Importance of feeding behaviour

when assessing the impact of nutrition on farm animal welfare




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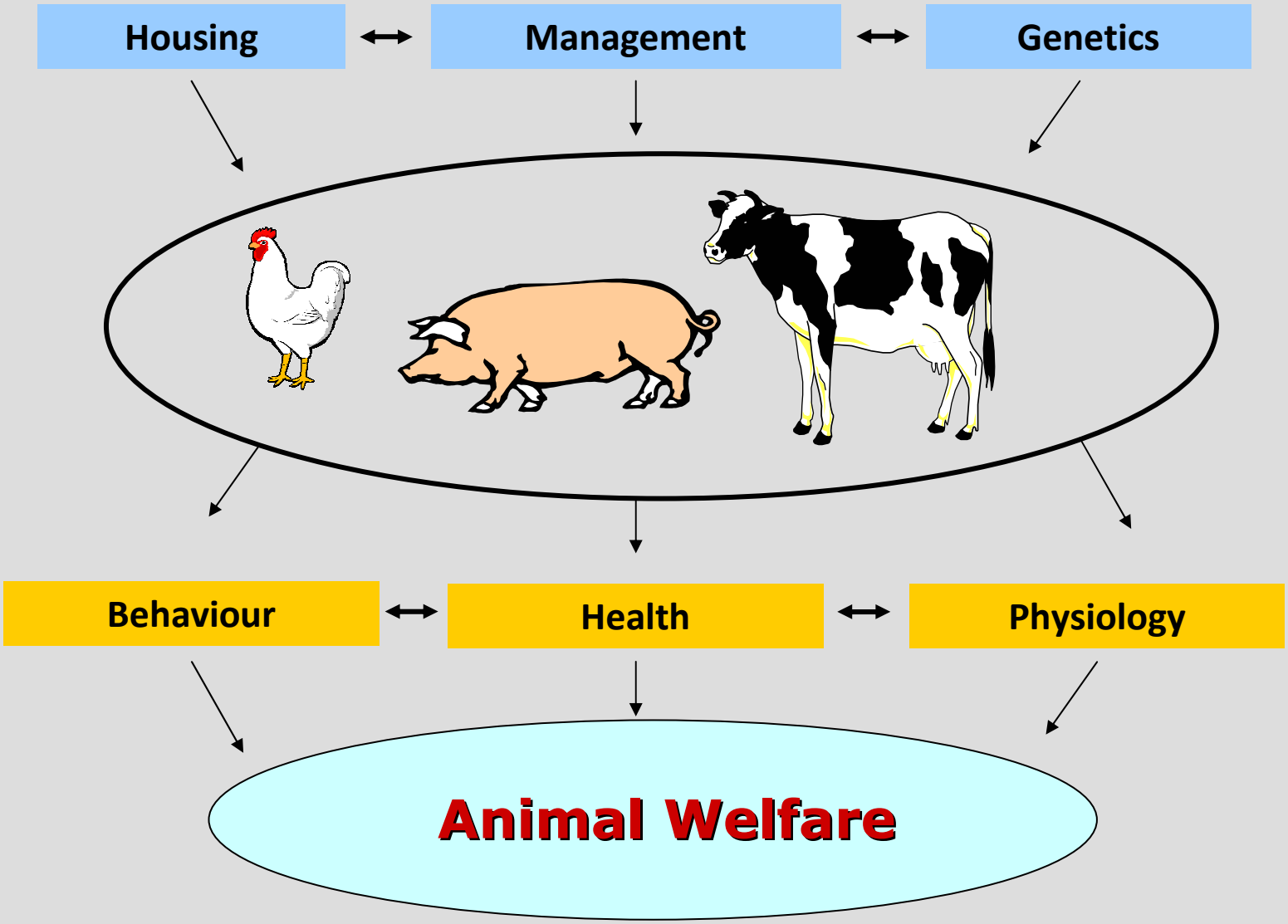
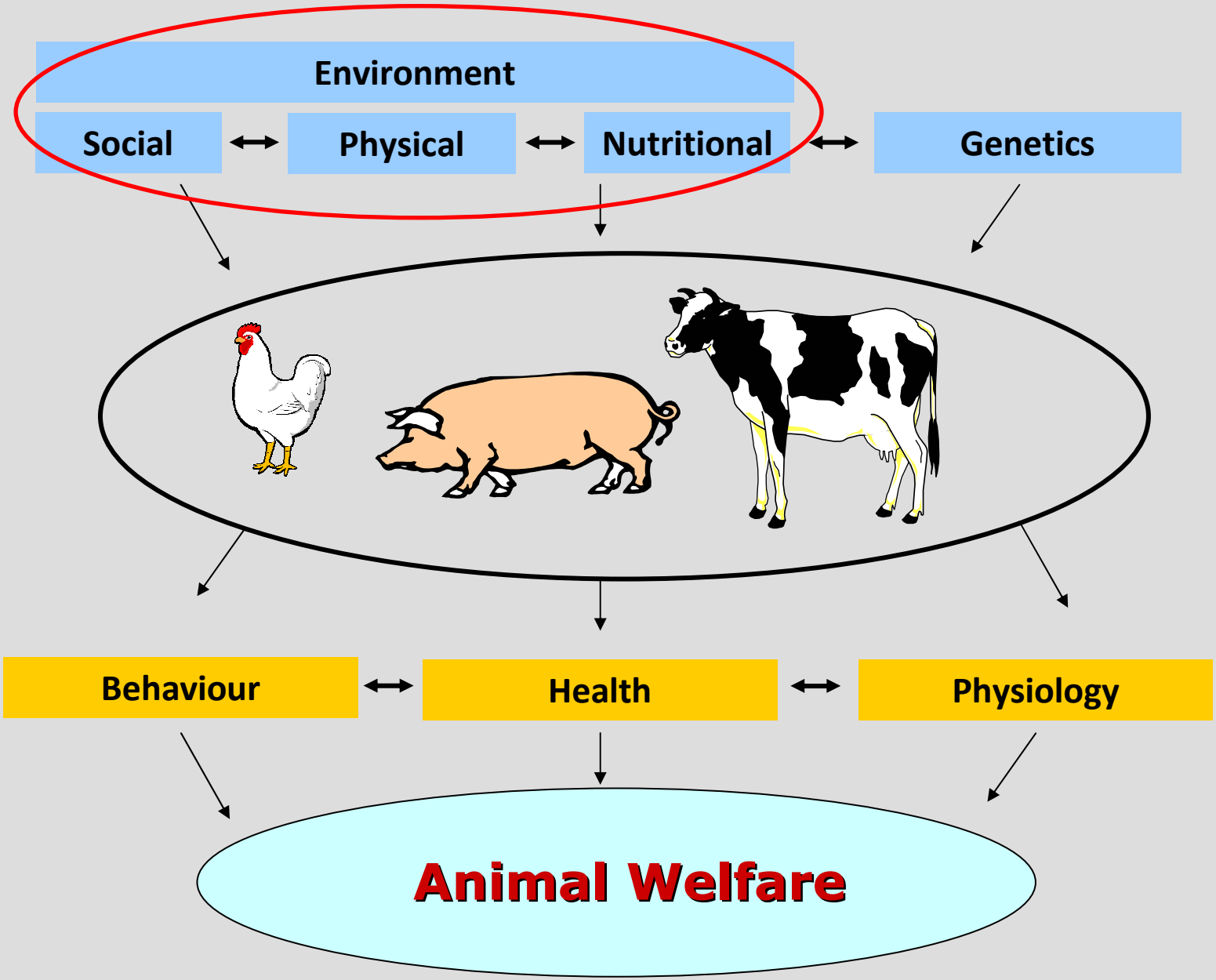
Feeding behaviour…

