

Relevance of animal-based indicators for pig welfare assessment – Part II

Xavier Manteca
School of Veterinary Science, *Universitat Autònoma de Barcelona*, Spain



Directorate-General for
Health & Consumers



Executive
Agency for
Health and
Consumers

Some selected examples

#1 Neonatal mortality

#2 Manure on the body

#3 Human-animal relationship

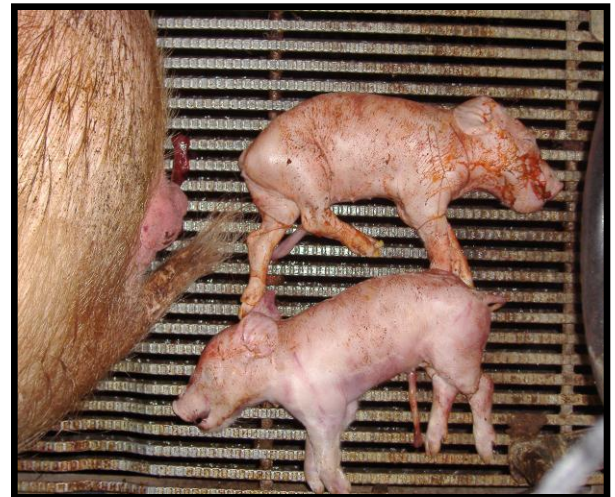
#4 Aggression

#5 Stereotypies

#6 Castration

Neonatal mortality in pigs

- Major welfare and economic problem
- Average figures (15% of piglets born alive) much higher than acceptable values
- Emphasis on management



Neonatal mortality in pigs (II)

- Farrowing crates raise other welfare problems and neonatal mortality is still high
- What about genetic selection?

Small differences in neonatal mortality among lines (Blasco et al., 1995) and low heritability (Casellas et al., 2004).



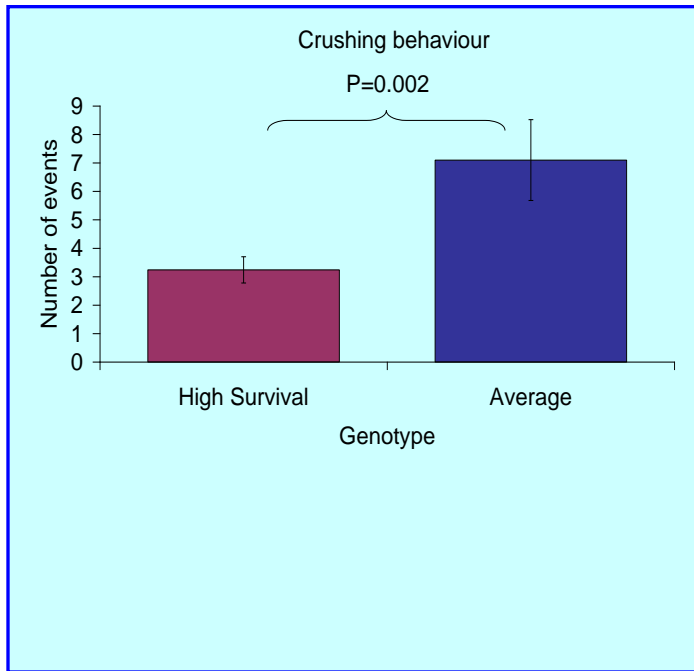
Piglets and sows from two genotypes: High Survival and Average lines.

Outdoor system and indoor loose-housed system (see pictures below).

The selection strategy had its greatest impact outdoors

(only 12% total mortality in the High Survival line compared with 18% in the Average line)





Average number of crushes performed during farrowing by High Survival and Average sows



- Regardless of farrowing environment, maternal behaviour was influenced by genotype.
- High Survival sows were better mothers.
- They were more careful with the piglets (see above)

Neonatal mortality in pigs

- **Stillbirths account for 30-40% of deaths and crushing by the sow is the second most important cause of neonatal mortality**
- **Many studies are not reliable and do not take into account the sequence of events leading to death**

(Edwards, 2002)

Neonatal mortality in pigs

- **Weak piglets have difficulties to compete with littermates and gain access to the udder**
- **This may cause hypothermia and starvation, and increases the risk of crushing by the sow**
- **Hypoxia is a main cause of weakness in newborn piglets**

(Edwards, 2002; Baxter et al., 2008)

Neonatal mortality in pigs

- **Very long farrowings increase the risk of hypoxia in piglets**
- **Sows prevented from building a nest have significantly longer farrowings than sows that are allowed to build a nest (90 min. longer)**
- **This is due to a reduction in oxytocin release**

(Oliveiro et al., 2008, 2009)



What does a newborn piglet need to survive?

PIGLET FACTORS

First time behaviours:

- Quick to find udder
- Quick to grasp teat
- Quick to suckle colostrum

Optimum birth weight

Optimum body shape

Maintain body temperature
(i.e. 38-39°C)



SOW FACTORS

High placental efficiency

Good maternal behaviour:

