

Intermittent suckling improves galactose absorption in weanling pigs

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EAAP 2014 Session 7:

Feeding (and management) to improve gut barrier function and immunity in livestock



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Outline

- Background
 - Issues associated with weaning
 - Intermittent suckling
- Hypothesis
- Results and Discussion
- Conclusion
- Benefits to Industry
- Future Research



Background

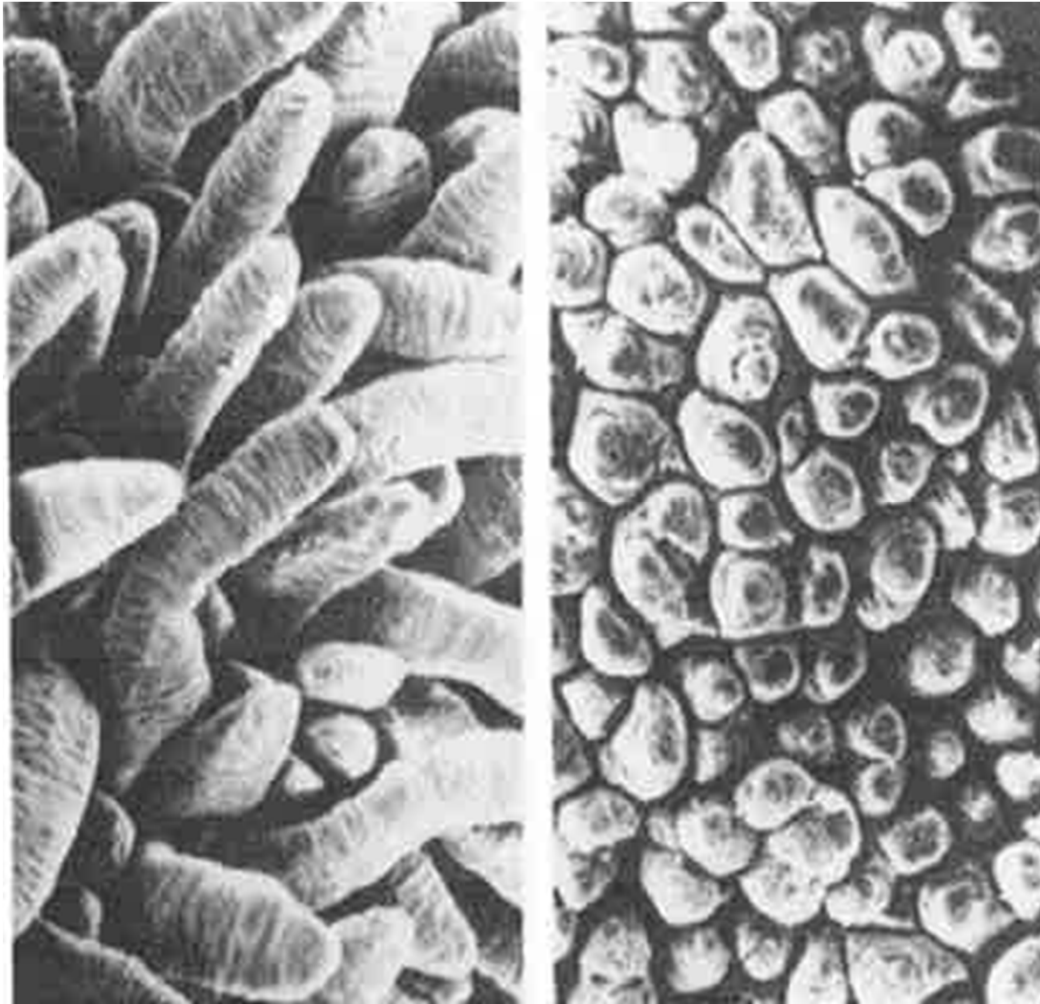
Weaning of piglets is stressful

Sudden changes in diet and environment



Solid feed intake

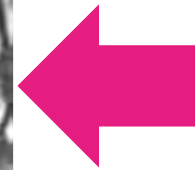
Background



Day 21 suckling

Day 28 weaned

Low feed
intake =
gut
damage



Background

↓ Solid feed intake



- Reduced growth (“growth check”)
- Gastrointestinal disease and dysfunction

↑ Morbidity and mortality

↓ Efficiency of Production

Background

Intermittent suckling = type of gradual weaning



↓ Adaptation time to weaning = ↑ Gastrointestinal tract health?