- Link between food and feed intake (FI)
  - Searching, foraging
  - Finding, choosing
  - Gaining, maintaining access
  - Meal size, -frequency, -duration
    - ⇨ feeding rate, time spent feeding, FI


Housing
Management
Genetics
Behaviour
Health
Physiology
Animal Welfare


Environment
Social
Physical
Nutritional
Genetics
Behaviour
Health
Physiology
Animal Welfare

Environment

Social ⟷ **Physical** ⟷ **Nutritional**

For example…

- **Group size**
- **Group composition**
- **Mixing**

- **Space**
- **Equipment**
- **Handling**

- **Feed composition**
- **Quantity**
- **Presentation**

Nutrition Facts

Serving Size 6 ounces
Servings Per Container 8

Amount Per Serving

Calories 220	Calories from Fat 60
	% Daily Value*
Total Fat 7g	**11%**
Saturated Fat 0.5g	**3%**
Trans Fat 0g	
Cholesterol 45mg	**15%**
Sodium 390mg	**16%**
Total Carbohydrate 17g	**6%**
Dietary Fiber 5g	**20%**
Sugars 5g	
Protein 23g	

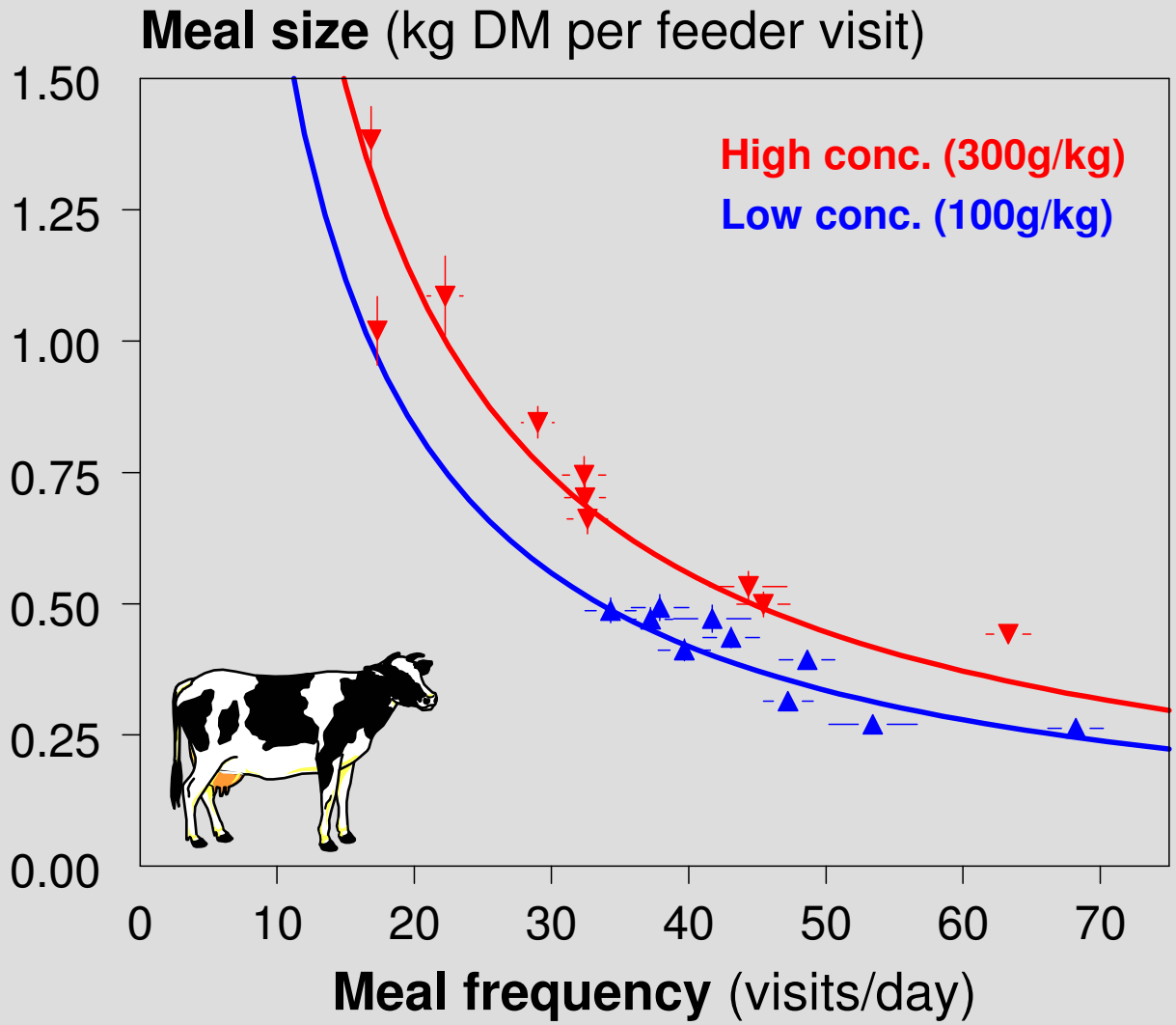
Vitamin A 10% • Vitamin C 70%
Calcium 6% • Iron 10%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

		Calories:	2,000	2,500
Total Fat	Less than		65g	80g
Saturated Fat	Less than		20g	25g
Cholesterol	Less than		300mg	300mg
Sodium	Less than		2,400mg	2,400mg
Total Carbohydrate			300g	375g
Dietary Fiber			25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Food quality



Friggens et al. (1998)

