



# Better Training for Safer Food *Initiative*

Training course on "Animal Welfare in pig production"

**Biology and behaviour of pigs  
kept in natural and semi-natural  
conditions**

**Dr Emma Baxter  
SRUC**

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**Herning, Denmark, Oct 14<sup>th</sup>-17<sup>th</sup>, 2014**

# Why look at natural behaviour and biology?

## Definitions of welfare:

- Ability to be have naturally
- Health and biological function
- Mental states, well-being

It doesn't really matter.  
**Knowledge of natural  
behaviour can be  
useful in identifying  
welfare problems**

# Domestication

Domesticated 9000 years ago

Large morphological changes

Ancestor = wild boar → behaviour can be studied

Knowledge from feral and extensively kept animals

Inter-breeding is possible, same species *Sus scrofa*

Less fearful of humans



# Domestication

Behaviour has  
changed very little

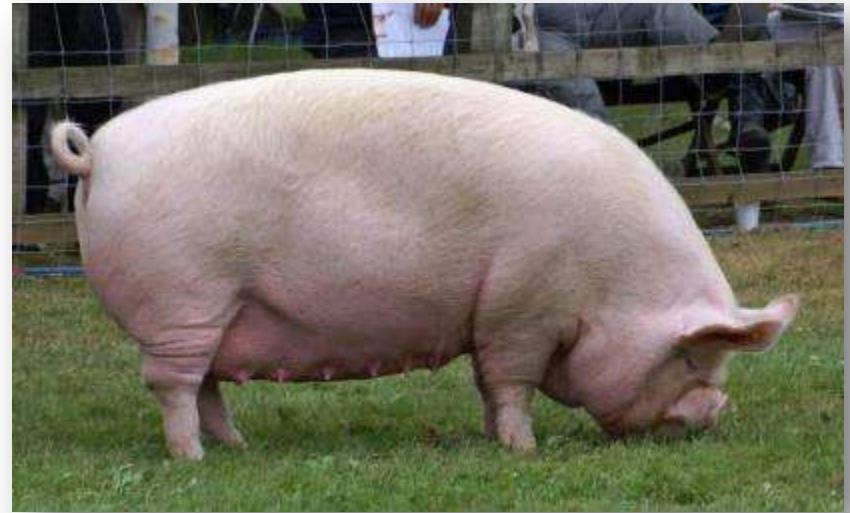


## Morphological changes - size

### Mature size:

Wild boar = 35-230kg

Domestic pig = 300kg+





# Morphological changes – litter size



6-8 boarlets

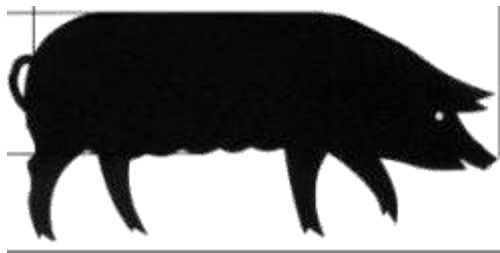


12-14+ piglets

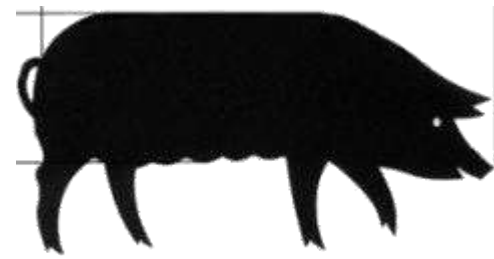
16+ piglets for  
hyper-prolifics

## Morphological changes - size

Even with modern breeds size has rapidly increased by **55%** in the last 30 years



