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Associations between tail biting and immune status in pigs

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Aim

Identify whether immune status and displaying tail biting behaviour are associated in barren and enriched housed pigs.

Take home message

- **Tail biting** and the **immune status** of pigs are (**temporarily**) **associated.**
- **Tail biters** may have a relatively **high innate immune** status.
- **Cause** and **effect** of this association remain to be elucidated.

Background

- Physiological imbalance may increase motivation to explore & forage, and thereby enhance risk of tail biting (**Fig 1**).
- In several species, relations were found between unwanted behaviours and immune responses.

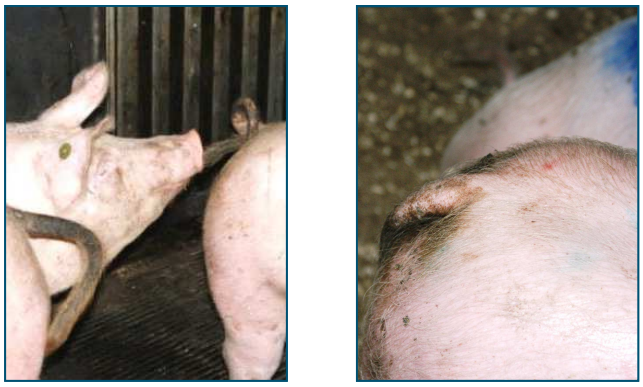

Figure 1. Tail biting in pigs (left) can result in severe tail wounds (right).

Materials and methods

- n=480 pigs, housed barren (B) or enriched (E) (**Fig 2**).
- Leukocytes, immunoglobulins (Ig) binding KLH (natural antibodies), complement activity and haptoglobin were determined at 8, 9 (three days after temporary mixing) and 22 weeks of age.
- Pigs were classified as tail biter or non-tail biter and victim or non-victim during the weaner (WP), grower (GP) and finisher phase (FP).
- Interaction between classifications led to distinction of tail biters, victims, tail biter/victims, and neutrals.

Figure 2. Pigs kept barren (left) or enriched (right).

Results

- Tail biters had **lower haptoglobin** levels in w8 (B: GP P<0.05) (**Fig 3A**), w9 and w22 compared to non-tail biters (E: FP P<0.05 and 0.10, respectively) (**Fig 3B**).
- B tail biters had a **higher increase** in **haptoglobin** after mixing than non-tail biters (GP P<0.01) (**Fig 3A**).
- B tail biters in FP had **higher classical** complement activity in w8 (P<0.01) and w9 (P<0.10) than non-tail biters (**Fig 3C**).
- E tail biters in FP had **lower alternative** complement activity in w9 with the **highest reduction** after mixing compared to non-tail biters (both P<0.05) (**Fig 3D**).
- Tail biters had generally **highest IgG** titers and B tail biters tended to have a **higher increase** from w8-9 (**Table**).
- **Leukocyte** levels were **not** evidently associated with tail biting.
- **Immune** status was **not** evidently associated with tail biting observed in the **weaner phase.**

IgG	Biter	Victim	Biter/Victim	Neutral	B	V	BxV
B housing GP							
IgG w8 (titer)	2.9	2.8	3.1	2.7			
IgG w9 (titer)	**3.6**	3.1	**3.4**	3.1	**		
IgG w22 (titer)	4.6	4.7	4.8	4.5			
Δ w9-w8 IgG	*0.8*	**0.2**	**0.3**	0.4	+	*	
E housing FP							
IgG w8 (titer)	**5.3**[a]	2.7[b]	2.8[b]	3.0[b]	*	*	*
IgG w9 (titer)	5.1	3.4	3.2	3.6			
IgG w22 (titer)	*4.2*	5.1	*4.4*	5.1	+		
Δ w9-w8 IgG	-0.2	0.7	0.5	0.6			

+ P<0.10; * P<0.05; ** P<0.01

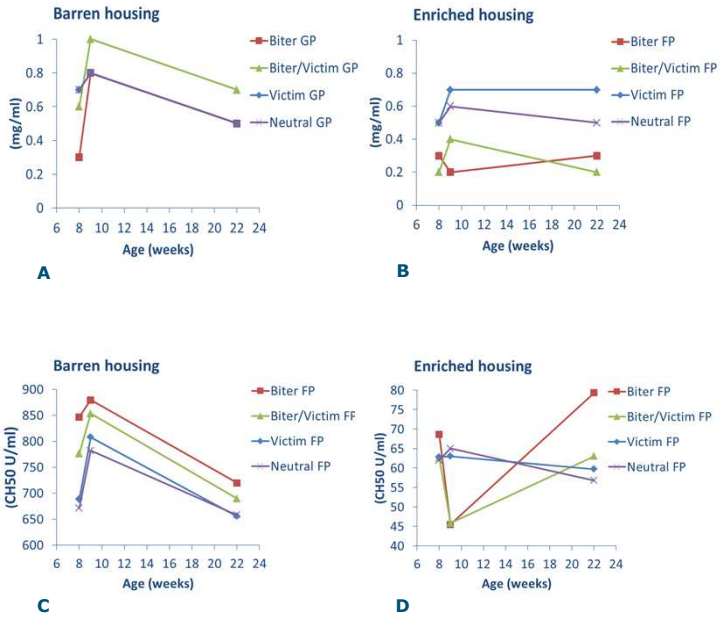

Figure 3. A: Haptoglobin levels in barren housed grower pigs;
B: **Haptoglobin** levels in enriched housed finisher pigs;
C: **Classical** complement activity in barren housed finisher pigs;
D: **Alternative** complement activity in enriched housed finisher pigs.

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