



Faculty of Health and Medical Sciences

# Health monitoring and the issue of rehoming farm animals

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Section of Biomedicine  
Lab Animal Science and Welfare**



## Health monitoring

Routine sampling of healthy animals to detect their health status



# Microbiology

## Impact of infections on research

### DIRECT

- Clinical/pathological changes
- Immunomodulation
- Physiological modulation
- Oncological modulation
- Fertility modulation
- Microbiological competition

### INDIRECT

- Contamination of biological products
- Activation of direct effects



# **Recommendations for the health monitoring of rodent and rabbit colonies in breeding and experimental units**

**Recommendations of the Federation of European Laboratory Animal Science Associations (FELASA) Working Group on Health Monitoring of Rodent and Rabbit Colonies accepted by the FELASA Board of Management, 9 June 2001**

**FELASA Working Group on Health Monitoring of Rodent and Rabbit Colonies: W. Nicklas (Convenor), P. Baneux, R. Boot, T. Decelle, A. A. Deeny, M. Fumanelli & B. Illgen-Wilcke**

FELASA, BCM Box 2989, London WC1N 3XX, UK

## **Contents**

1	Preamble	20
2	General considerations	21
3	Risk of introducing unwanted microorganisms	22
4	Frequency of monitoring and sample size	23

# **FELASA recommendations for the health monitoring of breeding colonies and experimental units of cats, dogs and pigs**

**Report of the Federation of European Laboratory Animal Science Associations (FELASA) Working Group on Animal Health**

**FELASA Working Group on Animal Health: C. Rehbinder (Scand-LAS), Convener; P. Baneux (SFEA); D. Forbes (LASA); H. van Herck (NVP); W. Nicklas (GV-SOLAS); Z. Rugaya (Balt-LASA); G. Winkler (SGV)**

FELASA, BCM Box 2989, London WC1N 3XX, UK

## **Contents**

Introduction	1
1 General considerations	2
2 Inspection of the colony	2
3 Monitoring procedures	3
4 Health monitoring report	3

# **FELASA recommendations for the health monitoring of experimental units of calves, sheep and goats**

**Report of the Federation of European Laboratory Animal Science Associations (FELASA) Working Group on Animal Health**

**FELASA Working Group on Animal Health: C. Rehbinder (Convenor), S. Alenius, J. Bures, M. de las Heras, C. Greko, P. S. Kroon & A. Gutzwiller**

FELASA, BCM Box 2989, London WC1N 3XX, UK

## **Contents**

Introduction	329
1. General considerations	330
2. Inspection of the farm of origin	331
3. Inspection of the experimental animal unit	331
4. Monitoring procedures	332
5. Health monitoring report	332
6. Remarks on the selection, sampling procedures and laboratory examinations of	332

## Prevention of infections in laboratory animals

### Rederivation

- Caesarian section
- Embryo transfer

### Protection

- Barrier
- Isolator

### Health monitoring









## The 'quantitative research use' scale



## Health status of pigs

Conventional

Minimal disease (MD/MS)

Specific pathogen free (SPF)

Microbiologically defined



## SPF Pigs

- Specific pathogen free
- Defined by agricultural organisations
  - DK: Danske Slagterier
- Example
  - Evil lung disease (*Actinobacillus pneumoniae*)
  - Mange (*Sarcoptes*)
  - Lice
  - Atrophic rhinitis (Toxin-prod. *Pasteurella multocida*)
  - Porcine dysentery (*Serpulina hyodysentery*)
  - Enzootic pneumonia (*Mycoplasma*)

## MD Pigs

- Specific pathogen free
- Defined by agricultural organisations
  - DK: Danske Slagterier
- Example
  - Evil lung disease (*Actinobacillus pneumoniae*)
  - Mange (*Sarcoptes*)
  - Lice
  - Atrophic rhinitis (Toxin-prod. *Pasteurella multocida*)
  - Porcine dysentery (*Serpulina hyodysenteria*)

## Microbiologically defined research pigs

35-45 infectious agents

- International guidelines (FELASA)
  - Quarantine
  - Decontamination
  - Isolation
- Different regimes



## FELASA - Approved Health Monitoring Report

Name and address of the breeder: Ellegaard Göttingen Minipigs ApS, DK-4261 Dalmose - Denmark