Calm and "quiet" during farrowing

Slow and supported lying

Appropriate response to crushing

Some selected examples

#1 Neonatal mortality

#2 Manure on the body

#3 Human-animal relationship

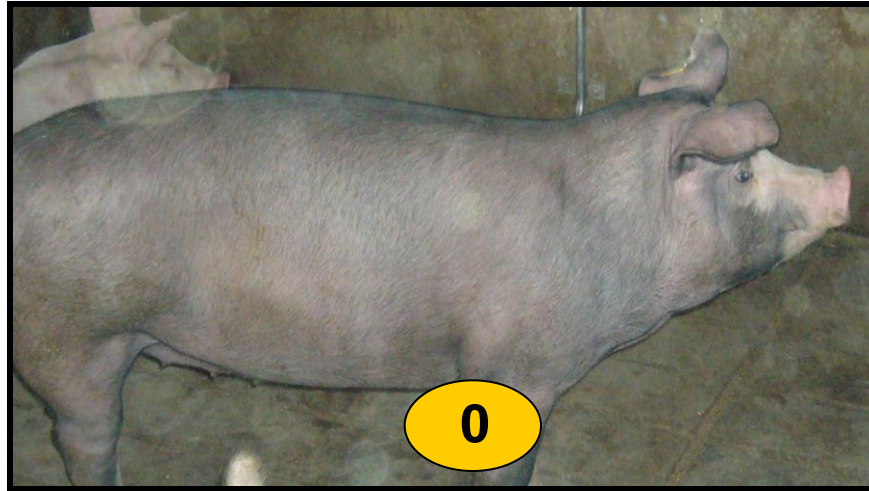
#4 Aggression

#5 Stereotypies

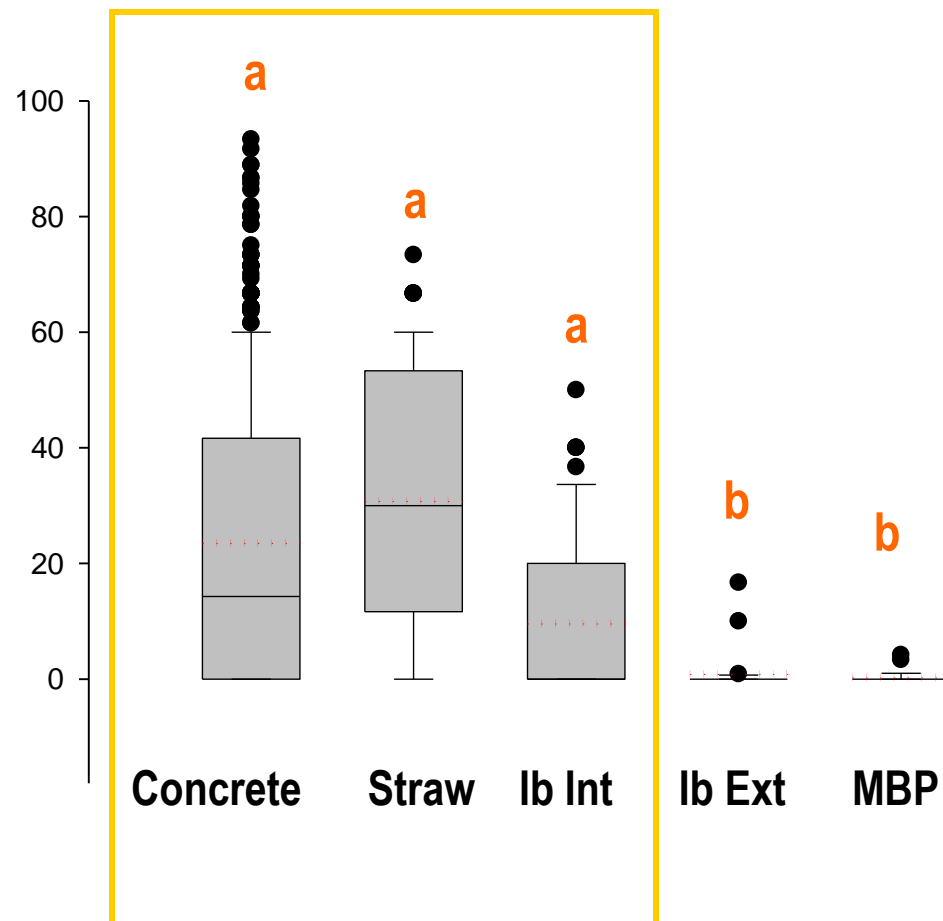
#6 Castration

GOOD HOUSING

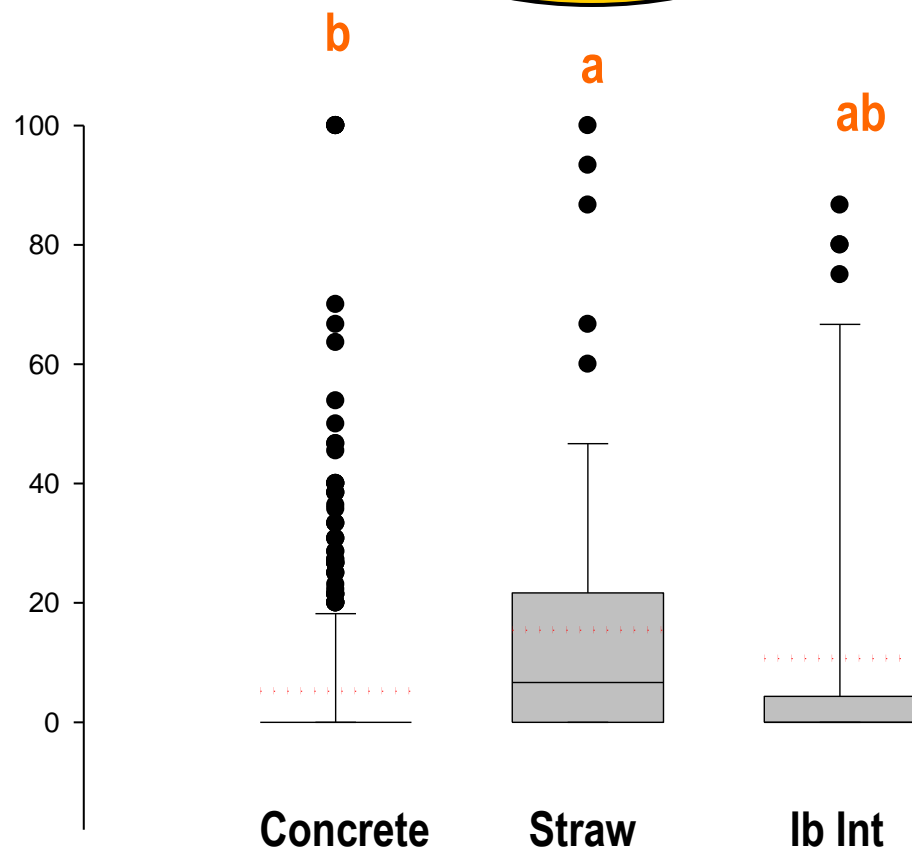
MANURE ON THE BODY



Moderately soiled body



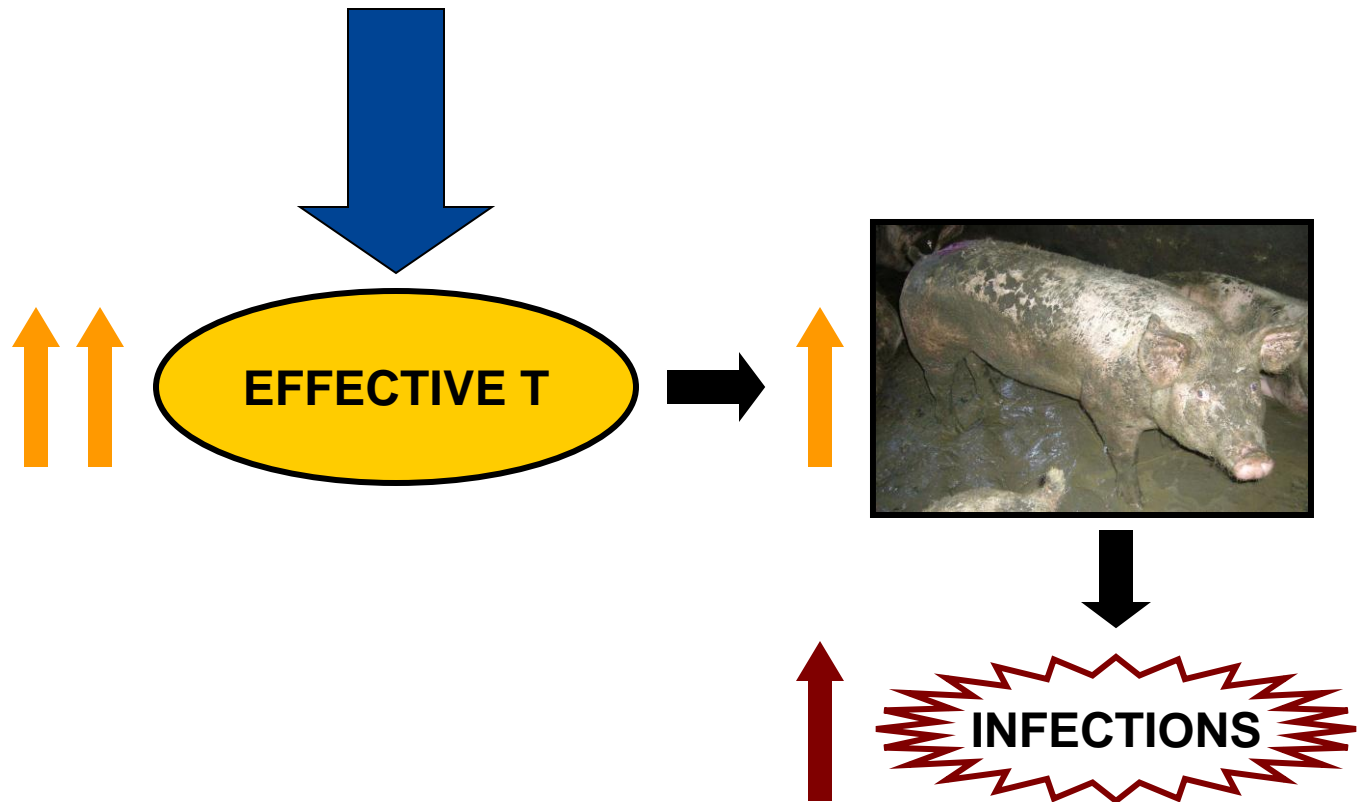
Severely soiled body



HR + Air Velocity + T room

Type of floor → Straw > Partly slatted > Fully slatted

Growing stage → Final > Mid > Early



Some selected examples

#1 Neonatal mortality

#2 Manure on the body

#3 Human-animal relationship

#4 Aggression

#5 Stereotypies

#6 Castration

"The human factor"

- Poor stockmanship may lead to poor supervision of the animals
- It may cause chronic fear