Measuring Gastrointestinal Health???

Two sugar absorption tests:



From Cera *et al.*, (1988)

Mannitol

Galactose

Mannitol Absorption



Absorption

=

Passive

Higher plasma mannitol concentration

=

Greater intestinal surface area

Galactose Absorption



Absorption

=

Passive + Active

Higher plasma galactose concentration

=

Improved intestinal function

Hypothesis



Intermittent suckling

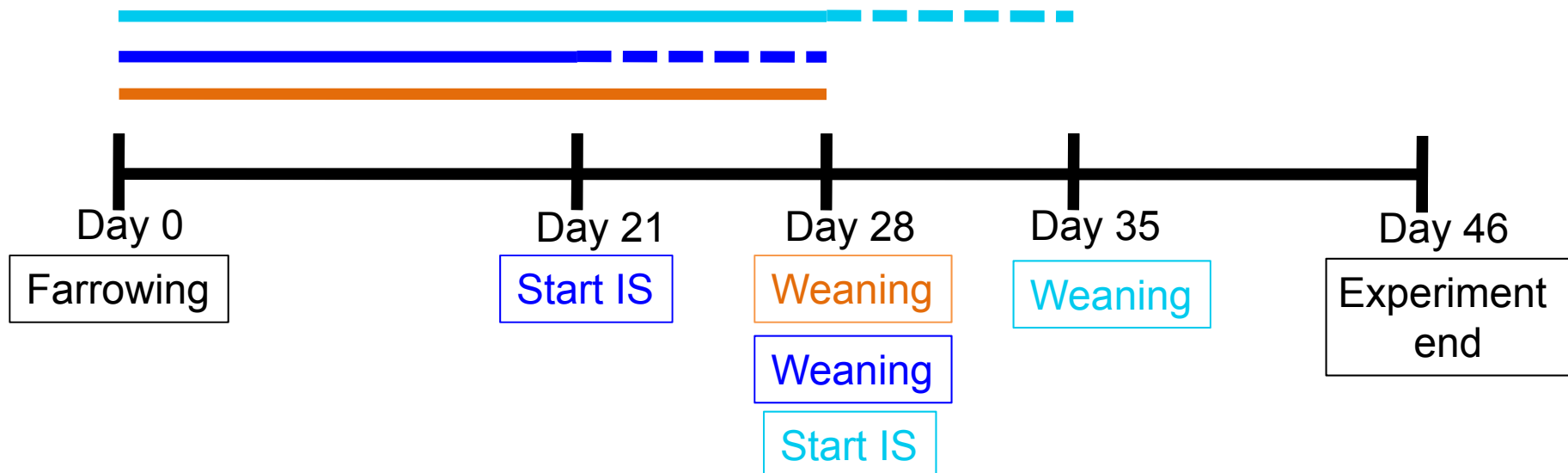


↑ Gastrointestinal
absorptive
capacity
of mannitol and
galactose

Materials and Methods

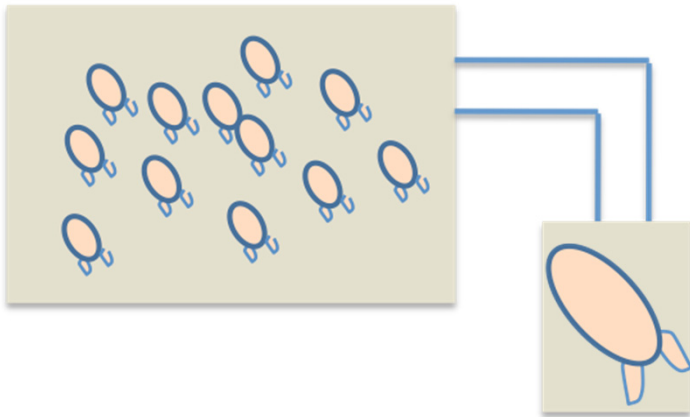
Thirty-six gilt litters were allocated to 1 of 3 weaning regimes:

