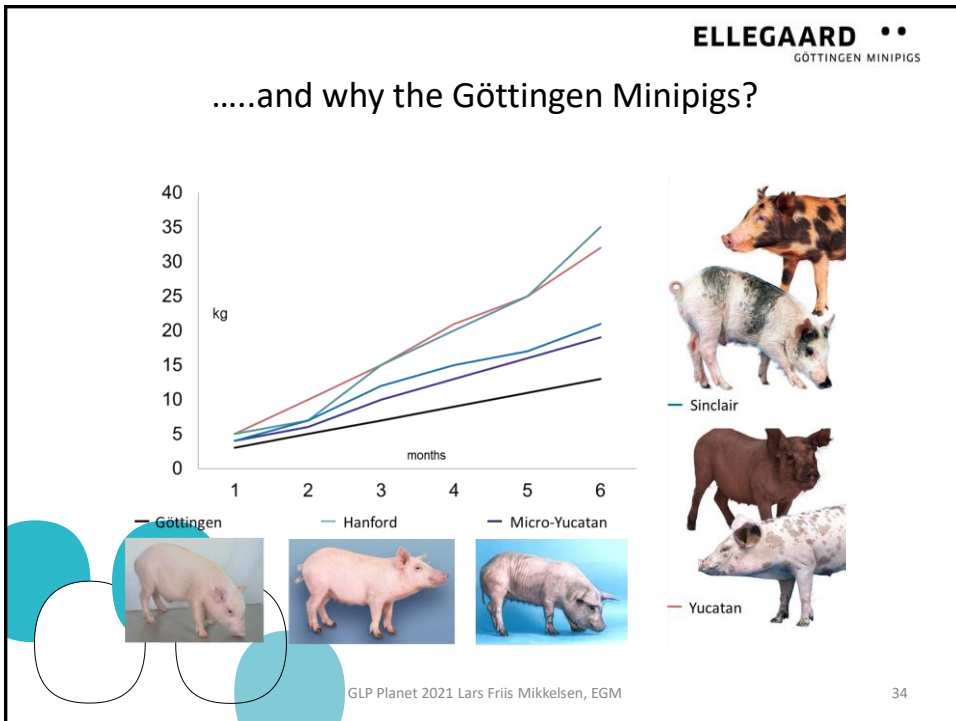
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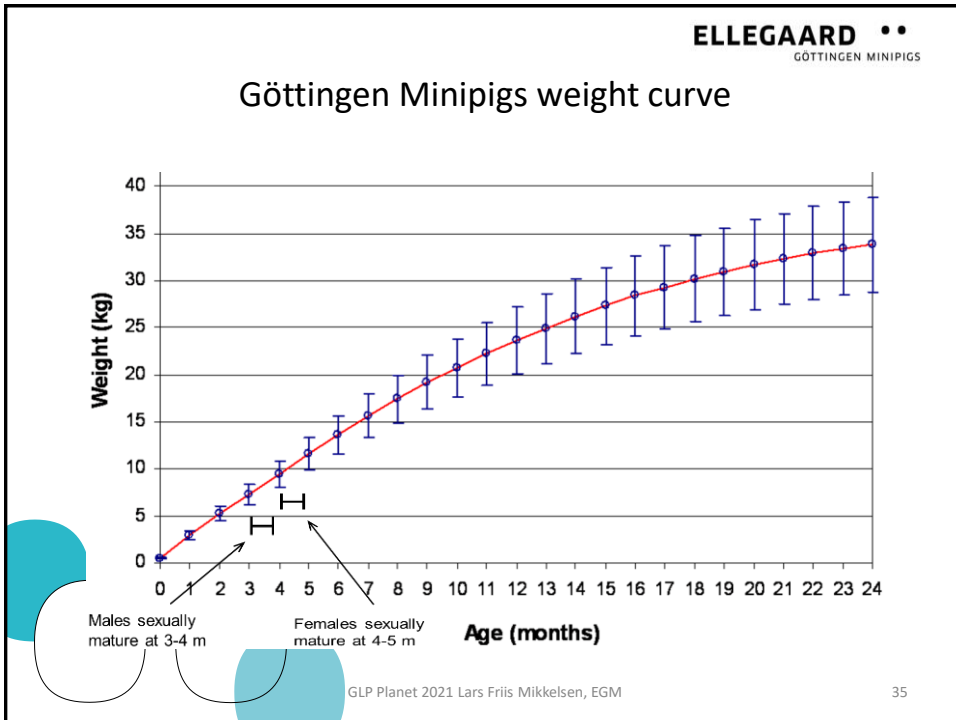
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Research Facility – surgical suite

- New surgical and research facility

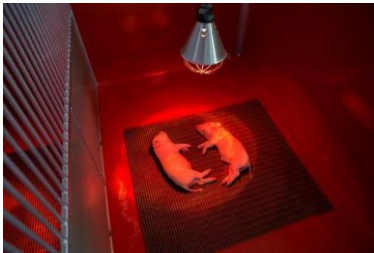


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Post surgery and housing




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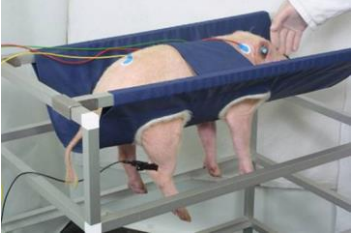
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Education and training



Education and training of customers in handling, dosing and training of minipigs plus surgical procedures



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Models for Scientific Research

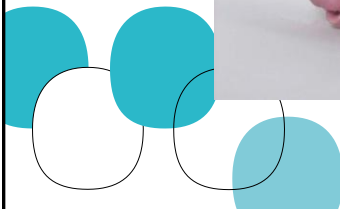
- The Göttingen Minipig is increasingly being selected for all aspects of pharmaceutical research
 - The smallest of all commercially available mini- and micro-pigs
 - Available in large uniform groups
 - Well-defined and managed genetics
 - Well-defined health status
 - More and more available background data
 - **Easy to fulfill natural needs, socialize and train for scientific procedures**
 - More accepted by the general public

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Questions or comments?



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