- And lead to husbandry practices that are not necessary or acceptable

"The human factor" (II)

- Training the stockpeople and the veterinarians is probably the most cost-effective strategy to improve animal welfare
- Without specific training on animal welfare, veterinarians and animal scientists may miss some important aspects of it
- Treatment of pain remains a major issue
(eg Hewson et al., 2007)

"The human factor" (III)

	HANDLING		
	POSITIVE	MINIMAL	NEGATIVE
Time to interact with humans, min.	48 ^a	96 ^b	120 ^c
Pregnancy rate in primiparous sows, %	88 ^a	57 ^b	33 ^b
Age at first succesful copulation, days	161 ^b	176 ^{bc}	193 ^c

(Hemsworth et al., 1986; Hemsworth et al.,1991)

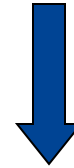
**APPROPRIATE
BEHAVIOUR**

HUMAN-ANIMAL RELATIONSHIP

HAR test at pen level



NO panic

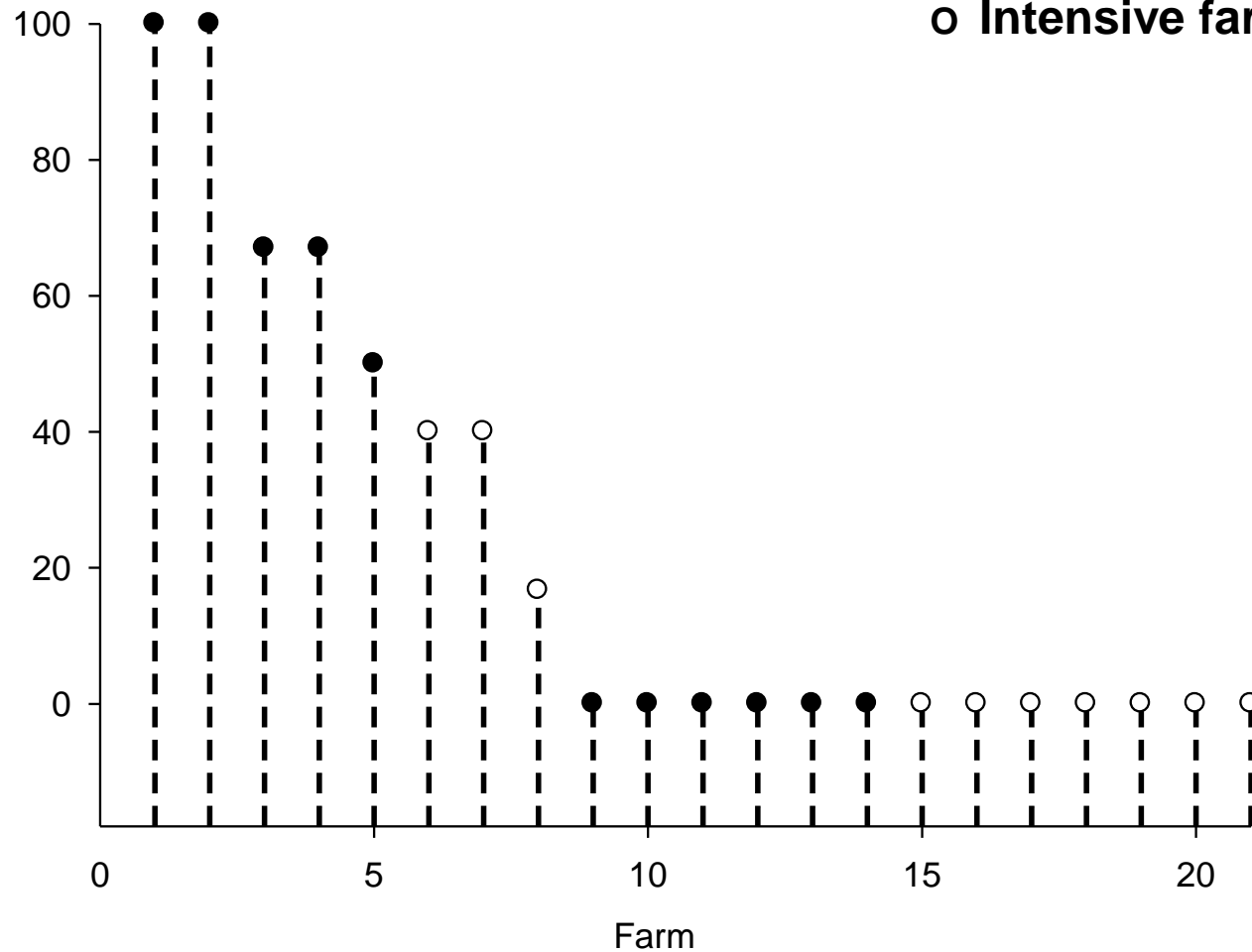


> 60% pigs frightened

PANIC response

Panic response (%)