Date of issue: Dec. 11, 2001

Unit N°: Barrier 1

Date of examination: November 5, 2001

Species: Pig

Breed: Göttingen Minipig

Rederivation: March 1992

	HISTORICAL RESULTS	CURRENT TEST RESULTS	LABORATORY	METHOD
<b>VIRAL INFECTIONS</b>				
Aujeszky's Disease	neg (0/150)	0/10	SVIV	ELISA
Classical Swine Fever	neg (0/150)	0/10	SVIV	ELISA
Encephalomyocarditis Virus	neg (0/60)	0/10	SVIV	Neutr.
Haemagglutinating Encephalomyelitis	neg (0/137)	0/10	SVIV	IPT
Porcine Epidemic Diarrhoea	neg (0/70)	0/10	SVIV	ELISA
Porcine Influenza				
H1N1	neg (0/150)	0/10	SVIV	HI
H3N2	neg (0/150)	0/10	SVIV	HI
Porcine Parvovirus	pos (32/167)	1/10	SVIV	ELISA
Porcine Reproduct. & Resp. Disease	neg (0/128)	NT	SVIV	ELISA
Porcine Reproduct. & Resp. Disease	neg (0/10)	0/10	SVIV	IPT
Porcine Respiratory Coronavirus	neg (0/70)	0/10	SVIV	ELISA
Porcine Rotavirus	pos (5/100)	5/10	Panum	latex aggl.
Porcine Rotavirus	pos (116/120)	NT	Panum	ELISA
Transmissible Gastroenteritis	neg (0/150)	0/10	SVIV	ELISA
<b>BACTERIAL INFECTIONS</b>				
Actinobacillus pleuropneumoniae				
Serotype 1-12	neg (0/150)	0/10	SVS	ELISA/CF
Bordetella bronchiseptica	neg (0/150)	0/10	Panum	Culture
Brachyspira (Serpulina) hyodysenteriae	neg (0/80)	0/10	SVS	Culture
Campylobacter spp.	neg (0/140)	0/10	Panum	Culture
Clostridium perfringens	pos (2/138)	0/10	Panum	Culture
Erysipelothrix rhusiopathiae	neg (0/150)	0/10	Panum	Culture
Eubacterium suis	neg (0/150)	0/10	Panum	Culture
Haemophilus parasuis	neg (0/149)	0/10	SVS	CF
Leptospira spp.	neg (0/20)	NT	Panum	Serum Aggl.
Listeria monocytogenes	neg (0/120)	0/10	Panum	Culture
Mycoplasma hyopneumoniae	neg (0/146)	0/10	SVS	ELISA
P. multocida (toxin producing)	neg (0/150)	0/10	Panum	Culture
P. haemolytica	neg (0/30)	NT	Panum	Culture
P. pneumotropica	neg (0/30)	NT	Panum	Culture
other Pasteurellae	neg (0/30)	NT	Panum	Culture
Salmonella spp.	neg (0/150)	0/10	Panum	Culture
Staphylococcus hyicus	neg (0/150)	0/10	Panum	Culture
β-haemolytic Streptococci	neg (0/150)	0/10	Panum	Culture
Streptococcus pneumoniae	neg (0/150)	0/10	Panum	Culture
Streptococcus suis	neg (0/150)	0/10	Panum	Culture
Yersinia enterocolitica	neg (0/150)	0/10	Panum	Culture
spp. associated with lesions:				
No lesions reported				
<b>FUNGAL INFECTIONS</b>				
Candida albicans	pos (5/30)	NT	Panum	Culture
Microsporium spp.	neg (0/110)	0/10	Panum	Culture
Trichophyton spp.	neg (0/110)	0/10	Panum	Culture
<b>PARASITOLOGICAL INFECTIONS</b>				
Arthropods	neg (0/150)	0/10	Panum	Micr. Insp.
Helminths	neg (0/150)	0/10	Panum	Flotation
Coccidia (Eimeria, Isospora)	neg (0/150)	0/10	Panum	Flotation





http://www.minipigs.dk/

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InPrivate



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NEWS PROFILE CONTACTS SITEMAP [ad]

- ✓ HOME
  - ✓ CHARACTERIZATION
  - ✓ BACKGROUND DATA
  - ✓ QUALITY
  - ✓ ANIMAL CARE
  - ✓ PRODUCTS
  - ✓ ANIMALS IN RESEARCH
- SEARCH ON SITE
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### Welcome to Ellegaard Göttingen Minipigs

Göttingen minipigs @ are accepted non-rodent models in pharmacology and toxicology. Studies performed on these minipigs are fully recognized by regulatory authorities worldwide, including FDA.

They should be considered, along with dogs and primates, when choosing the best non-rodent species for drug development and regulatory studies.



Surgery and Anaesthesia Courses  
Anaesthesia and surgery courses at our facility in Dalmose, Denmark

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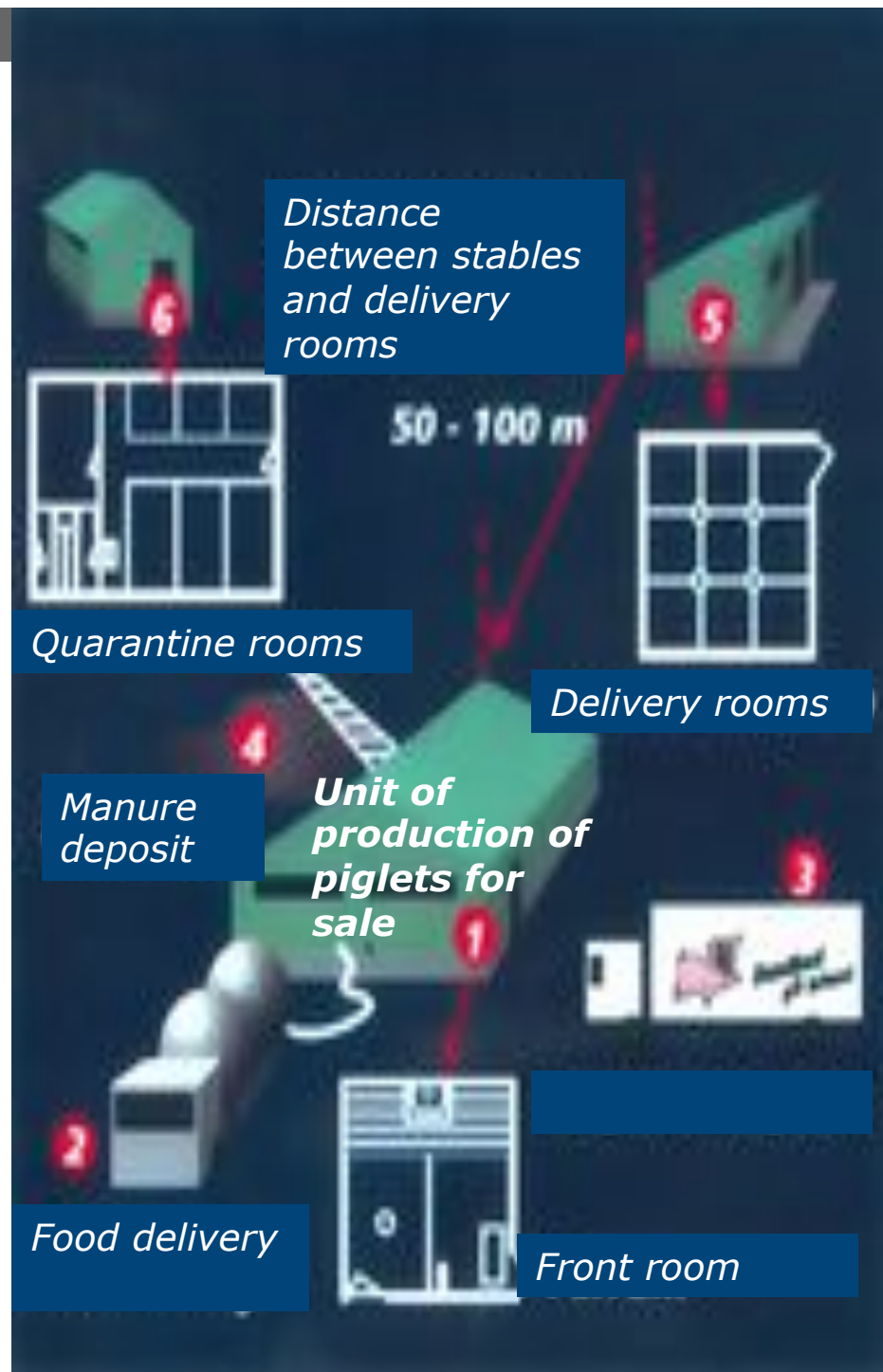
[Mission Statement](#)