Food presentation

Nutrition, (feeding) behaviour and animal welfare

- Grazing vs. indoor feeding of roughage to ruminants (Morales-Almaraz et al., 2011)
- Tongue rolling in dairy cows (Lindström and Redbo, 2000; Mustafa et al., 2009)
- Weaning of piglets (Bolhuis et al., 2008)
- Use of 'chewing time' in feed formulation for ruminants (Nørgaard et al., 2008)
- Feeding chicory root to prevent boar taint (Hansen et al., 2006)
  ⇨ castration unnecessary?
- Biosecurity and inappropriate manure handling
  ⇨ prevents feeding whole-crop silage to swine (Jensen et al., 2010)



Restrictive feeding of parent stock

- Selection for fast, lean growth ⇨ necessary to restrict feed **gestating sows** (50-60%) and **broiler breeders** (25-50%)
- ⇨ prolonged, severe hunger
- Ad libitum feeding ⇨ production, leg- and cardio-vascular health

…. at least for broiler breders

Restricted feeding of gestating sows

- Little evidence that increased feeding is detrimental for reproductive performance !!
- Many (most?) papers with **H** and **L** feed levels find
  - no effect (eg. Hoppe et al., 1990)
  - improved piglet birth weight and gain (eg. Coffey et al., 1994)
  - lower FI by sow during lactation (eg. Revell et al., 1998)

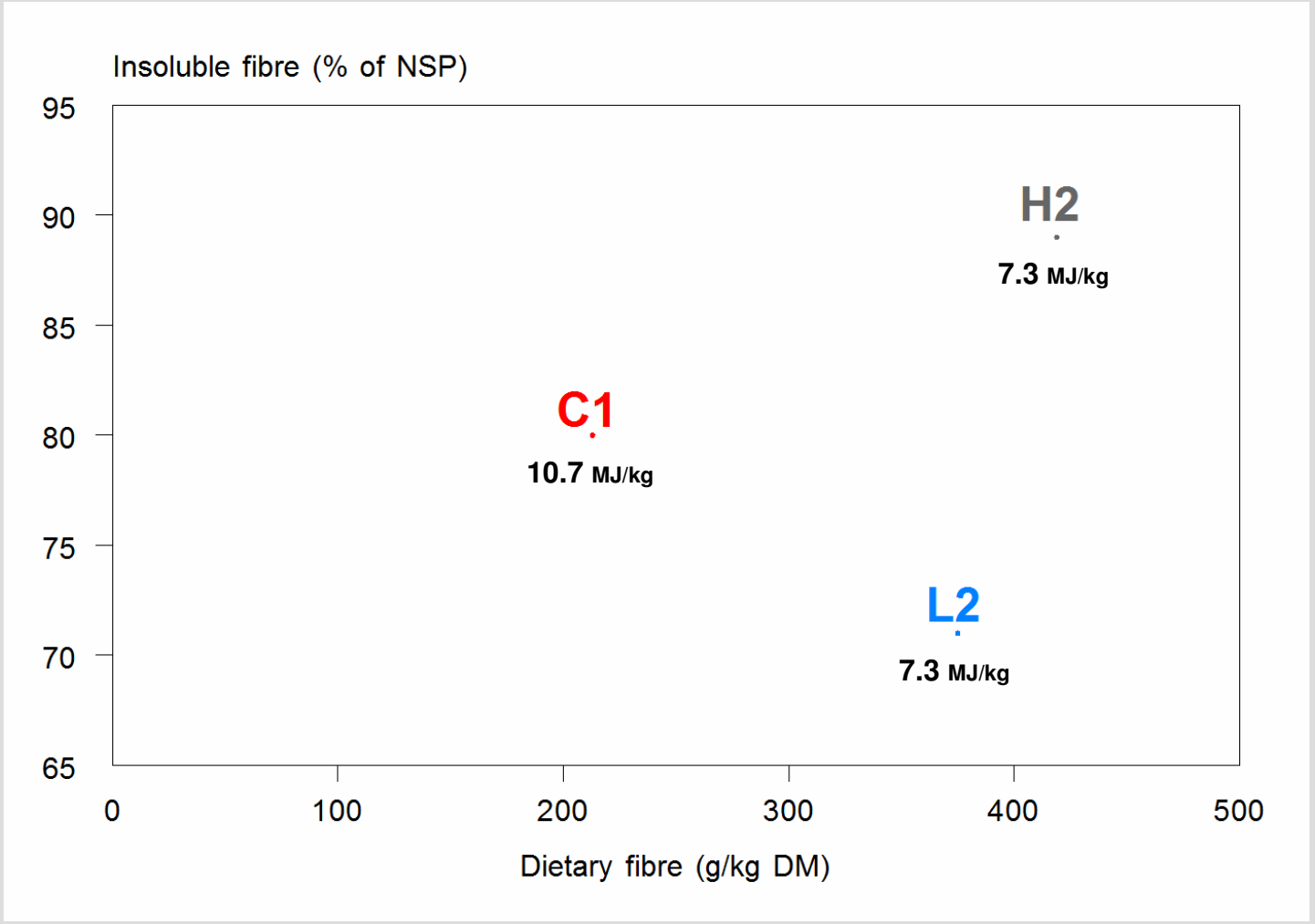
"…extra feed allowance during mid-gestation has … slight advantages on productive output, although probably not high enough to justify the extra feed wastage." (Cerisuelo et al., 2008)