● Extensive units
○ Intensive farms



No significant difference between intensive and extensive pigs

Marked differences in the degree to which the animals were fearful

STOCKMANSHIP

**GENETIC
BACKGROUND**

**GROWING
PERIOD**

Space allowance
Degree of curiosity
Passive avoidance

FEAR RESPONSE

Some selected examples

#1 Neonatal mortality

#2 Manure on the body

#3 Human-animal relationship

#4 Aggression

#5 Stereotypies

#6 Castration



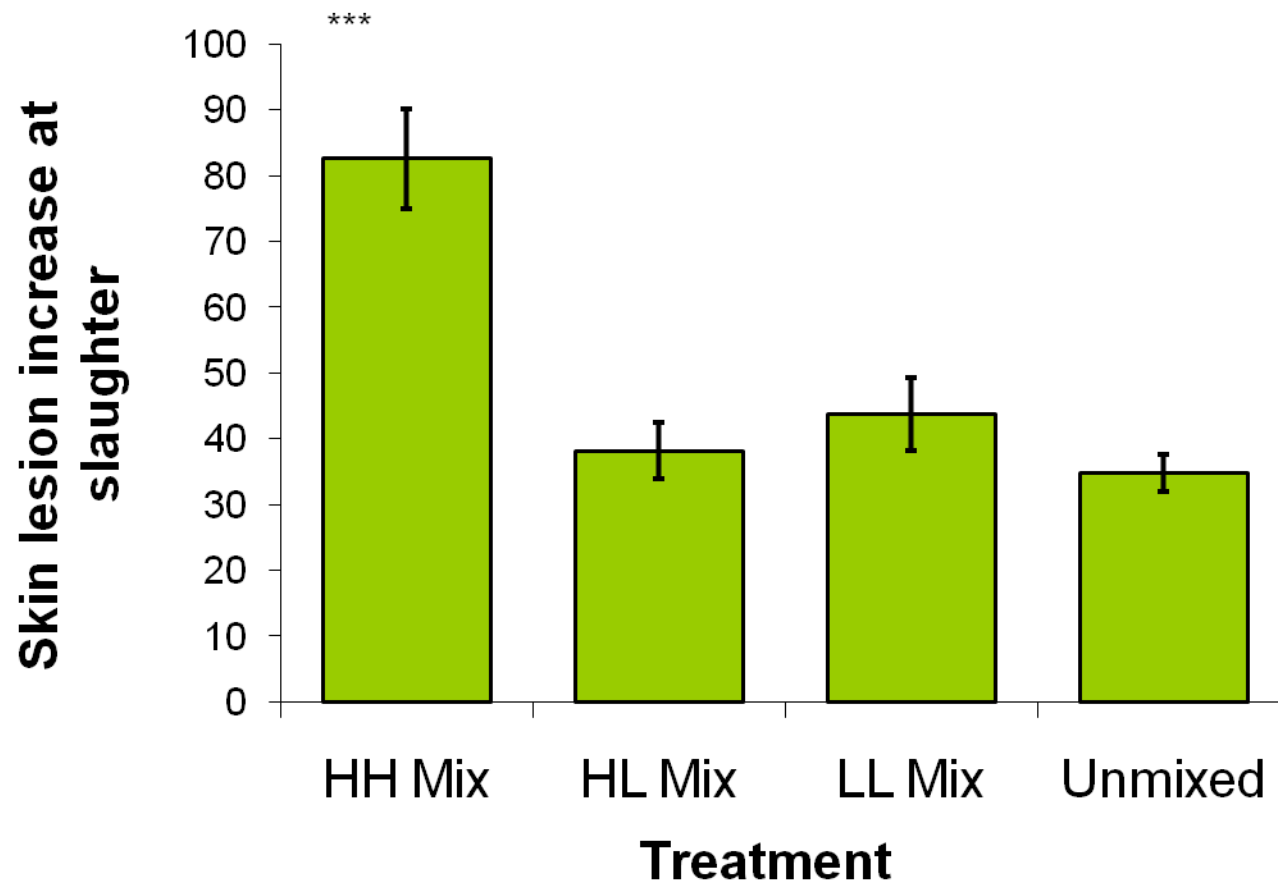
- It is an important welfare problem in fattening pigs and group-housed pregnant sows (SCAHAW, 1997)
- Aggressive behaviour is affected by the genotype of the animal



- Aggressive behaviour is affected by the genotype of the animal and genetic selection for reduced aggression is feasible
- Fighting and bullying post-mixing are moderately heritable, and skin lesion counts 24hrs after mixing could be used as a proxy trait



(D'Eath et al., 2009 Turner et al., 2009)

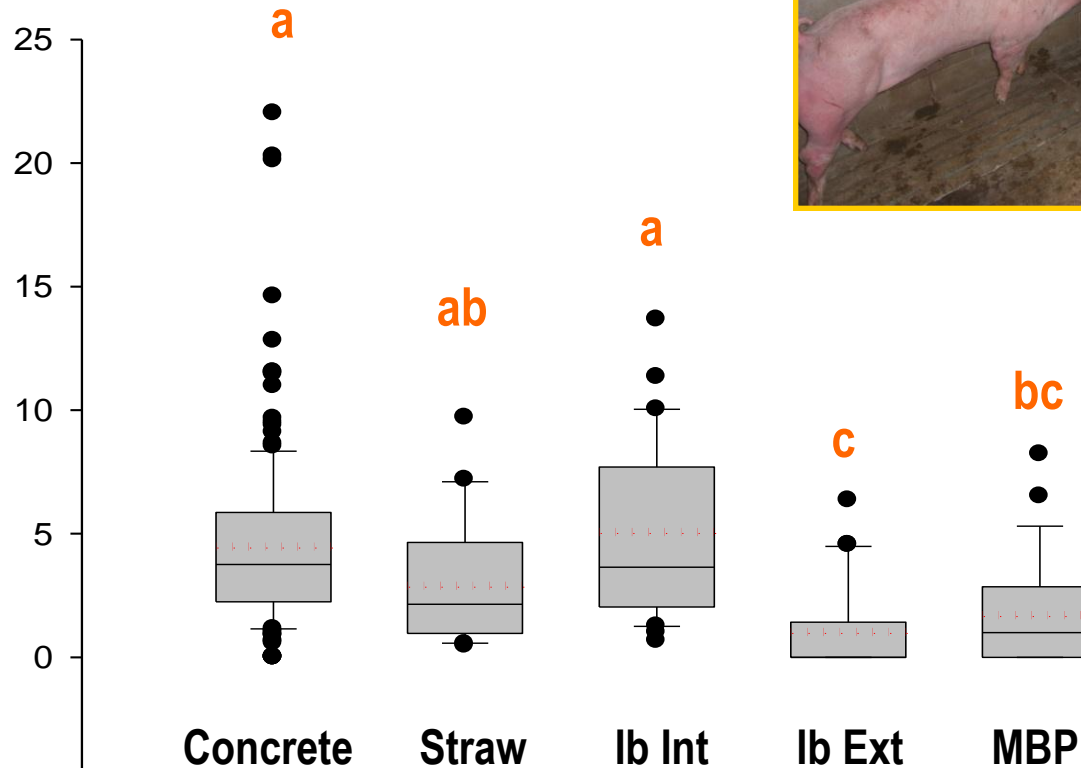


(data from Alistair Lawrence)

APPROPRIATE
BEHAVIOUR

AGRESSIVE BEHAVIOUR

Occurence (%)