1981



2010

## What is the problem?

Accommodation has  
not adapted at the  
same rate





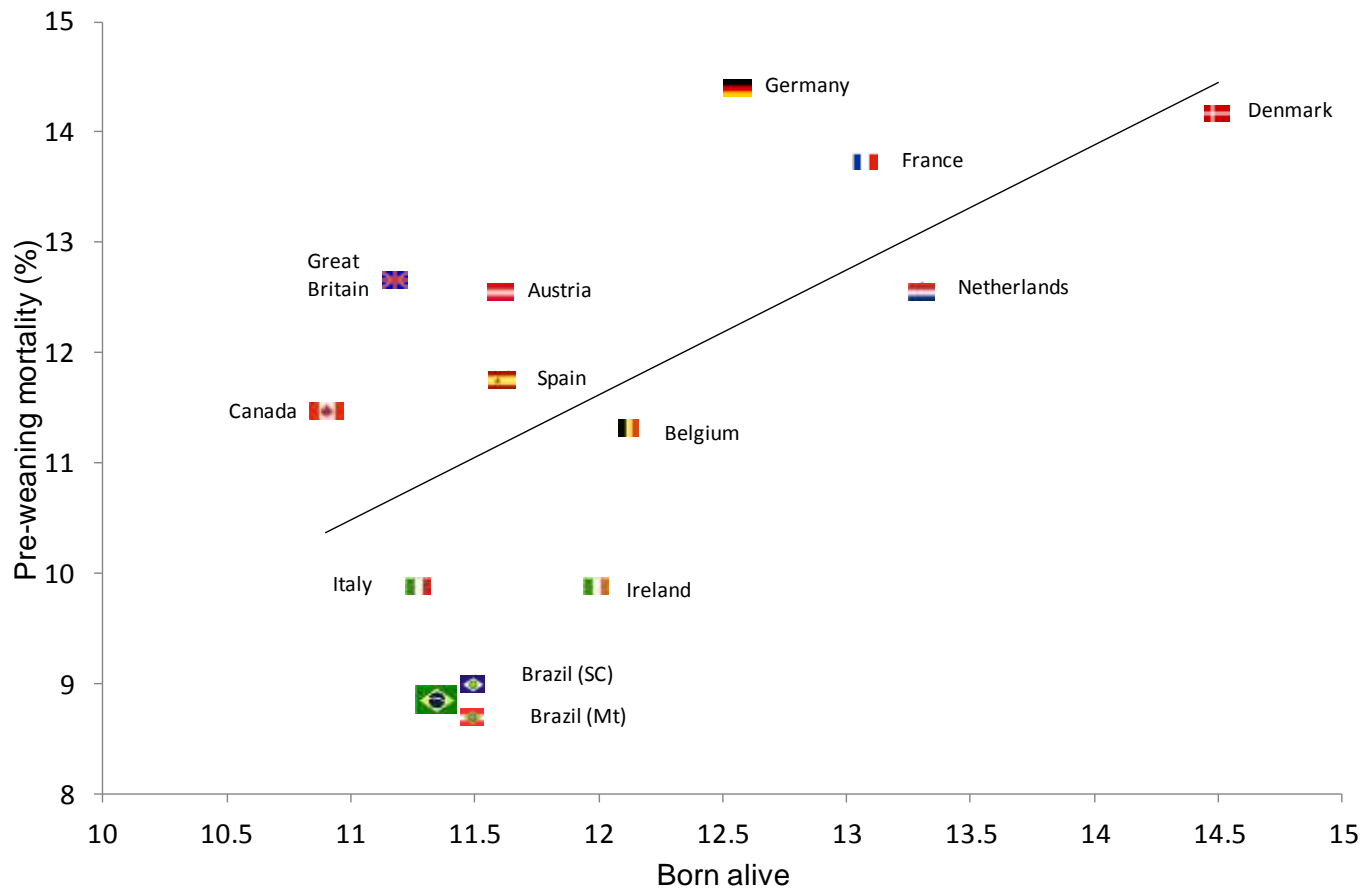
## What is the problem?