"No advantage for providing **38** vs **25** MJ ME/d to sows during gestation was found." (Hoppe et al., 1990)

"These results suggest that energy levels recommended by the National Research Council (1998) for sows are enough" (Yang et al, 2008)

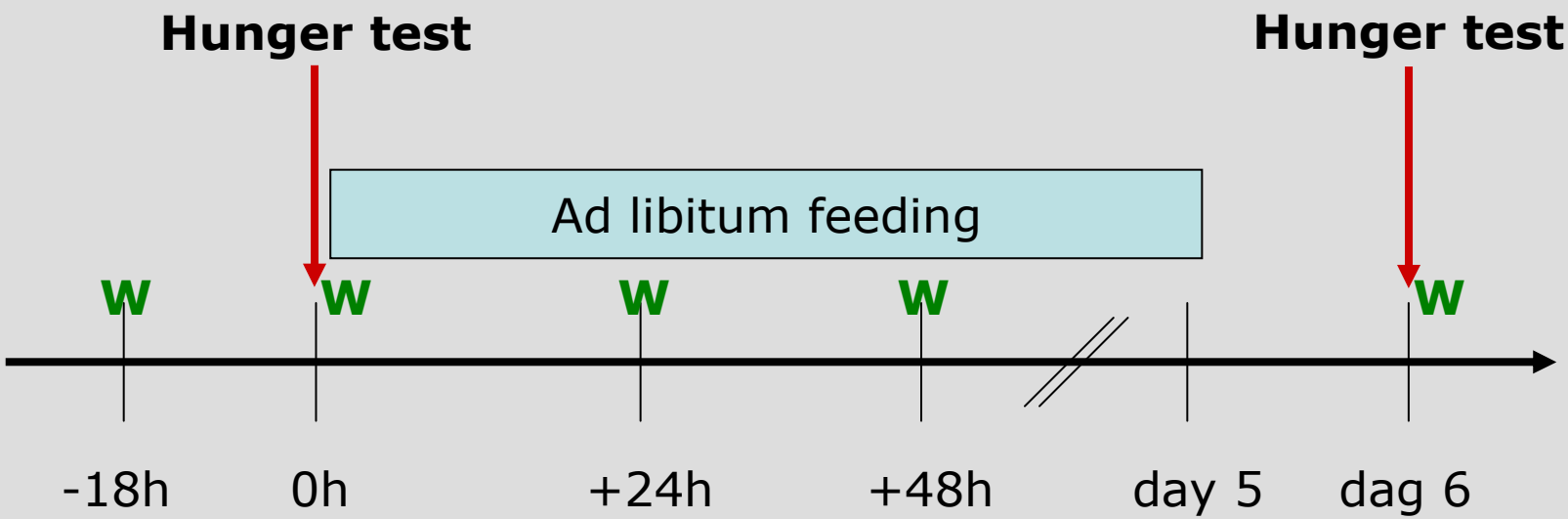
No assessment of behaviour or welfare !!