RELIABILITY
- NO observer
effect

PREDICTIVE FACTORS

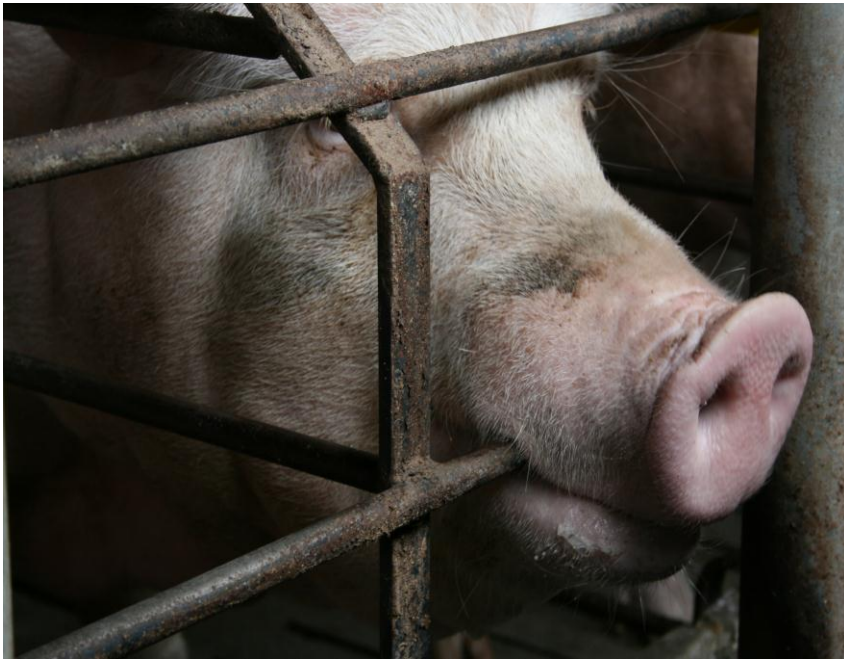
<u>Type of feeder</u>	OR	95% CI
Trough	1	
Dry hopper	1.8	1.2-2.6
Wet feed hopper	1.7	1.1-2.7
<u>Enrichment</u>		
Yes	1	
No	2.1	1.2-3.6