Littersize  $\uparrow$  100%

Mortality  $\uparrow$  45%

# What is the problem?



# Morphological changes – piglet maturity



Domestication  
Selection for lean meat

- No hair
- No brown fat
- Reduced physiological maturity



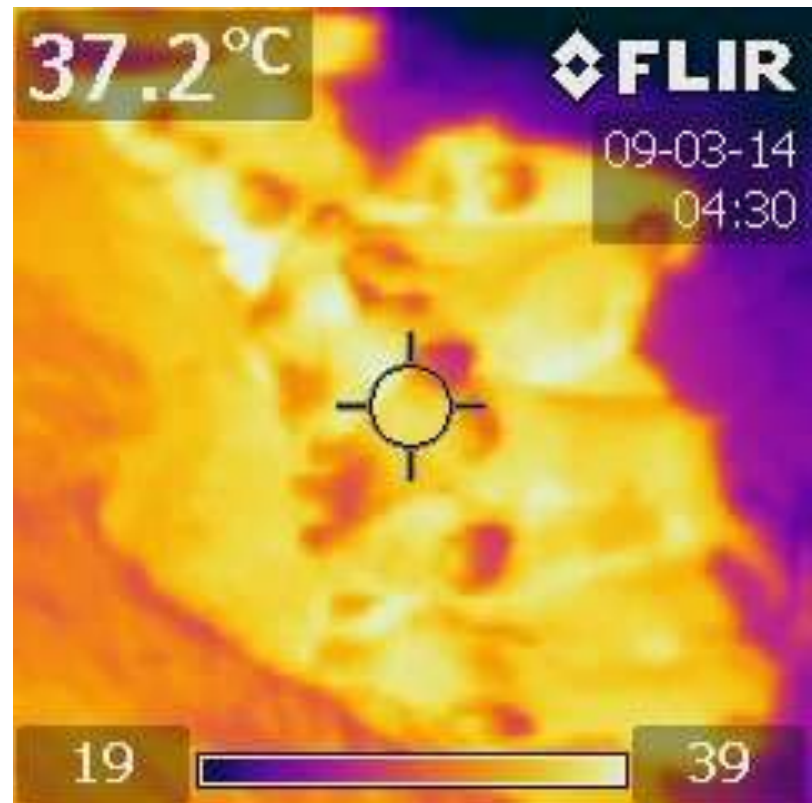
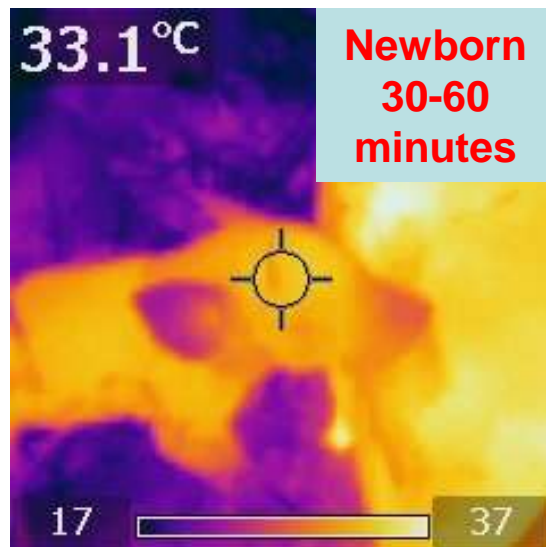
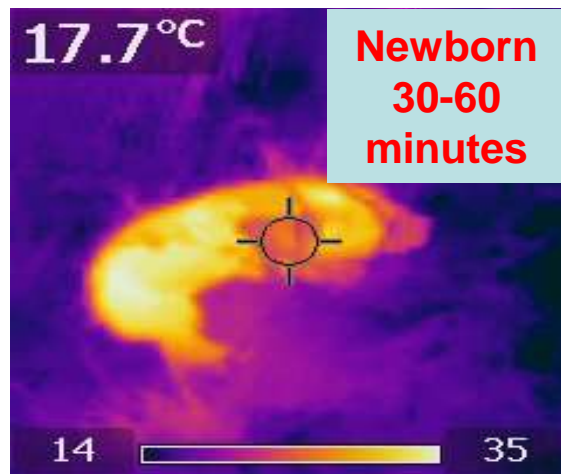
# What is the problem?

Increased vulnerability

- **Relies heavily on behavioural maturity to survive**

Thermoregulation = challenge





# Thermoregulation

- Endotherm (generate own heat)
- Homeotherms (regulate close to a set point)
- Normal temp 39°C (38.5-40.5 °C)
- Very few sweat glands → use behaviour to thermoregulate
- **Sensitive to cold stress**
- **Sensitive to heat stress**