- Control, **CW28 (n=9)** – continuous access to the sow until weaning at day 28
- Two intermittent suckling (IS) treatments:
 - **IS21 (n=9)** – intermittent suckling starting at day 21 until weaning at day 28
 - **IS28 (n=9)** – intermittent suckling starting at day 28 until weaning at day 35



Materials and Methods

- Creep feed offered *ad libitum* from 10 days of age
- Intermittent suckling treatment groups:



8am to 4pm for 7 days before weaning



Materials and Methods

1 piglet per litter (n=9) = 10% mannitol (5ml/kg) orally

3 DAYS PREWEANING

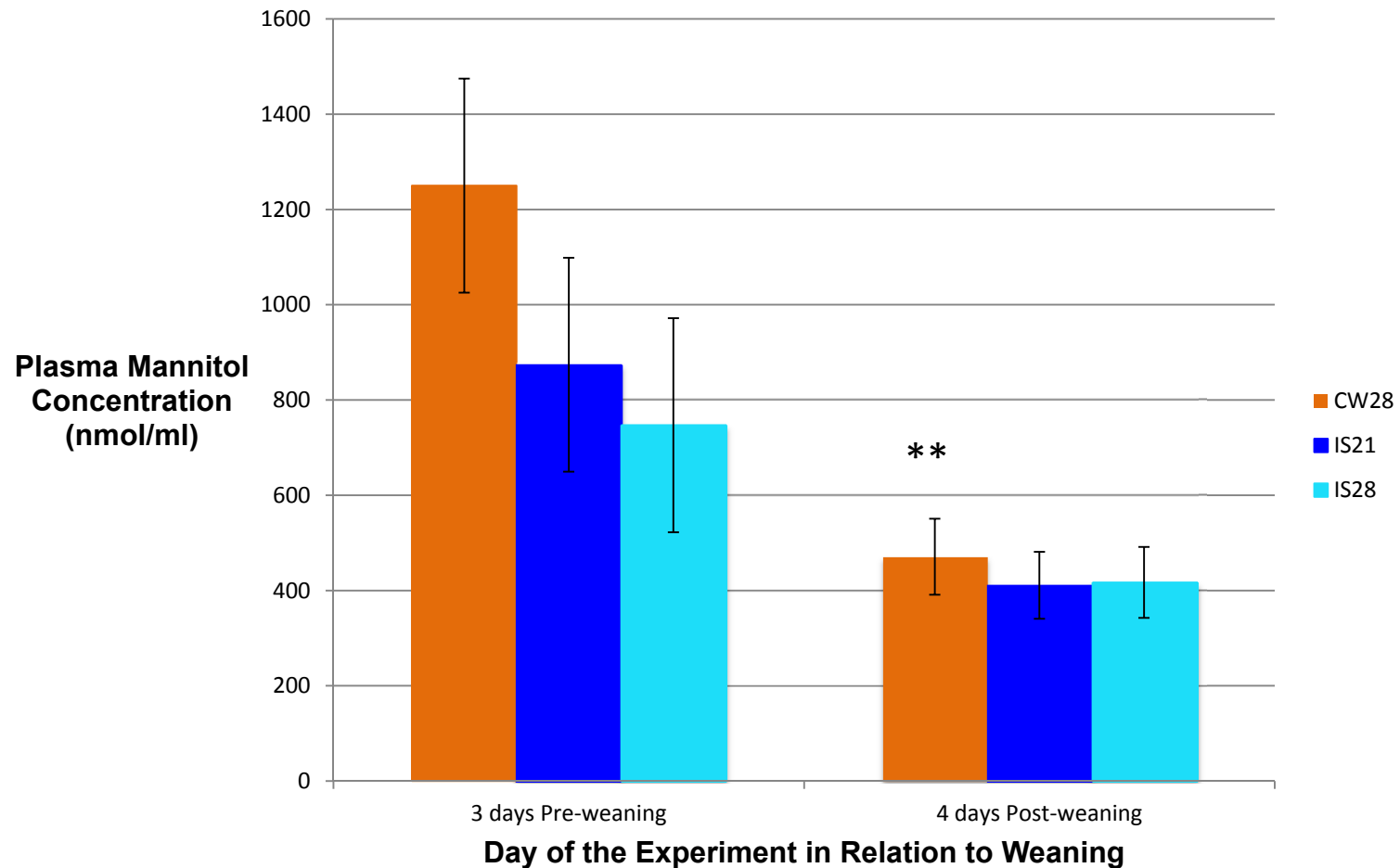
4 DAYS POSTWEANING

1 piglet per litter (n=9) = 10% galactose (5ml/kg) orally