## Protection of SPF pigs

### Rules for

- Geographic site
- Bordering
- Interior equipment
- Staff entrance
- Delivery of pigs
- Receipt of diet and bedding
- Manure handling
- Cleaning and disinfection
- Sales
- Transport



## Protection of pig breeding

	<b>Conventional</b>	<b>SPF/MD</b>	<b>Microbiologically defined</b>
<i>Caesarian originated</i>	No	Yes	Yes
<i>Barrier</i>	No	Yes	Yes
<i>Quarantine regulation</i>	No	Yes	Yes
<i>Change of dress</i>	No	No	Yes
<i>Shower in</i>	No	No	Yes
<i>Decontamination of diet</i>	No	No	Yes
<i>Decontamination of Equipment</i>	No	No	Yes
<i>Water</i>	No	No	Yes
<i>Absolute filters in ventilation</i>	No	No	Yes
<i>Health monitored</i>	No	Yes	Yes



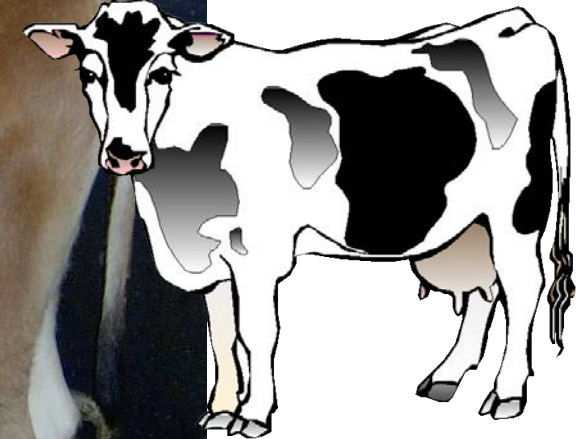
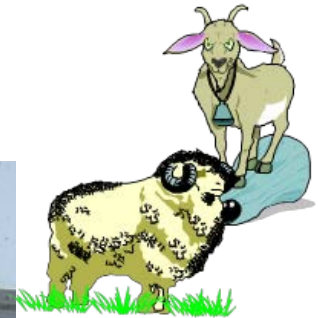
Does it make a difference for the 3R's whether farm animals are health monitored?





Does it make a difference for the 3R's whether farm animals are health monitored?

↑  
Importance of HM





Does it make a difference for the 3R's whether farm animals are health monitored?