Source = M.Herskin

# Thermoneutral zone

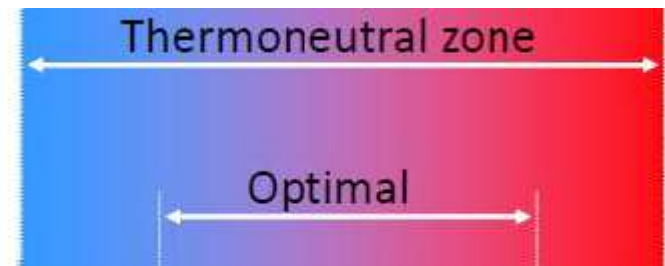
Pregnant sows 10-20°C

Lactating sows 15-20 °C

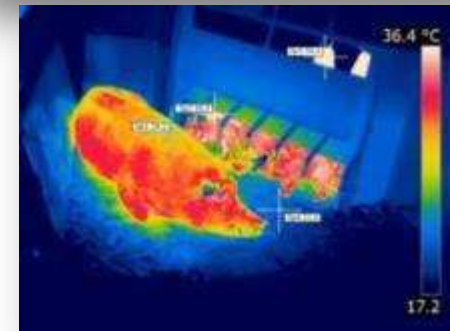
Growing pigs 12-20°C

Piglets at farrowing > 30°C

**Difficult to optimise  
temperature for both sows  
and piglets**

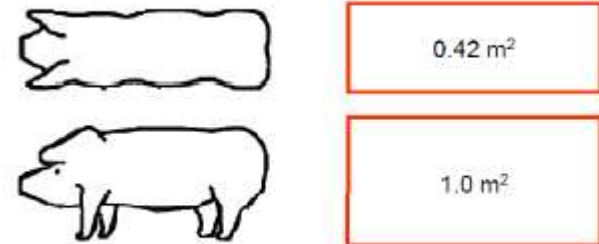
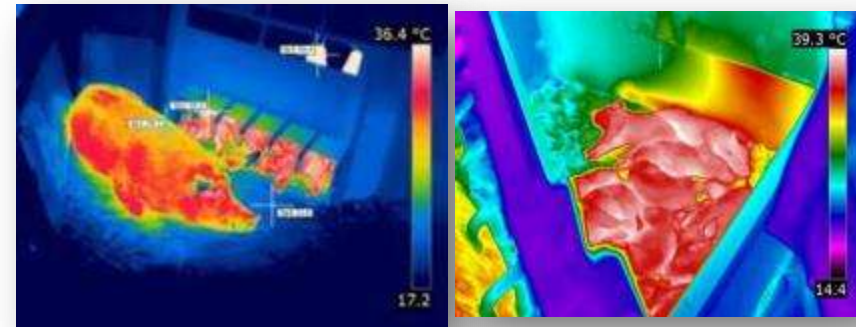


Source = M.Herskin



# Thermoregulation

- Lying behaviour = important way to thermoregulate
- Too cold: sternal recumbency, huddling (e.g. piglets need microclimate)
- Too warm: lateral recumbency, separated, panting
- **Warm pigs need extra space**



Drawing adapted from A. Velarde

Source = M.Herskin



## Other morphological differences



### Tails

Wild boar = generally straight  
Domestic pig = curled

Undocked tails up to 30 cm at  
slaughter

Removal of 75% at tail docking →  
9 cm

**The function of the tail is not  
well described**

# What do pigs do? How do they budget their time?

- Wild boar = diurnal (semi-natural), nocturnal (wild)
- Intake of food and water
- Social/agonistic behaviour
- Comfort behaviour
- Defecation and urination
- Sexual behaviour
- Rest/sleep
- Fear/escape
- Sickness- and pain behaviour
- Maternal behaviour
- Play and exploration