4 DAYS POSTWEANING

Results and Discussion

Mannitol absorption before and after weaning

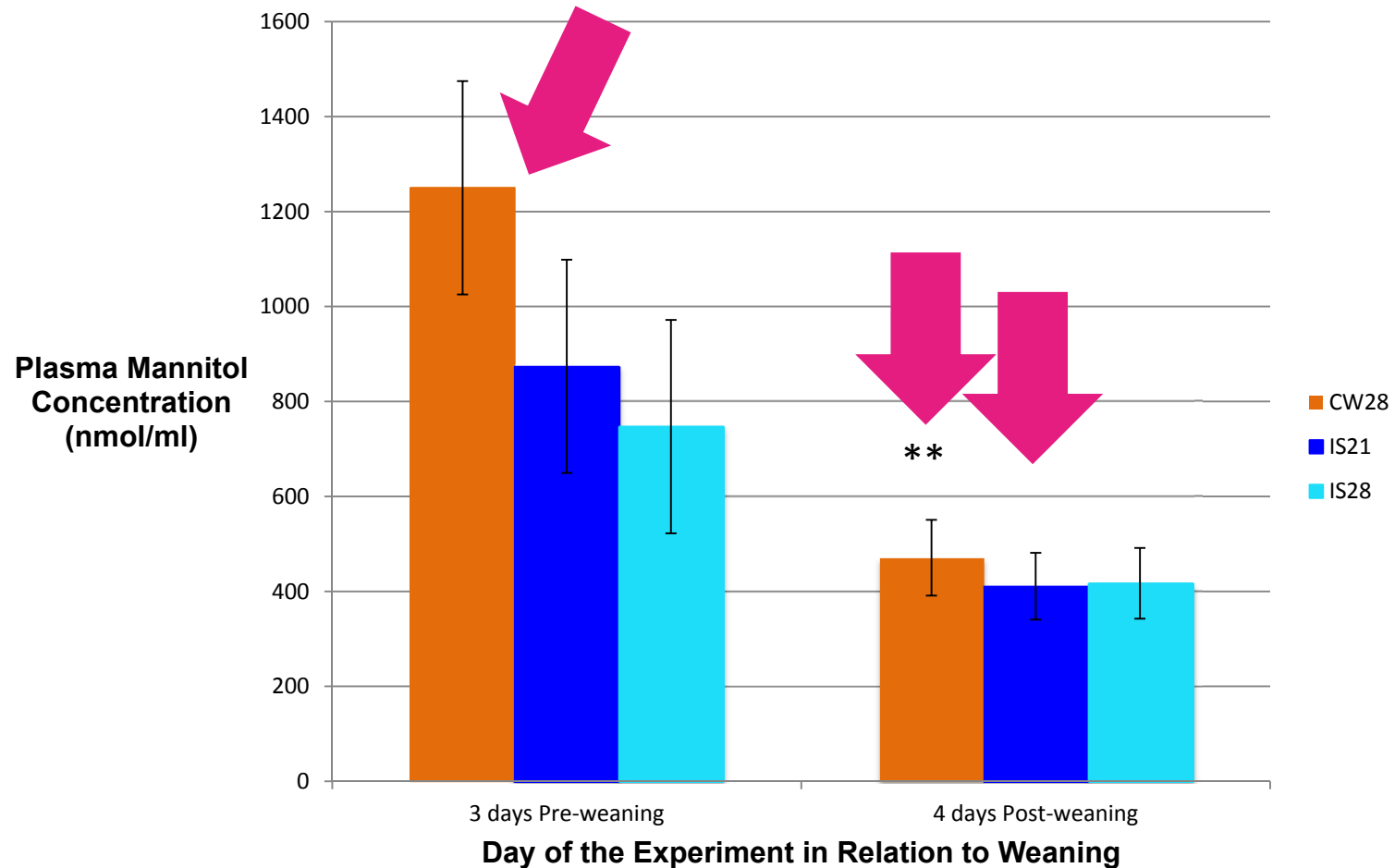


Higher plasma mannitol concentration

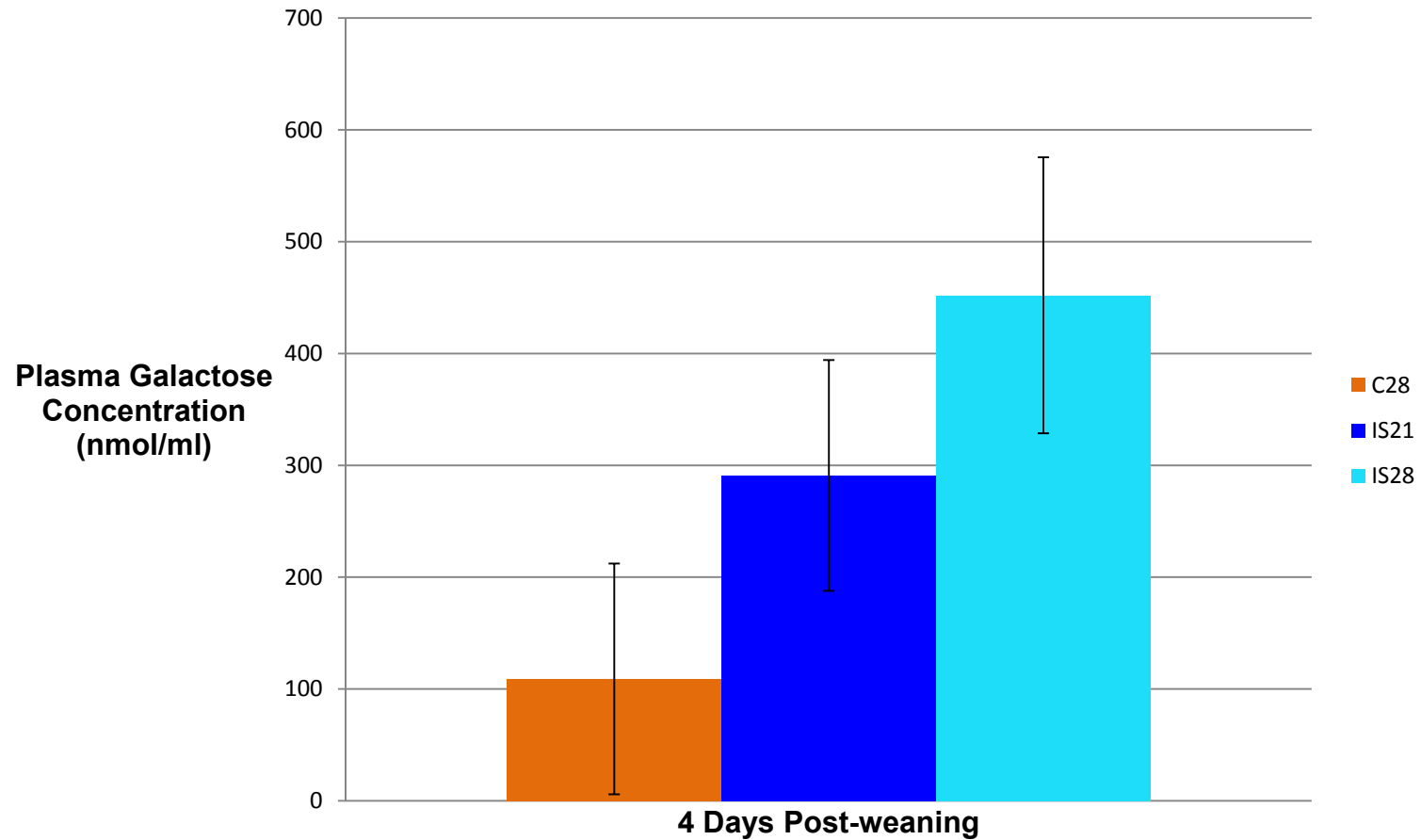
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Greater intestinal surface area