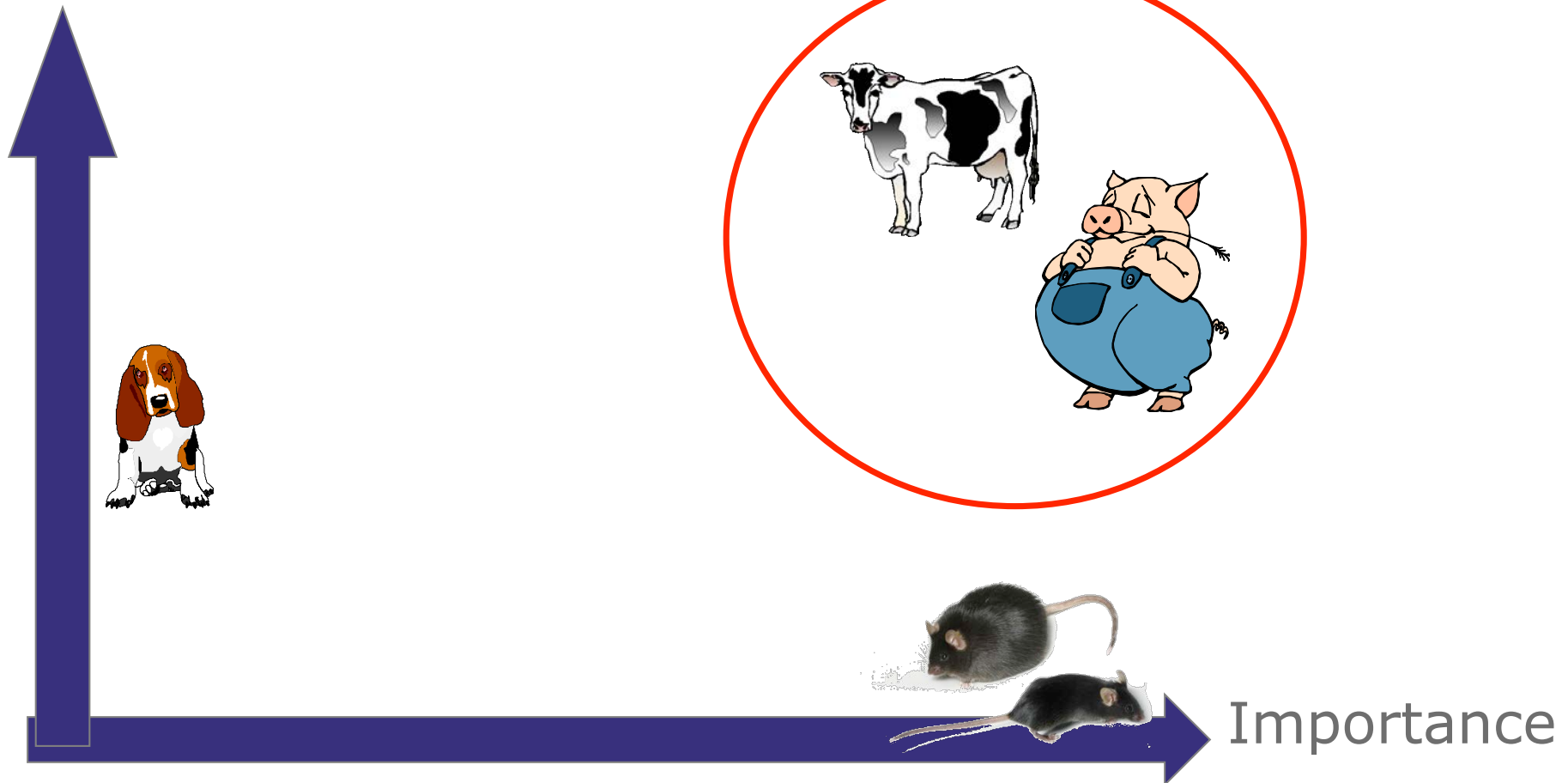


Does it make a difference for the 3R's whether farm animals are health monitored?



# The 'risk for the national economy' scale

Risk



## Pigs in Denmark

20,300,000 pigs slaughtered annually in Denmark (2006)

weighs 90 kg

5,400,000 human beings in Denmark

Each dane

'slaughter 3,75 pigs'

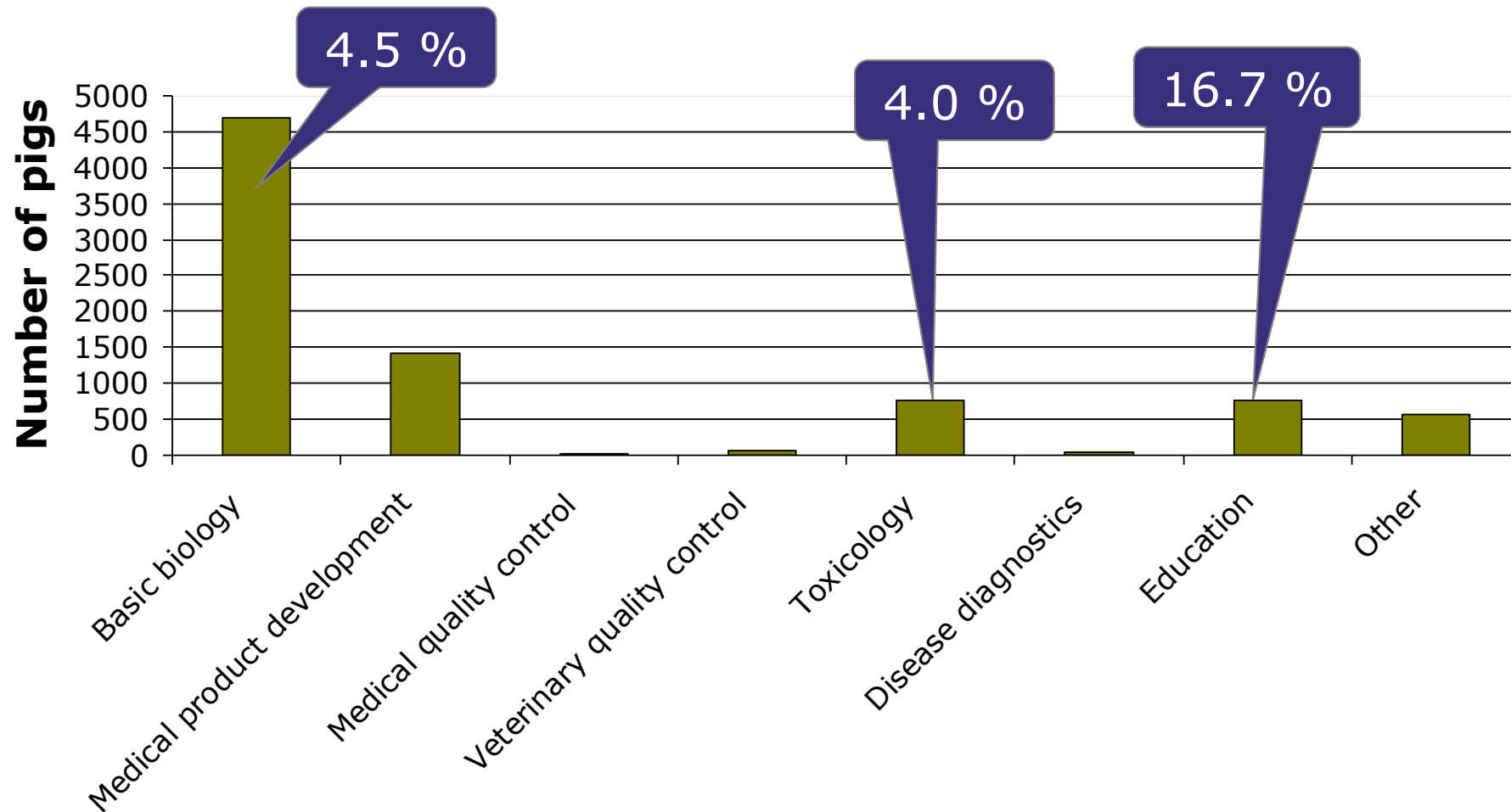
'eat 60 kg pig per year'