Quantity =  
Dependent on stage of  
life cycle

# Life Cycle

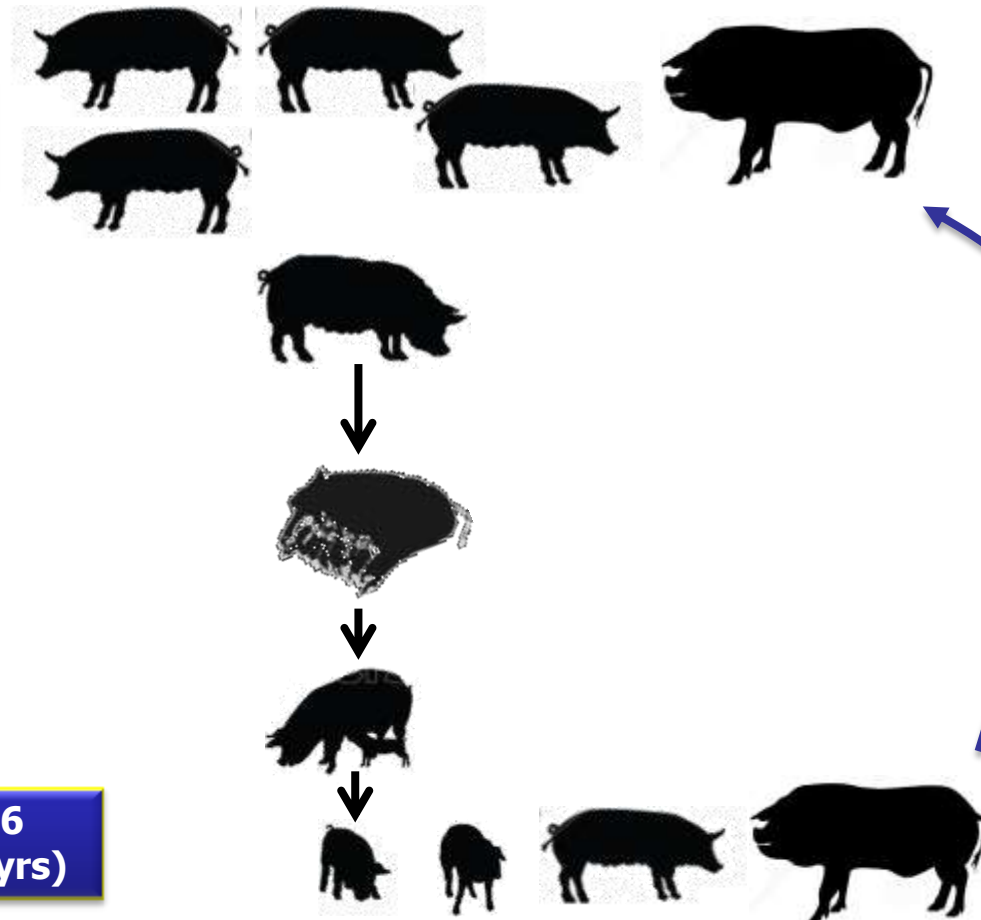
Females live in  
groups/sounders

Gestation  
114d

Farrowing

Neonatal & Lactation  
4 months

Weaning  $\Rightarrow$  Sexual maturity (6  
months)  $\Rightarrow$  Adulthood (max 20 yrs)



# Maternal Behaviour

Sow leaves the group before farrowing

Builds a nest: circular hollow filled with straw

Nest-building behaviour is a highly motivated behaviour. Controlled by hormones and external stimuli.





# Nest-building phase

Source: [www.freefarrowing.org](http://www.freefarrowing.org)

# Why does nest-building behaviour persist?

## Functional

- Prepares the sow for farrowing – the more active nest-building the more passive farrowing = safe for piglets
- Promotes positive maternal behaviour
- Reduces negative maternal behaviour



# Maternal behaviour, early piglet behaviour

- Behaviourally precocial young, born in litters
- Risk of crushing
- Sow-piglet interactions are limited
- Sow inactive
- Each piglet has its own teat – must reach the udder as quickly as possible
- Complex suckling behaviour



# Suckling behaviour

Phase	Duration	Sow		Pigs
1	Appr. 1 min.	grunts	→	gather, find teat
2	Appr. 1 min.	oxytocin	←	massage
3	Appr. 1 min.	grunts faster	→	sucks slowly
4	10 -15 sec.	milk	→	sucks fast
5	0 - 30 min.	stimulation?	←	massage

Source = K. Thodberg





# Teat order

## Establish early = good survival



Welfare problem = large litter sizes



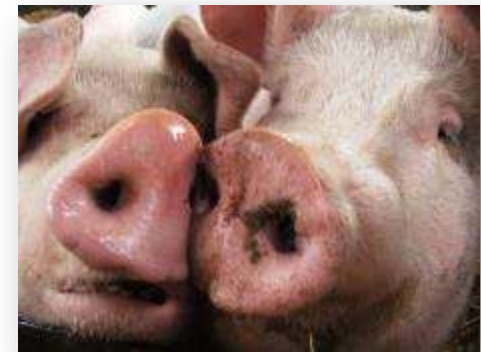
# Social behaviour

- Gregarious
- Form strong rank orders, stable within the group
- Group lies together, and interacts
- Led by the biggest and oldest female
- Young pigs are born into a group and gradually integrated without fighting
- Mixing with novel pigs → severe fighting until rank order is established
- **Welfare problem = mixing and isolation**