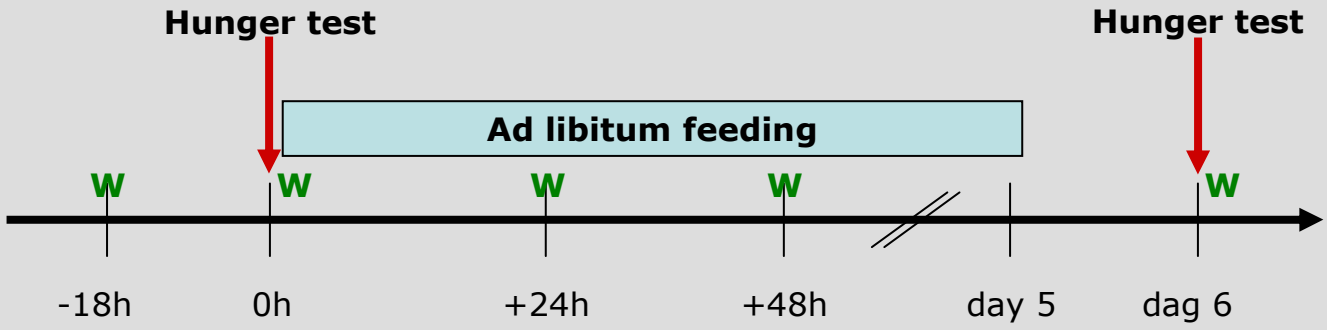
Type and amount of fibre for female broiler breeders