lives for 78,2 years

eats 4692 kg pig = 52 pigs



## Pigs in research (Denmark 2006)



## Purposes



## Notifiable contagious animal diseases

### Specific infections

- Strict legislation
- International agreements
  - Office International des Epizooties (OIE)
    - 1924 Agreement
      - [www.oie.int](http://www.oie.int)
  - EU directive
    - OIE involved from 1957





## Notifiable contagious animal diseases

Authorities have extended rights

- Prevention
- Treatment

Outbreaks

- Police precautions

Veterinarians

- Notification duty



## Notification

Obligatory for Member States to notify the Commission

- certain contagious diseases
  - appearance
  - subsequent eradication
    - within twenty four hours
      - initial outbreak
      - withdrawal of the restrictions imposed
  - first working day of each week
    - any secondary outbreaks



## OIE Listed diseases

### Multiple species diseases

- Anthrax
- Aujeszky's disease
- Bluetongue
- Brucellosis (*Brucella abortus*)
- Brucellosis (*Brucella melitensis*)
- Brucellosis (*Brucella suis*)
- Crimean Congo haemorrhagic fever
- Echinococcosis/hydatidosis
- Epizootic haemorrhagic disease
- Equine encephalomyelitis (Eastern)
- Foot and mouth disease
- Heartwater
- Japanese encephalitis
- New world screwworm (*Cochliomyia hominivorax*)
- Old world screwworm (*Chrysomya bezziana*)
- Paratuberculosis
- Q fever
- Rabies
- Rift Valley fever
- Rinderpest
- Surra (*Trypanosoma evansi*)
- Trichinellosis
- Tularemia
- Vesicular stomatitis
- West Nile fever

### Sheep and goat diseases

- Caprine arthritis/encephalitis
- Contagious agalactia
- Contagious caprine pleuropneumonia
- Enzootic abortion of ewes (ovine chlamydiosis)
- Maedi-visna
- Nairobi sheep disease
- Ovine epididymitis (*Brucella ovis*)

### Cattle diseases

- Bovine anaplasmosis
- Bovine babesiosis
- Bovine genital campylobacteriosis
- Bovine spongiform encephalopathy
- Bovine tuberculosis
- Bovine viral diarrhoea
- Contagious bovine pleuropneumonia
- Enzootic bovine leukosis
- Haemorrhagic septicaemia
- Infectious bovine rhinotracheitis/infectious pustular vulvovaginitis
- Lumpy skin disease
- Theileriosis
- Trichomonosis
- Trypanosomosis (tsetse-transmitted)

### Equine diseases

- African horse sickness
- Contagious equine metritis
- Dourine
- Equine encephalomyelitis (Western)
- Equine infectious anaemia
- Equine influenza
- Equine piroplasmosis





Ministeriet for Fødevarer, Landbrug og Fiskeeri  
Fødevarestyrelsen

# Central farm animal register

## CHR

### Centralt HusdyrbrugsRegister

Registration of every single animal



CHR

CHR giver mulighed for at fremsøge oplysninger om ejendomme med husdyr.



Dyr

Dyr giver mulighed for at fremsøge oplysninger om hvert enkelt kreatur.



Flytninger af svin

Indberetning, søgning og rettelse af indberetninger af flytninger af svin. Du skal vælge fanebladet *Rapport*, hvis du vil foretage søgninger uden at logge på.



Flytte-dokumenter

Udskrivning af flyttedokumenter på egen printer.



Besætning

Besætning giver mulighed for at fremsøge oplysninger om besætninger.



Aquaculture Farms

Detailed information on active Aquaculture Farms located in Denmark.