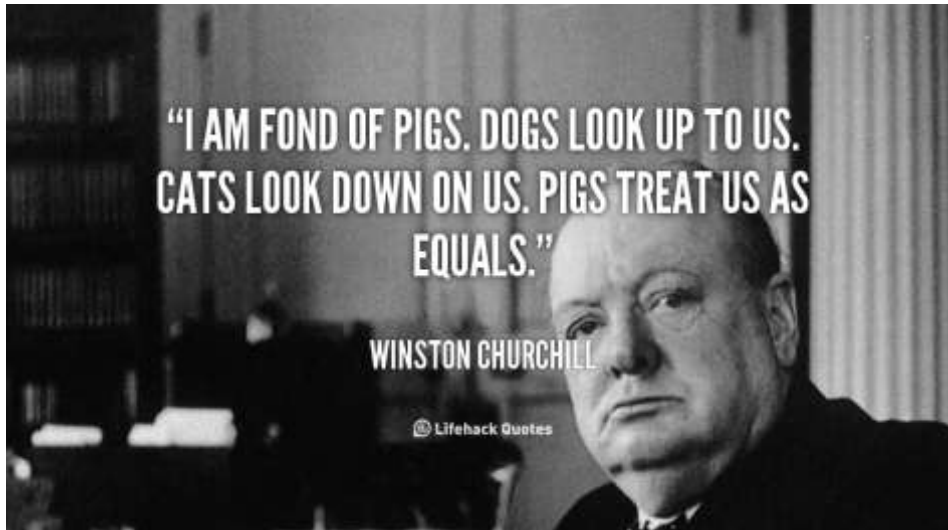


# Pig Senses and Cognitive Abilities

- Pigs have well developed senses
- ÷ night vision → inactive in the dark
- Smell, hearing = primary senses
- Snout = primary sense organ



# Pig Senses and Cognitive Abilities



- Curious
- Investigative
- Well-developed learning abilities

Welfare problem = boredom, redirected behaviours



# Feeding, foraging, investigating

- Omnivorous, opportunistic
- Pigs will seek food 6-7h/d → highly motivated behaviour
- Characterised by rooting with the snout
- Socially facilitating
- Pigs must have access to rooting materials



# Feeding, foraging, investigating

- Pigs like to chew and manipulate items
- Pigs like to play

# Feeding, foraging, investigating

**Welfare problem = when the environment prohibits these behaviours they are redirected**

# Feeding, foraging, investigating

**Welfare problem = when the environment prohibits these behaviours they are redirected**

Sham chewing

Wind sucking

# Sickness behaviour

**Healthy pigs** are active and noisy

**Diseased pigs:**

- Deviates from the group, leaves
- Stops eating
- Lies down (buried if possible)
- Shivers/vomits
- Looks “hairy”



# Why behave differently?

- Need to be able to overcome disease in order to survive
- Typical sickness behaviour has:  
**Evolutionary value ~ survival**
  - ↓ spread of disease
  - ↓ risk of predation/conspecific
  - ↑ energy for metabolism
  - ↑ able to favour heat productionCoupled to the immune system



**Sickness behaviour increases survival**

Slide and expertise = M. Herskin

# Illness and Animal Welfare

- Illness = aversive  $\Rightarrow$  reduced welfare
- Welfare may improve when sickness behaviour is possible
- Ill/injured animals = vulnerable, special needs and preferences
- Special regulations for the care/management of ill animals
- Tools to help spot pigs in need



# Pain and Animal Welfare

Can pigs feel pain?

**Rule of thumb/Benefit of the doubt:  
If it would be painful for you it would be  
painful for the pig**



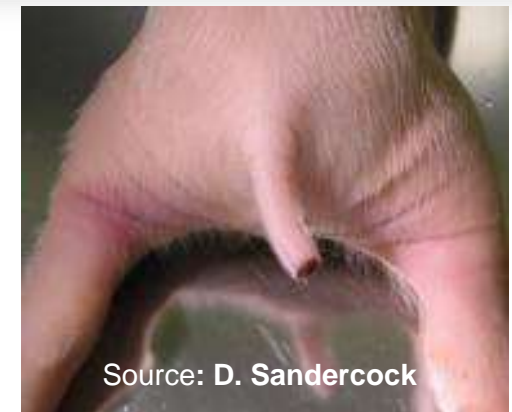
Slide and expertise = M. Herskin

# Why Pain?

The fact that tissue damage “hurts” is a functional adaptation to life in a challenging environment