PRECISION → SENSITIVE across systems

Welfare in pregnant sows

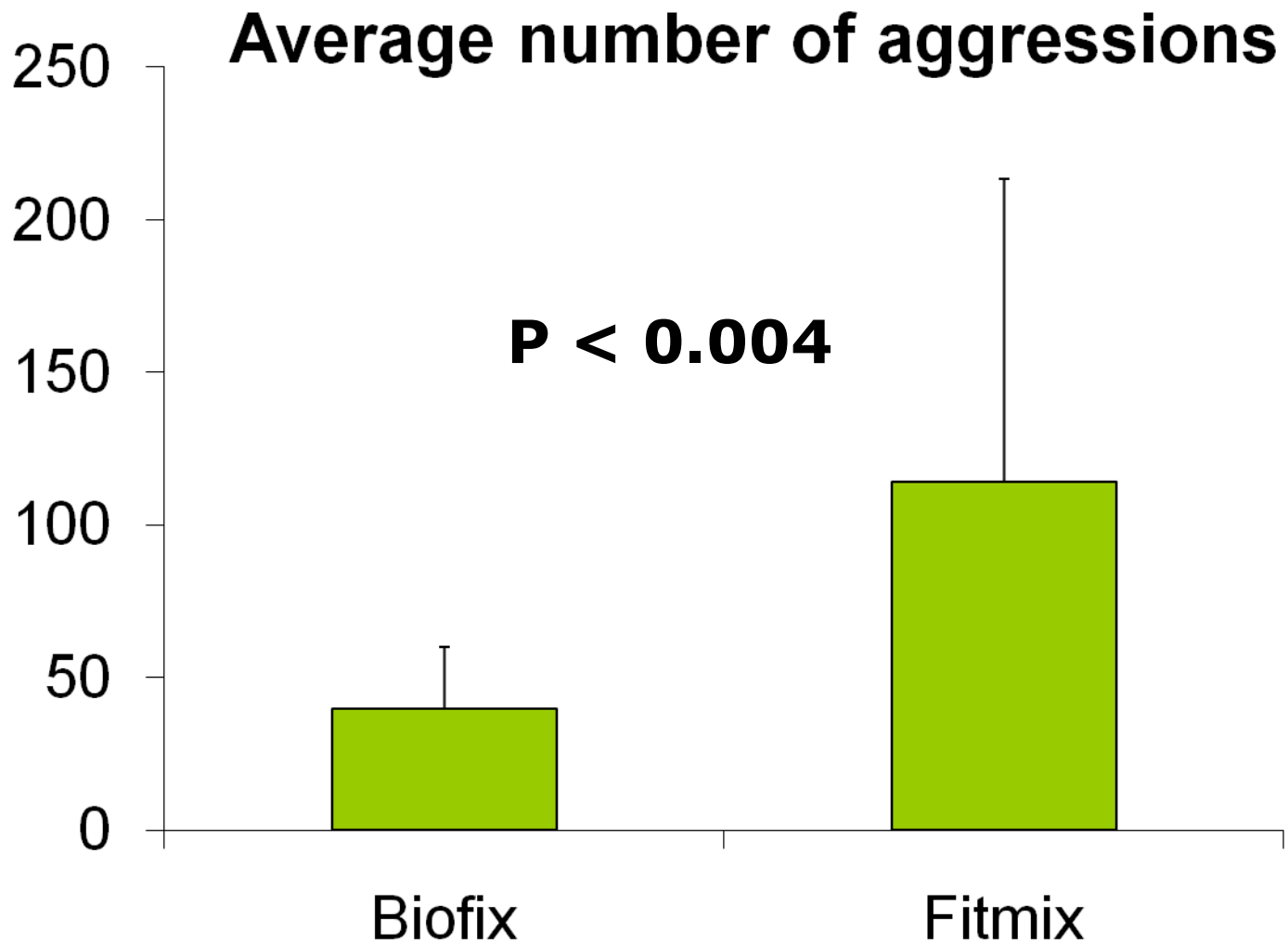


Welfare in pregnant sows











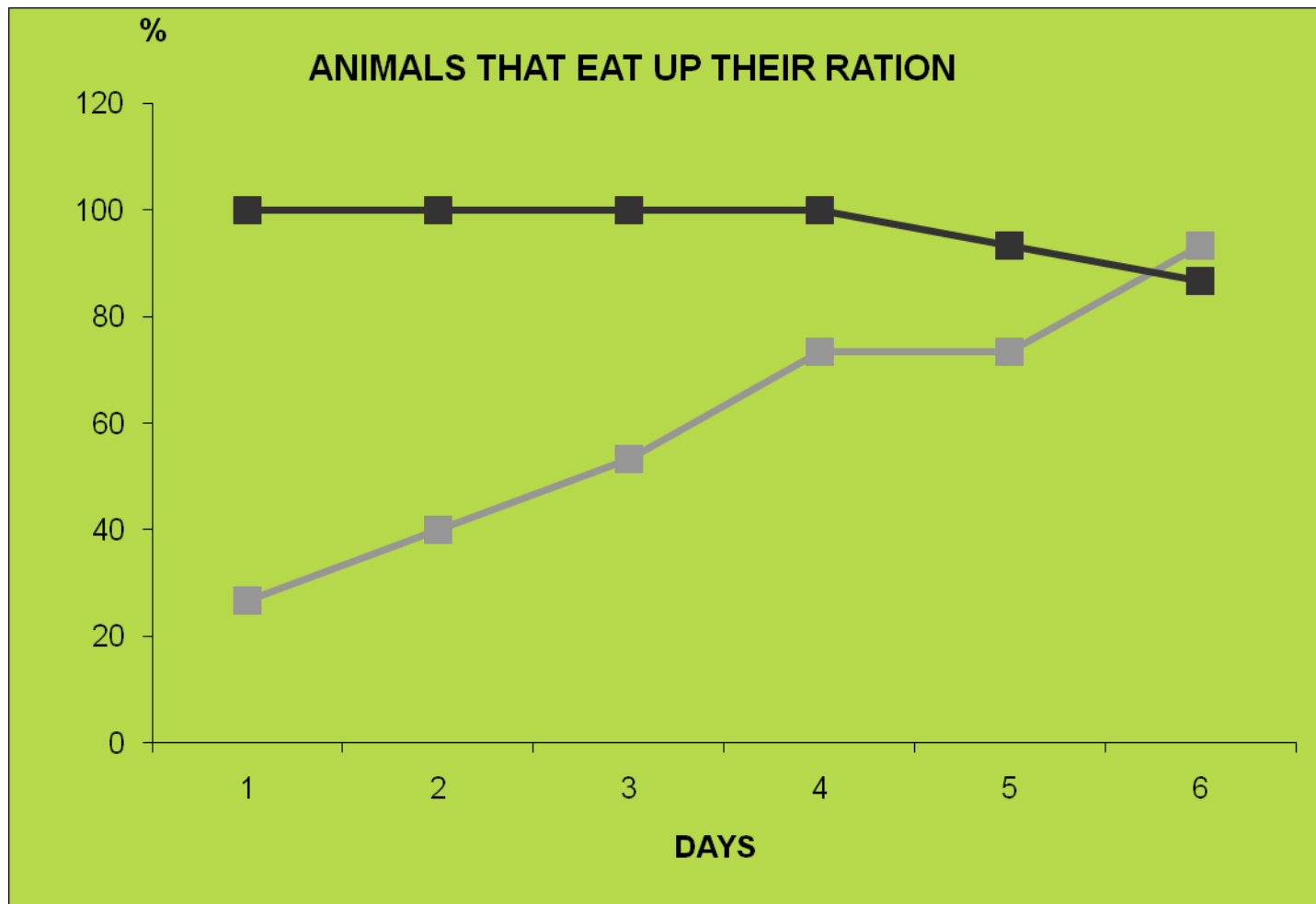
Intensity of aggressive interactions (%)

	BIOFIX	FITMIX
Intensity 1	71.3 ^a	60.8 ^b
Intensity 2	25.1 ^b	36.4 ^a
Intensity 3	2.8	2.2
Intensity 4	0.9	0.8

Location of aggressive interactions (%)

	BIOFIX	FITMIX
Feeder	23.5 ^b	81.5 ^a
Drinker	12.2 ^a	2.0 ^b
Other	64.3 ^a	16.4 ^b





First pregnancy



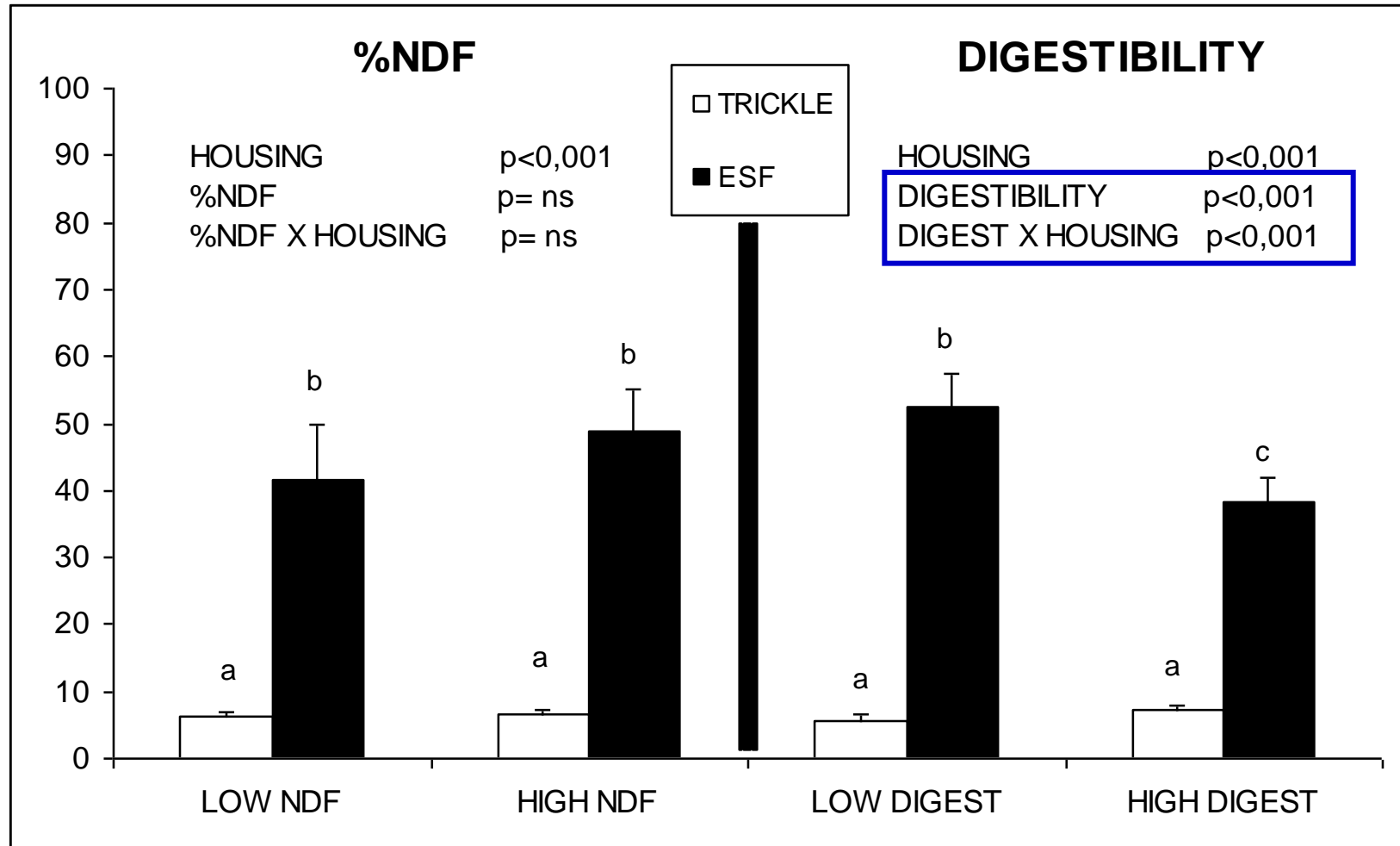
Second pregnancy

Stereotypies

- Behaviours that are repetitive, invariant and without obvious function (Odberg, 1978)
- Repetitive behaviours induced by frustration, repeated attempts to cope, and/or CNS dysfunction (Mason, 2006)