Udskrifter

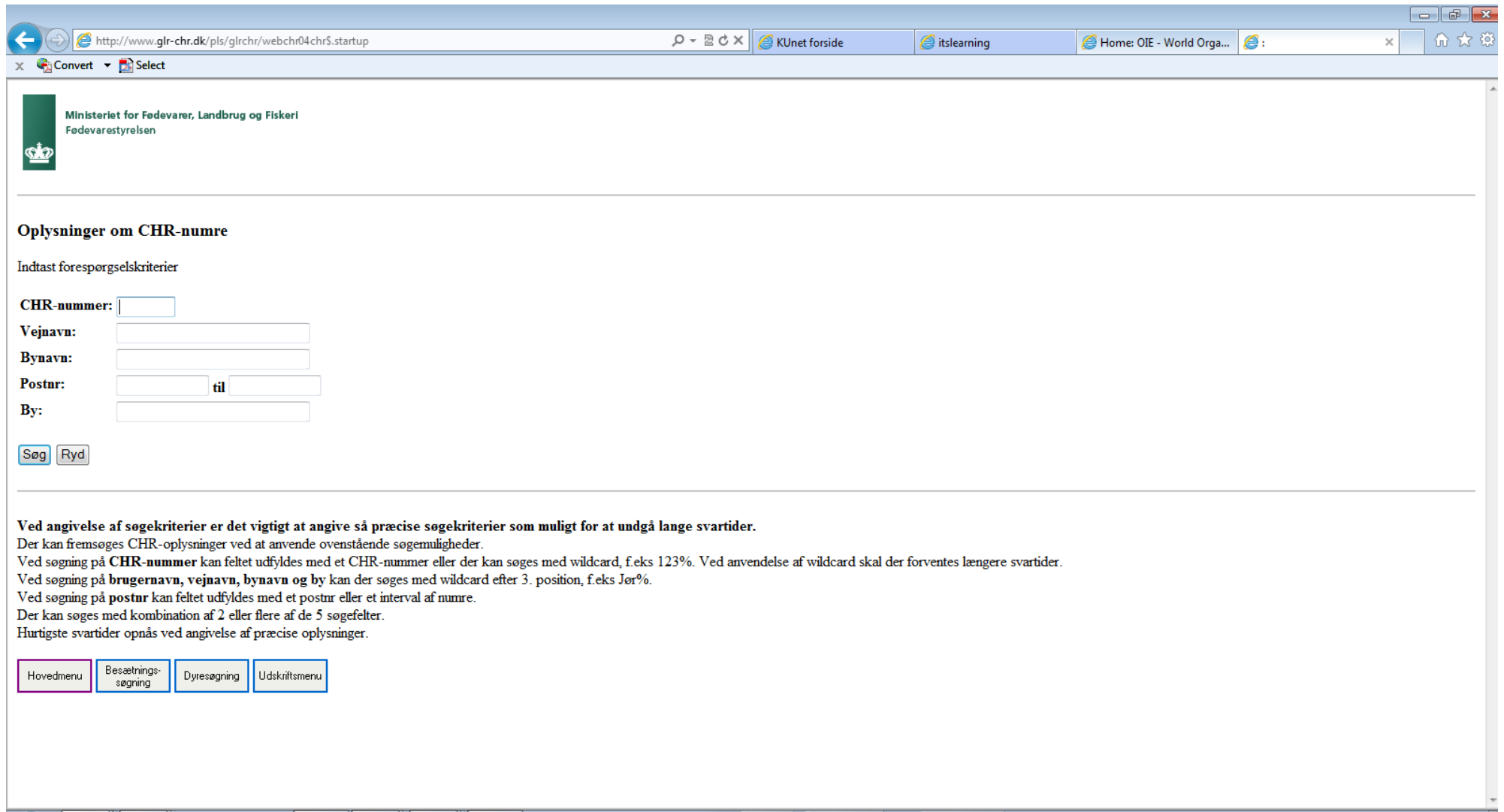
Udskrifter giver mulighed for at udskrive almindelig besætningsliste eller periode besætningsliste.



Om CHR

Om CHR indeholder information om hvem man kan kontakte ved spørgsmål eller rettelser.





Ministeriet for Fødevarer, Landbrug og Fiskeri  
Fødevarestyrelsen

### Oplysninger om CHR-numre

Indtast forespørgselskriterier

CHR-nummer:

Vejnavn:

Bynavn:

Postnr:  til

By:

**Ved angivelse af søgekriterier er det vigtigt at angive så præcise søgekriterier som muligt for at undgå lange svartider.**  
Der kan fremsøges CHR-oplysninger ved at anvende ovenstående søgemuligheder.  
Ved søgning på **CHR-nummer** kan feltet udfyldes med et CHR-nummer eller der kan søges med wildcard, f.eks 123%. Ved anvendelse af wildcard skal der forventes længere svartider.  
Ved søgning på **brugernavn, vejnavn, bynavn og by** kan der søges med wildcard efter 3. position, f.eks Jør%.  
Ved søgning på **postnr** kan feltet udfyldes med et postnr eller et interval af numre.  
Der kan søges med kombination af 2 eller flere af de 5 søgefelter.  
Hurtigste svartider opnås ved angivelse af præcise oplysninger.



## Inspections (EU Transport)

No longer at the internal frontiers

During

- Transport

At

- staging points
- place of destination
- etc.

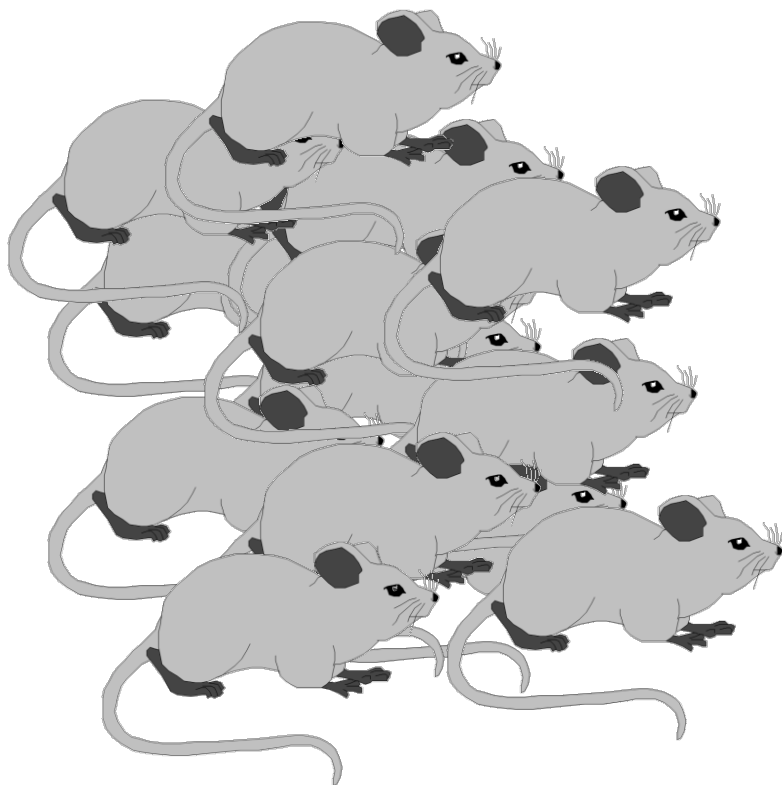
The state veterinarian has always access to animals