Pain responses are evolutionary very old

**Plasticity in the nervous system ⇒ long term pain is maladaptive and highly detrimental for animal welfare**



# Acute pain

Avoidance, escape

Activity

Direct attention towards:  
rubbing, tail flicking

Call for help/warn others



**Pain functions to avoid further  
damage**

Slide and expertise = M. Herskin



# Long term pain/Chronic pain

## More discrete reactions

- Isolation
- Inactivity
- Lameness
- Guarding
- Teeth grinding



**Pain functions to protect the injured tissue and promote healing**

Additional welfare concern = what happens when the animal cannot show signs of pain?

# Knowledge of natural pig behaviour and biology should be thought of as an extra veterinary tool/aid



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**SRUC**

**BTSF**

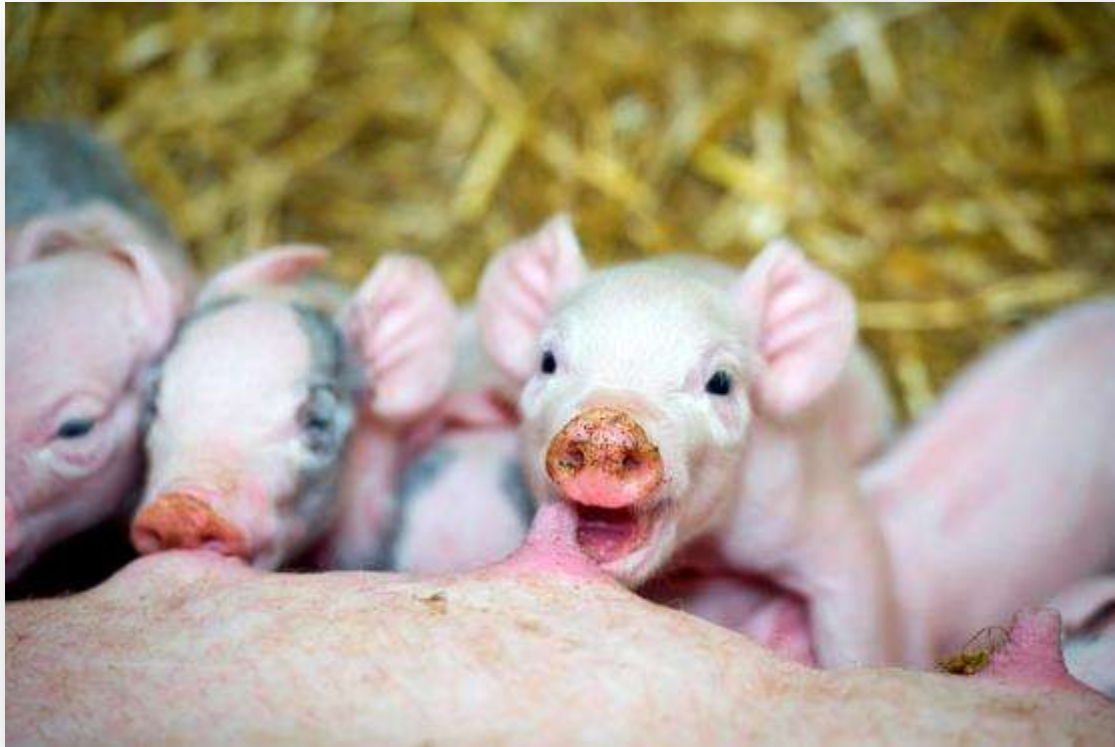
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**Herning, Denmark, Oct 14<sup>th</sup>-17th, 2014**

**Please use it when assessing animal welfare on farm**



# Thanks for your attention





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## **Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale"**

Campo Boario, 64100, Teramo, Italy

Email: [sancotraining@izs.it](mailto:sancotraining@izs.it)

Website: [www.sancotraining.izs.it](http://www.sancotraining.izs.it), [www.izs.it](http://www.izs.it)

Phone: +39 0861 332673

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• *European Commission  
Consumers, Health and Food Executive Agency  
DRB A3/042  
L-2920 Luxembourg*