Aggression in group-housed pregnant sows



Some selected examples

#1 Neonatal mortality

#2 Manure on the body

#3 Human-animal relationship

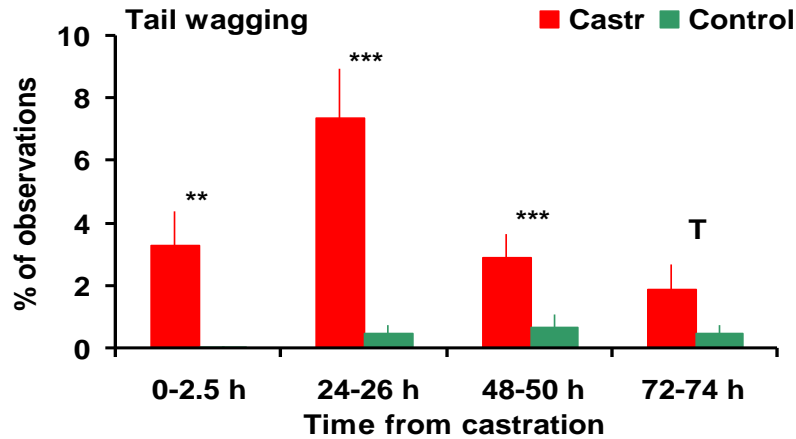
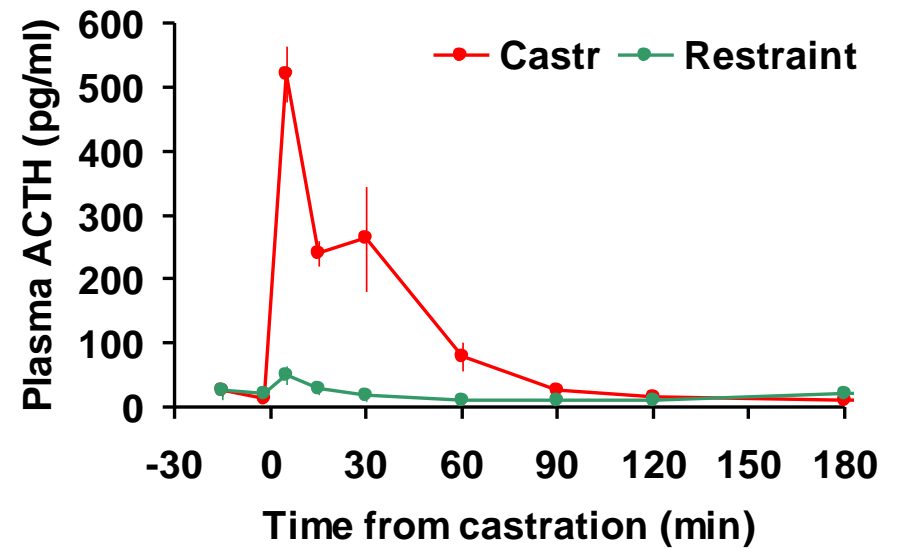
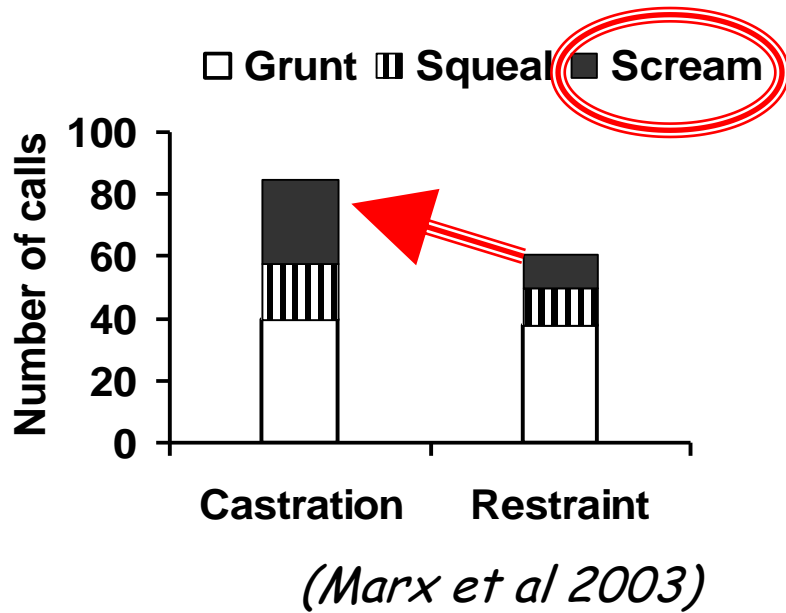
#4 Aggression

#5 Stereotypies

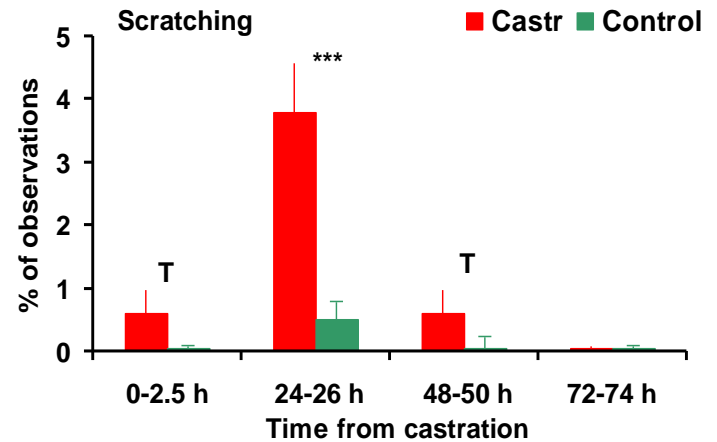
#6 Castration

Pain in pigs

- Disease
- Injuries caused by the physical environment
- Injuries caused by other animals
- Management procedures



(Hay et al 2003)