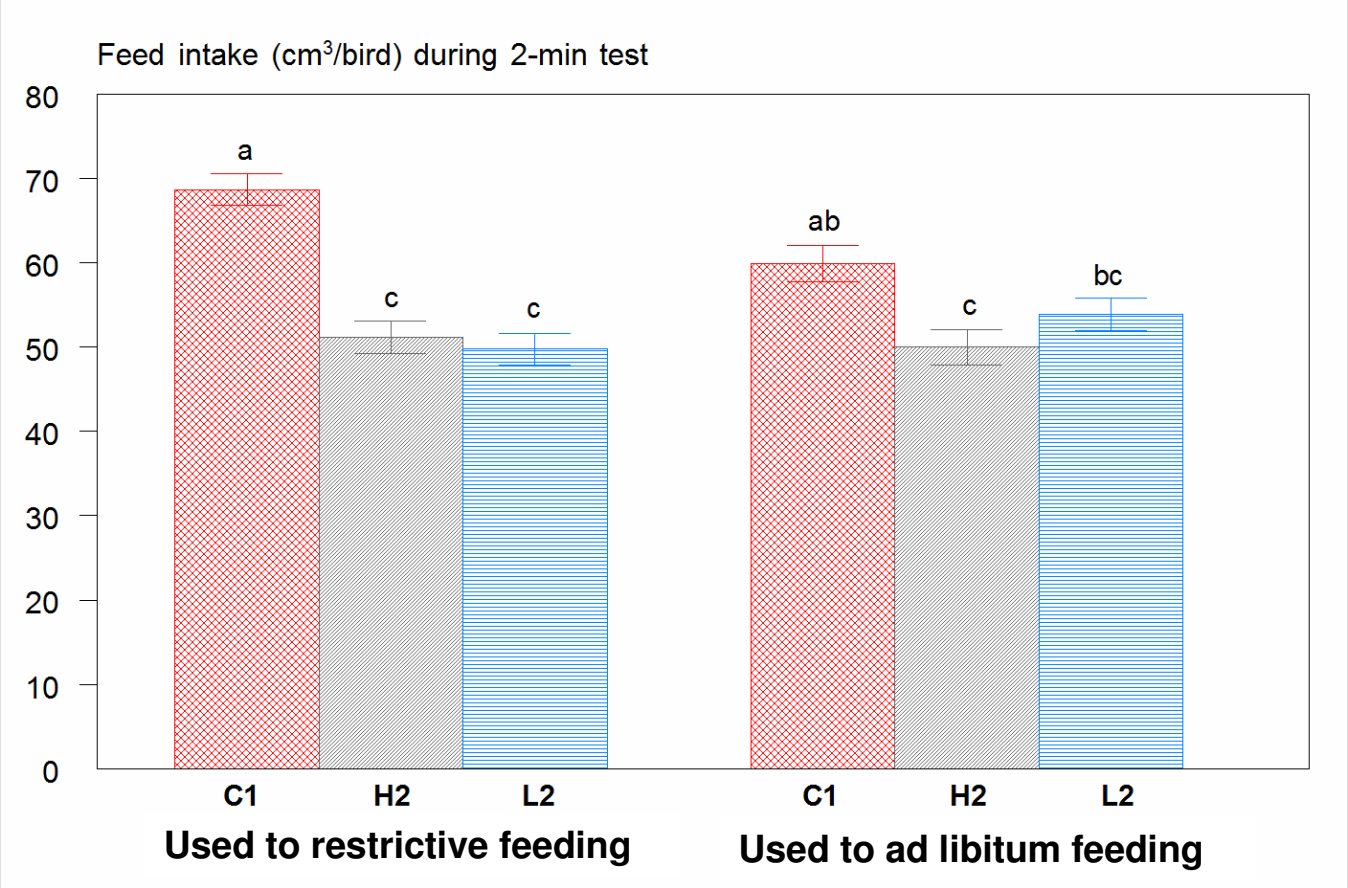


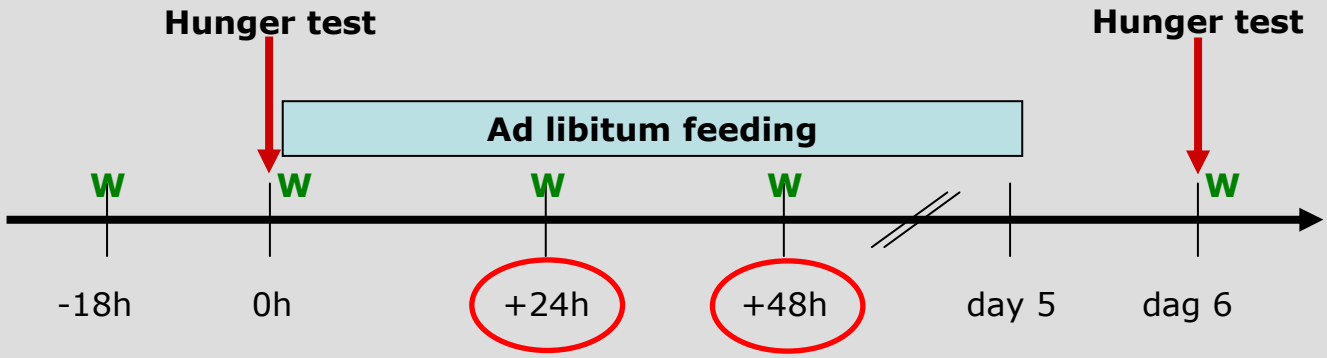
Nielsen *et al.*, Animal vol. 5 (2011)