# Uncontrolled versus controlled variation

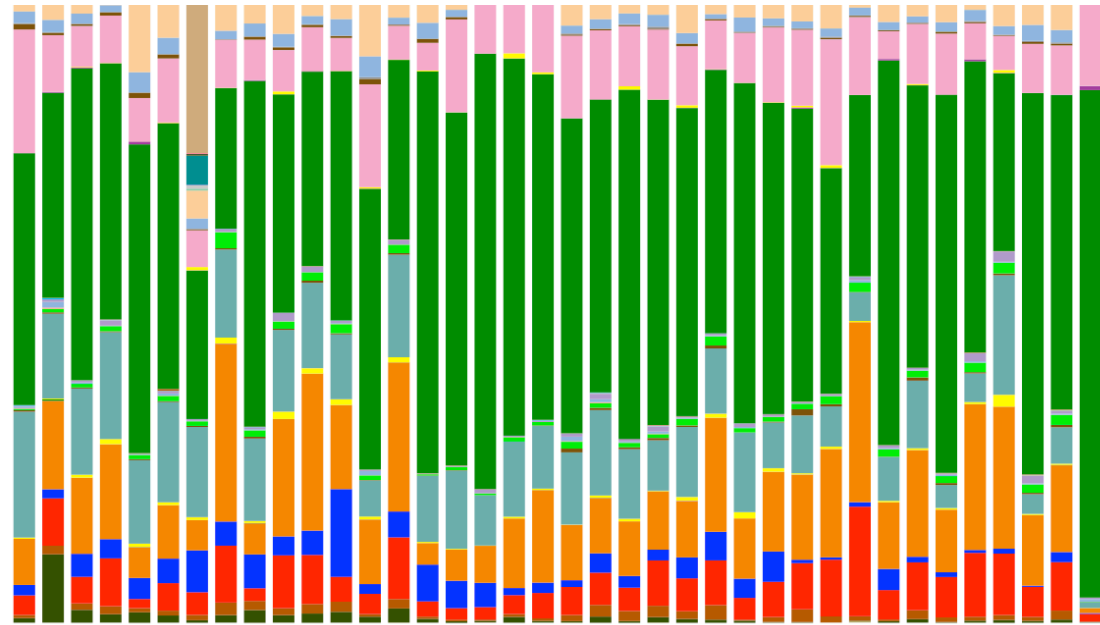
Uncontrolled



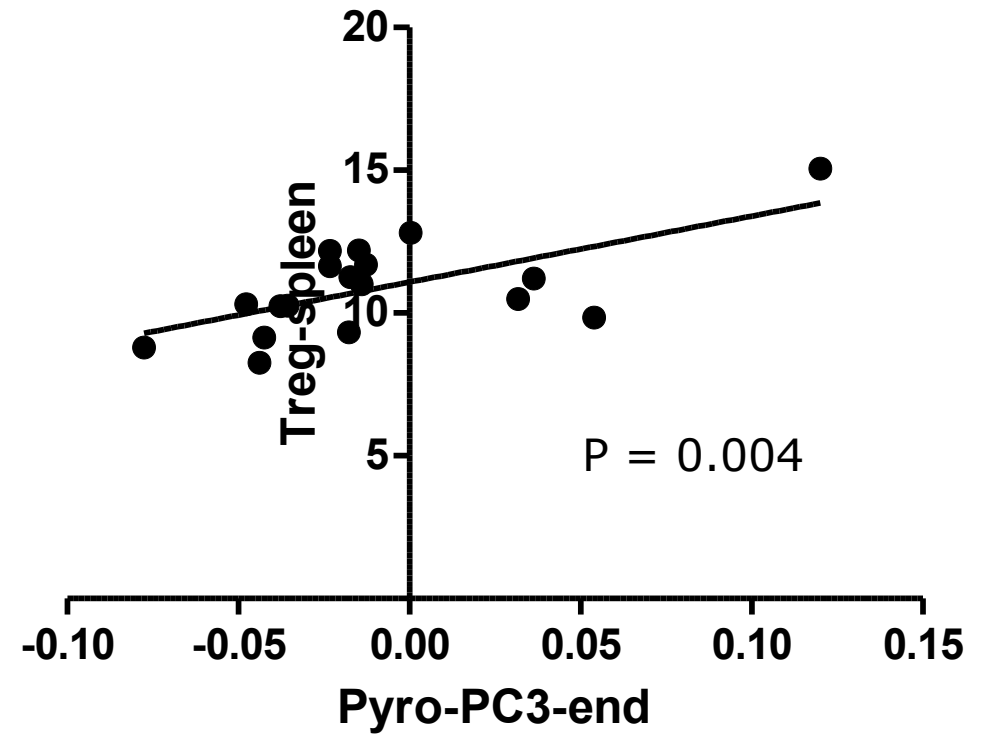
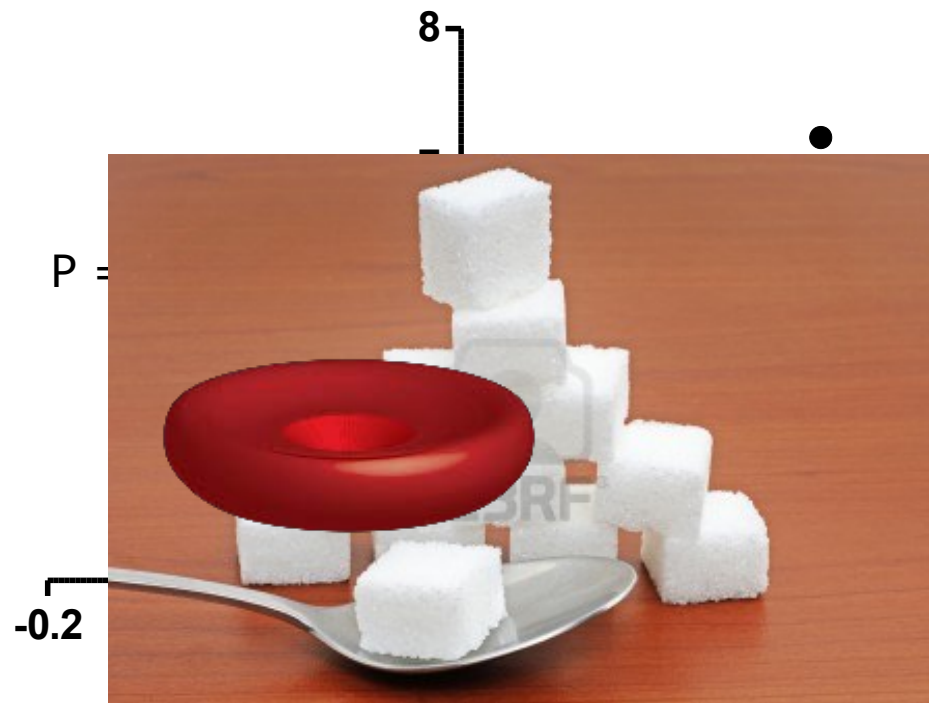
Controlled