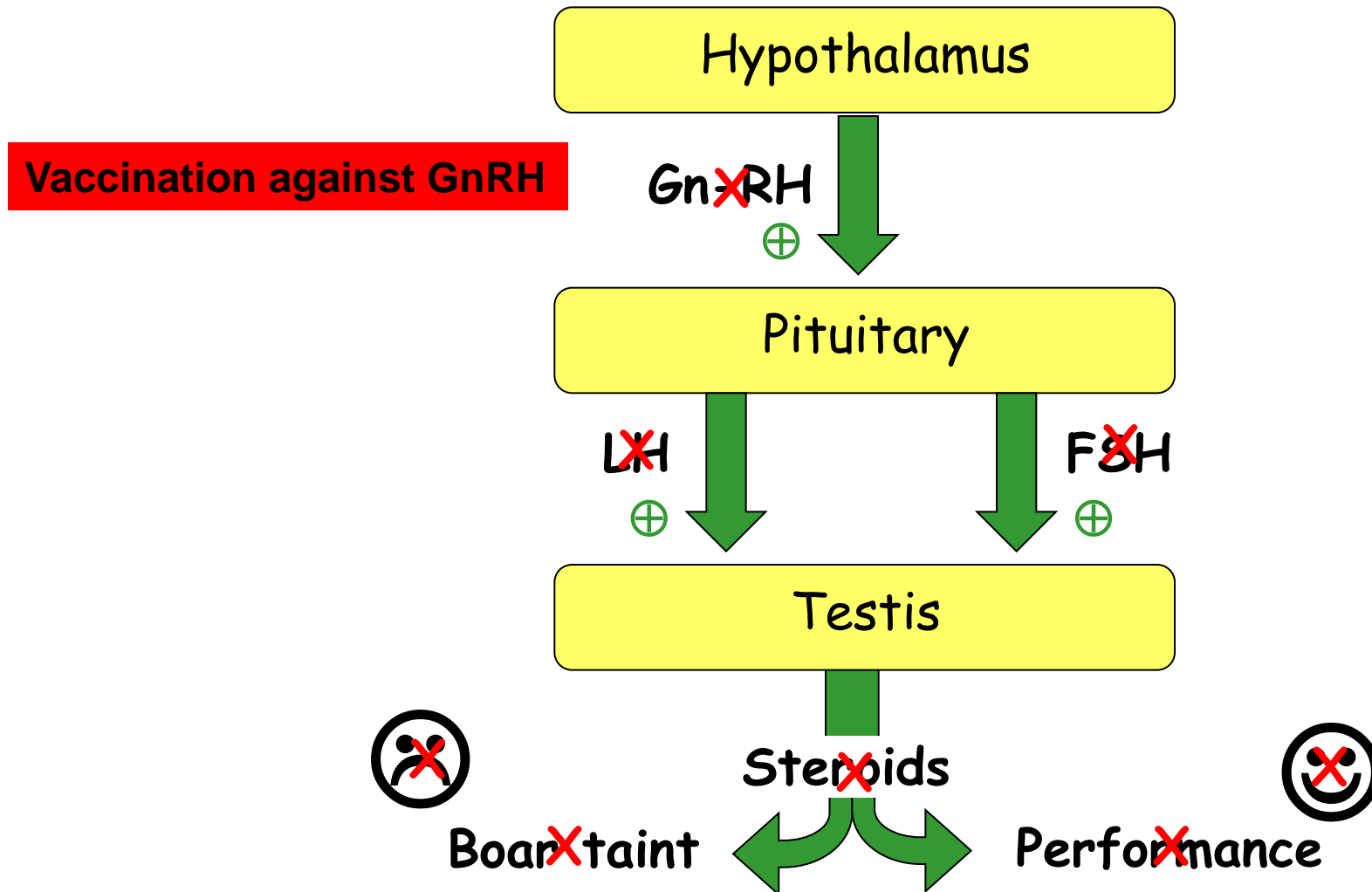


(Hay et al 2003)

Alternatives to surgical castration

- Raising of entire males
- Genetic selection
- Sperm sorting
- Immunocastration

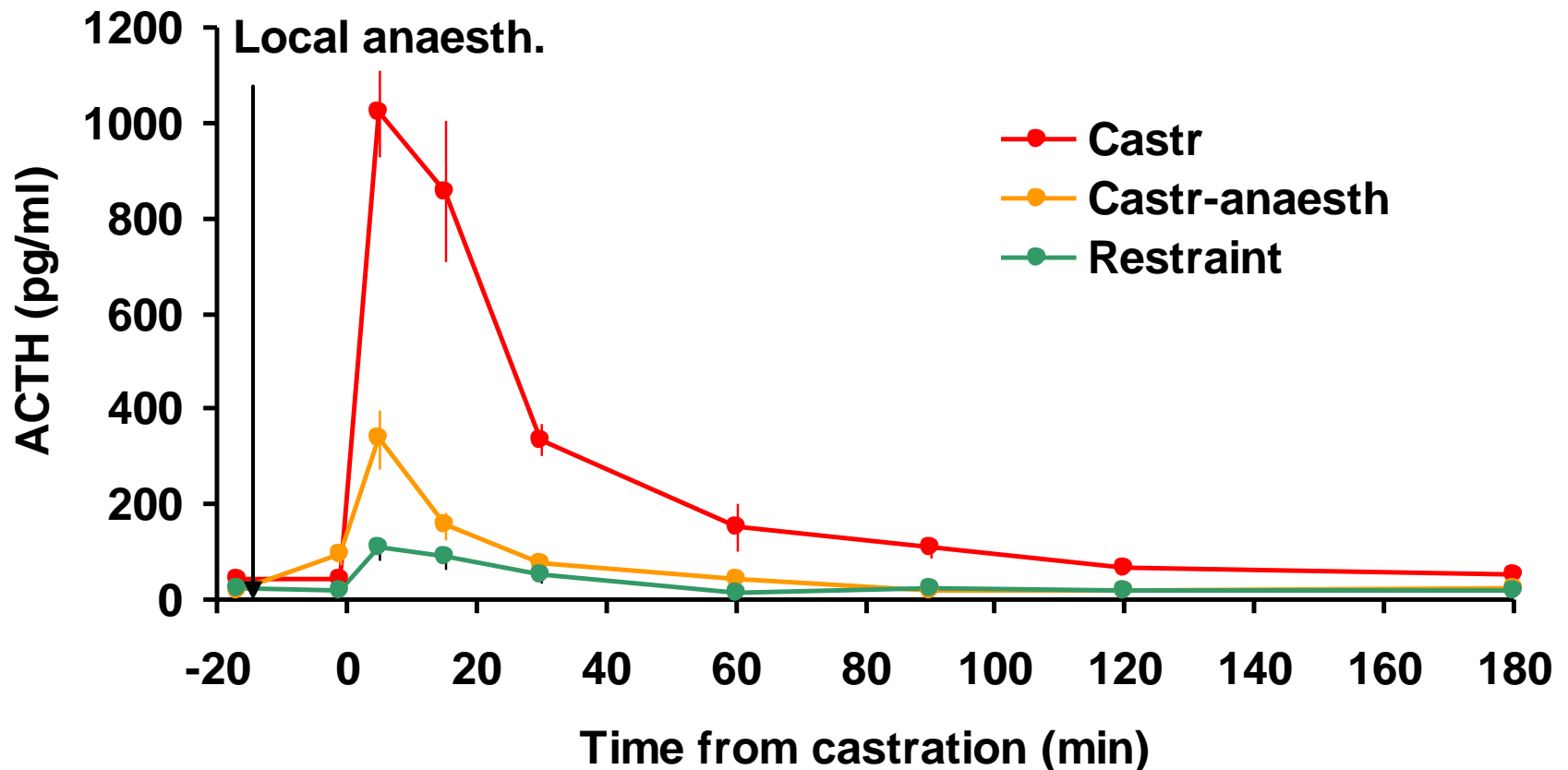
Immunocastration



Methods to reduce pain caused by surgical castration

- General anaesthesia – injection
- General anaesthesia – inhalation
- Local anaesthesia
- Analgesia

Castration with local anaesthesia - lidocaine



(Prunier et al. unpublished)