



## Correction

# Correction: Early Changes in Microbial Colonization Selectively Modulate Intestinal Enzymes, but Not Inducible Heat Shock Proteins in Young Adult Swine

The *PLOS ONE* Staff

Tables 1, 2, 3, and 4, and Supporting Information Table 4 are incorrect. The author has provided corrected versions of Tables 1, 2, 3, and 4, and Table S4, which can be viewed below.

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**Table 1. Zootechnical data and plasma  $\alpha$ -acid glycoprotein and haptoglobin concentrations in pigs born to control or antibiotics-treated sows and slaughtered at different ages (LSmeans and SEM, n = 9-12 per treatment and age).**

	Sow's treatment			Offspring's age			Antibiotics			Statistics (P = ) <sup>1</sup>			
	Control	Control	Control	d14	d28	d42	d14	d28	d42	SEM	treat.	age	treat.*age
<b>Performance</b>													
Birth BW (kg)	1.46	1.52	1.43	1.64	1.66	1.62	1.64	1.66	1.62	0.08	0.15	0.30	0.72
Slaughter BW (kg)	4.5	8.7	14.2	4.5	8.3	13.3	4.5	8.3	13.3	0.8	0.34	<0.0001	0.63
Daily BW gain (g)	222	254	286	216	253	283	216	253	283	15	0.86	0.0004	0.98
<b>Plasma proteins of inflammation</b>													
$\alpha$ -Acid glycoprotein ( $\mu$ g/mL)	905	722	994	839	756	950	839	756	950	54	0.58	0.001	0.63
Haptoglobin ( $\mu$ g/mL)	579	896	1038	760	234	1262	760	234	1262	386	0.79	0.29	0.43

<sup>1</sup>treat.: Treatment of sows pre- and post-partum (control versus antibiotics); age (d14 and d28, unweaned; d42 weaned at d28); treat.

\*age: treatment by age interaction.  
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**Table 2. Morphology of the jejunum of pigs born from control or antibiotics-treated sows and slaughtered at different ages (LSmeans and SEM, n = 9-12 per treatment and age).**

	Control				Antibiotics				Statistics (P = ) <sup>1</sup>			
	d14	d28	d42	d42	d14	d28	d42	d42	SEM	treat.	age	treat.*age
<b>Jejunum</b>												
Villous height (VH, $\mu\text{m}$ )	556	427	421	492	390	453	24	0.27	2.4	0.27	<0.0001	0.13
Villous width ( $\mu\text{m}$ )	112	147	161	115	143	163	4.6	0.96	4.6	0.96	<0.0001	0.75
Villous surface area ( $\mu\text{m}^2$ , x $10^3$ )	55.2	52.7	60.9	48.9	47.9	64.3	2.9	0.31	2.9	0.31	0.0004	0.22
Crypt depth (CD, $\mu\text{m}$ )	194	229	403	173	277	374	2.6	0.97	2.6	0.97	<0.0001	0.29
Crypt width ( $\mu\text{m}$ )	35.6 <sup>c</sup>	42.7 <sup>b</sup>	52.0 <sup>a</sup>	40.2 <sup>b</sup>	48.0 <sup>a</sup>	49.4 <sup>a</sup>	1.7	0.098	1.7	0.098	<0.0001	0.051
Crypt surface area ( $\mu\text{m}^2$ x $10^3$ )	6.6	8.8	18.6	6.6	17.0	1.3	0.49	<0.0001	0.49	<0.0001	0.11	
				12.6								
VH: CD ratio	2.94	2.04	1.34	3.01	1.76	1.67	0.19	0.82	0.19	0.82	<0.0001	0.32
Absorption surface magnif. 'M'	12.1 <sup>a</sup>	7.6 <sup>c</sup>	6.3 <sup>c</sup>	10.0 <sup>b</sup>	6.4 <sup>c</sup>	6.9 <sup>c</sup>	0.5	0.054	0.5	0.054	<0.0001	0.057
<b>Ileum</b>												
Villous height (VH, $\mu\text{m}$ )	528	280	354	507	338	348	34	0.74	34	0.74	<0.0001	0.48
Villous width ( $\mu\text{m}$ )	113	106	151	109	115	145	4.5	0.98	4.5	0.98	<0.0001	0.16
Villous surface area ( $\mu\text{m}^2$ , x $10^3$ )	50.0	25.3	46.5	48.3	33.0	41.6	4.3	0.93	4.3	0.93	0.0002	0.33
Crypt depth (CD, $\mu\text{m}$ ) <sup>2</sup>	124 <sup>b</sup>	119 <sup>b</sup>	189 <sup>a</sup>	135 <sup>b</sup>	121 <sup>b</sup>	169 <sup>a</sup>	7	0.72	7	0.72	<0.0001	0.092
Crypt width ( $\mu\text{m}$ )	43.1	56.3	44.3	45.8	53.9	1.6	0.99	<0.0001	0.99	<0.0001	0.28	
				44.6								
Crypt surface area ( $\mu\text{m}^2$ x $10^3$ )	4.88 <sup>c</sup>	4.53 <sup>c</sup>	9.19 <sup>a</sup>	5.39 <sup>c</sup>	4.84 <sup>c</sup>	7.76 <sup>b</sup>	0.45	0.59	0.45	0.59	<0.0001	0.068
VH: CD ratio	4.34	2.39	1.92	3.90	2.79	2.15	0.28	0.79	0.28	0.79	<0.0001	0.30
Absorption surface magnif. 'M'	10.2	5.8	5.4	9.7	6.6	5.8	0.5	0.64	0.5	0.64	<0.0001	0.52

<sup>1</sup>treat: Treatment of sows pre- and post-partum (control versus antibiotics); age (d14 and d28, unweaned; d42 weaned at d28); treat.