# Next generation microbiological monitoring Pyrosequencing



## Correlation between diabetes parameters and gut microbiota in leptin-deficient obese mice



Ellekilde et al, 2012  
Submitted to Diabetologia



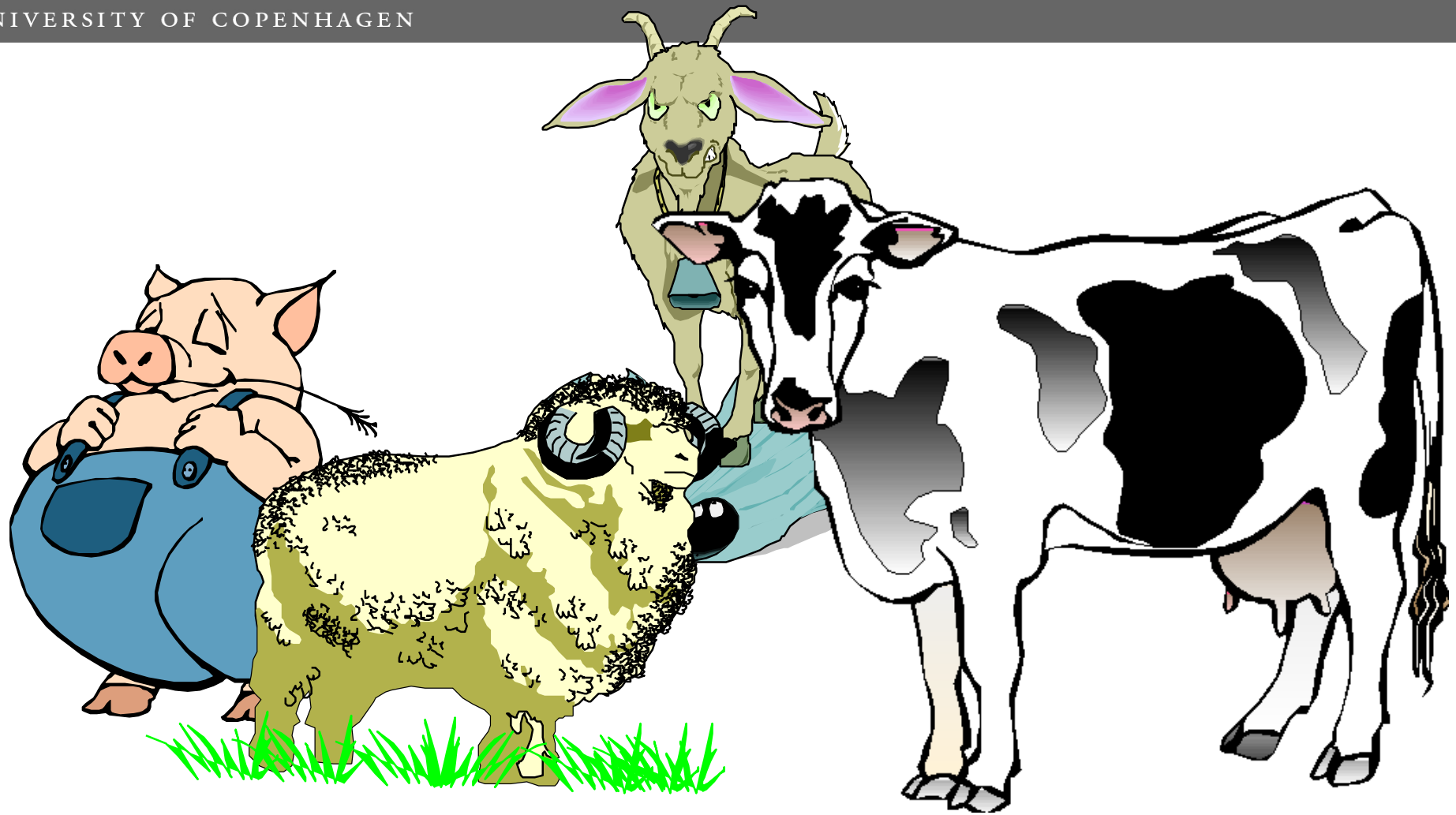
## Concluding remarks

Health monitoring in farm animals is only to a limited extent made for the sake of research and the 3R's

Any other fate than killing after the experiment is administratively complicated

The number of farm animals killed for food purposes outnumbers the number of research farm animals by a factor  $10^4$





Thank you for your  
attention