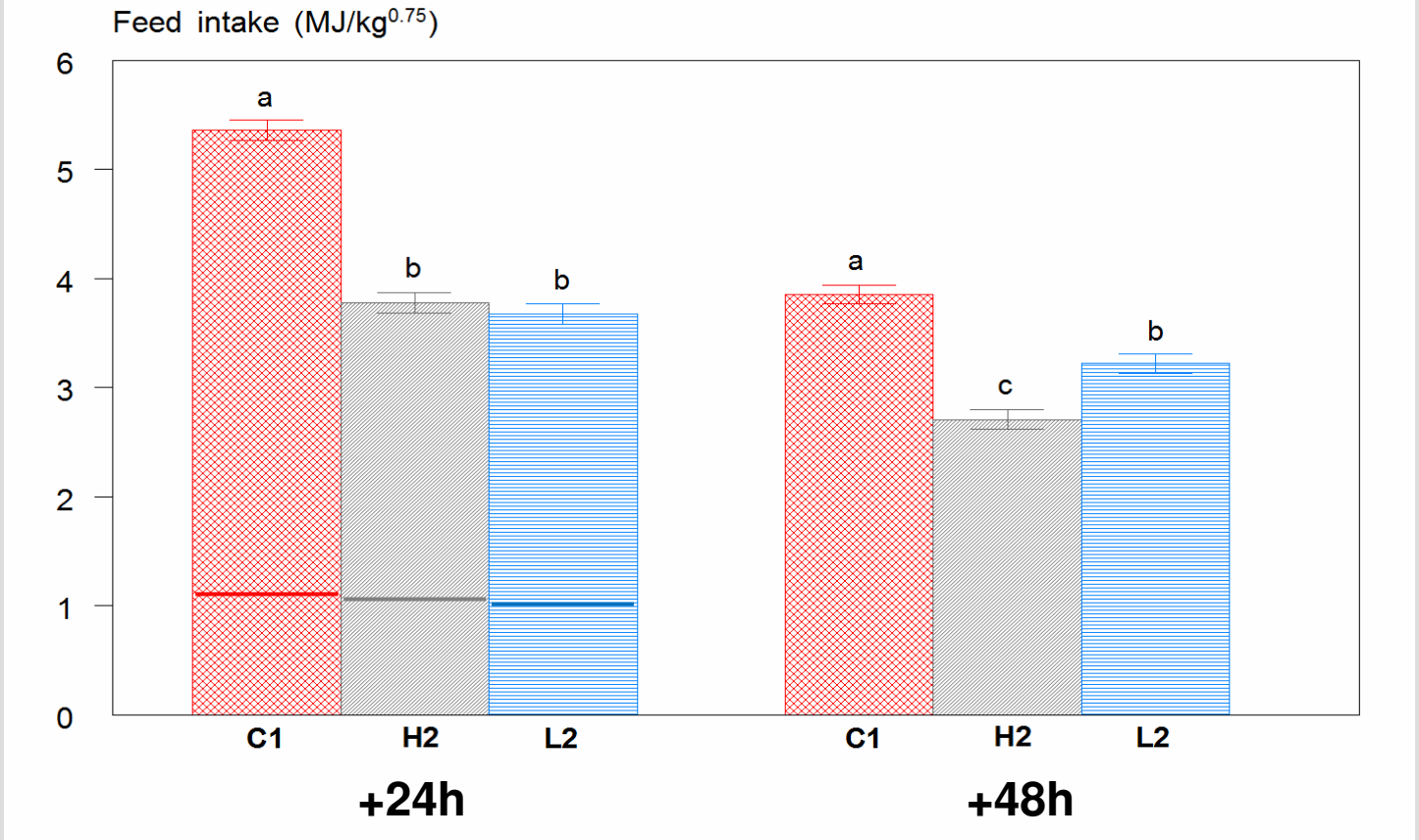
Pair-wise hunger tests




Hunger test
Hunger test
Ad libitum feeding
W
W
W
W
W
-18h
0h
+24h
+48h
day 5
dag 6


Feed intake (cm3/bird) during 2-min test
80
70
60
50
40
30
20
10
0
a
c
c
ab
c
bc
C1
H2
L2
C1
H2
L2
Used to restrictive feeding
Used to ad libitum feeding


Hunger test
Hunger test
Ad libitum feeding
W
W
W
W
W
-18h
0h
+24h
+48h
day 5
dag 6


Feed intake (MJ/kg0.75)
6
5
4
3
2
1
0
a
b
b
a
c
b
C1
H2
L2
C1
H2
L2
+24h
+48h

Welfare comparison

	Insoluble fibre		
+ve welfare:	**C1**	**H2**	**L2**
Most feed	o	++	++
Driest litter	+	++	o
Least hungry	o	+	+
Most foraging	o	++	o
Least tail peck	o	+	++
Most dust bathing	o	++	o
Least stereotypies	o	++	+
Gut fill - amount	o	+	
Gut fill – over time	o	++	

Restrictive feeding of parent stock

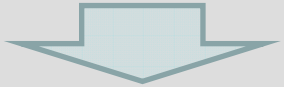
Methods to alleviate the negative consequences…?

▪More food ▪Increase fibre (inclusion, separate) ▪Appetite suppressants	**Food quality and quantity**
▪Smaller units (meals, smaller pellets) ▪Scatter feeding ▪Foraging devices, enrichment, operant ▪(Choice feeding, serial feeding) ▪(Contra-freeloading)	**Food presentation**
▪Dwarf parent stock (poultry)	**Genetics**

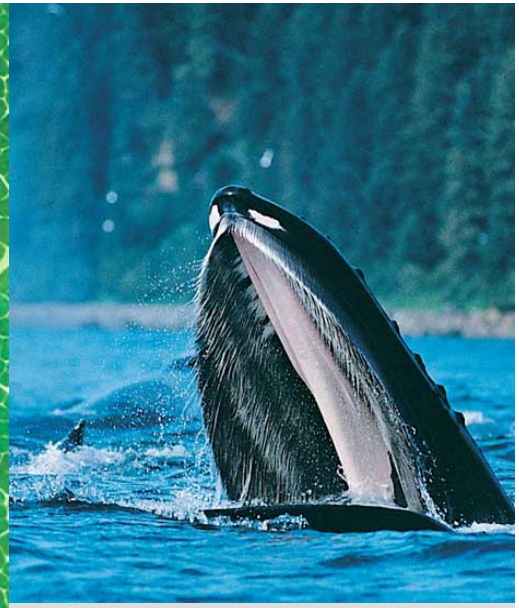
Last words (things to bear in mind) ...

- Animal welfare is an attribute of the **individual**
  – we most often deal with groups

- Measures of (feeding) behaviour
  ⇨ may reveal info on health and welfare



Differences between animals	**Changes within an animal**
• in homogenous groups • on different feeds • in different environments	• over time • due to environmental changes • due to illness



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