\*age: treatment by age interaction.

<sup>2</sup>Crypt depth: tended to be lower in ATB than CTL group at day 42 (P = 0.067).

<sup>abc</sup>: Means within rows with different letters differ (P < 0.05).

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**Table 3. Total Activities<sup>1</sup> of aminopeptidase N, dipeptidyl-peptidase IV and sucrose in the jejunum and ileum of pigs born to control or antibiotics-treated sows and slaughtered at different ages (LSmeans and SEM, n = 9-12 per treatment and age).**

Sow's treatment	Control				Antibiotics				Statistics (P = ) <sup>1</sup>				
	d14	d28	d42	d14	d28	d42	d14	d28	d42	SEM	treat.	age	treat.*age
<b>Jejunum</b>													
Aminopeptidase N (APN)	10.1	10.9	10.3	9.4	8.4	8.1	8.1	8.4	8.1	1.4	0.13	0.92	0.75
Dipeptidyl-peptidase IV (DPP-IV)	0.82	0.80	0.73	0.71	0.77	1.05	0.71	0.77	1.05	0.11	0.53	0.48	0.13
Sucrose	2.9	3.2	1.2	3.0	3.0	1.6	3.0	3.0	1.6	0.6	0.83	0.014	0.88
<b>Ileum</b>													
Aminopeptidase N (APN)	8.3 <sup>b</sup>	9.8 <sup>ab</sup>	12.6 <sup>a</sup>	6.1 <sup>b</sup>	11.9 <sup>a</sup>	10.2 <sup>ab</sup>	6.1 <sup>b</sup>	11.9 <sup>a</sup>	10.2 <sup>ab</sup>	1.1	0.38	0.0006	0.070
Dipeptidyl-peptidase IV (DPP-IV)	3.65 <sup>a</sup>	1.78 <sup>b</sup>	1.89 <sup>b</sup>	2.77 <sup>ab</sup>	3.28 <sup>a</sup>	2.37 <sup>ab</sup>	2.77 <sup>ab</sup>	3.28 <sup>a</sup>	2.37 <sup>ab</sup>	0.47	0.37	0.075	0.047
Sucrose (log)	-0.09	0.47	0.62	-0.41	0.50	0.55	-0.41	0.50	0.55	0.11	0.20	<0.0001	0.027

<sup>1</sup>Total activity (μmoles/min/g mucosa); x 10<sup>-3</sup> for DPP-IV.

<sup>2</sup>treat.: Treatment of sows pre- and post-partum (control versus antibiotics); age (d14 and d28, unweaned; d42 weaned at d28); treat.\*age: treatment by age interaction.

<sup>a,b</sup>Means within rows with different letters differ (P < 0.05).

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**Table 4. Protein expression of heat shock proteins and heat shock factor-1 in intestinal tissues of pigs born to control or antibiotics-treated sows and slaughtered at different ages (LSmeans and SEM, n = 9-12 per treatment and age).**

Sow's treatment	Control				Antibiotics				Statistics (P = ) <sup>1</sup>				
	d14	d28	d42	d14	d28	d42	d14	d28	d42	SEM	treat.	age	treat.*age
<b>Jejunum</b>													
HSP27/b-Actin	0.97	1.08	1.20	0.89	0.91	1.02	0.89	0.91	1.02	0.12	0.17	0.30	0.90
HSP70/b-Actin	0.61	0.74	0.81	0.52	0.59	0.63	0.52	0.59	0.63	0.07	0.031	0.12	0.84
<b>Ileum</b>													
HSP27/b-Actin	0.77	0.38	0.82	0.53	0.68	0.61	0.53	0.68	0.61	0.15	0.69	0.46	0.12
HSC70/b-Actin	0.82	0.76	0.75	1.04	1.12	0.73	1.04	1.12	0.73	0.11	0.050	0.11	0.23
HSP60/b-Actin	0.62	0.31	0.54	0.70	0.64	0.72	0.70	0.64	0.72	0.12	0.07	0.25	0.58
HSF1/b-Actin	0.33	0.38	0.41	0.33	0.31	0.41	0.33	0.31	0.41	0.08	0.69	0.51	0.87

<sup>1</sup>treat.: Treatment of sows pre- and post-partum (control versus antibiotics); age (d14 and d28, unweaned; d42 weaned at d28); treat.

\*age: treatment by age interaction.

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## Supporting Information

**Table S4.** mRNA relative expression levels of heat shock proteins in ileal tissue of pigs born to control or antibiotics-treated sows and slaughtered at different ages (LSmeans and SEM, n = 9–12 per treatment). (DOCX)

## Reference

1. Arnal M-E, Zhang J, Messori S, Bosi P, Smidt H, et al. (2014) Early Changes in Microbial Colonization Selectively Modulate Intestinal Enzymes, but Not Inducible Heat Shock Proteins in Young Adult Swine. PLoS ONE 9(2): e87967. doi:10.1371/journal.pone.0087967