Mannitol absorption before and after weaning



Galactose absorption after weaning

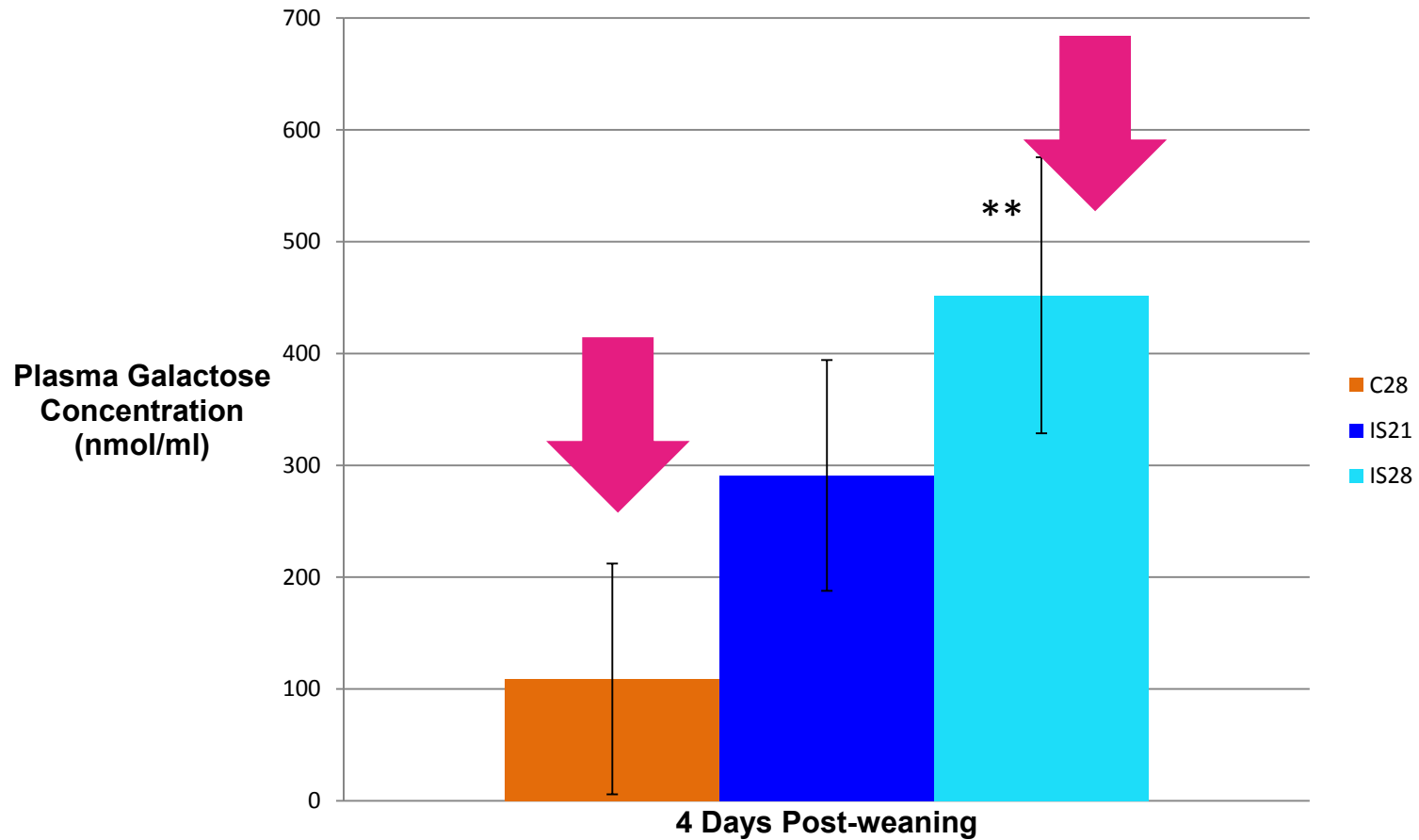


Higher plasma galactose concentration



Improved intestinal function

Galactose absorption after weaning



Conclusions



Intermittent suckling



Older weaning age



↑ Gastrointestinal absorptive capacity of mannitol ✗

↑ Gastrointestinal absorptive capacity of galactose ✓

Industry Implications

Improved gastrointestinal function



- Better performance of pigs after weaning
- ↓ Health risks associated with weaning



Efficiency of Production



<http://www.dookie.unimelb.edu.au>

Future Research

- Examine further the effect intermittent suckling has on gastrointestinal function and integrity
- Understand the mechanisms behind this potential improvement in gastrointestinal function



Thank you



References

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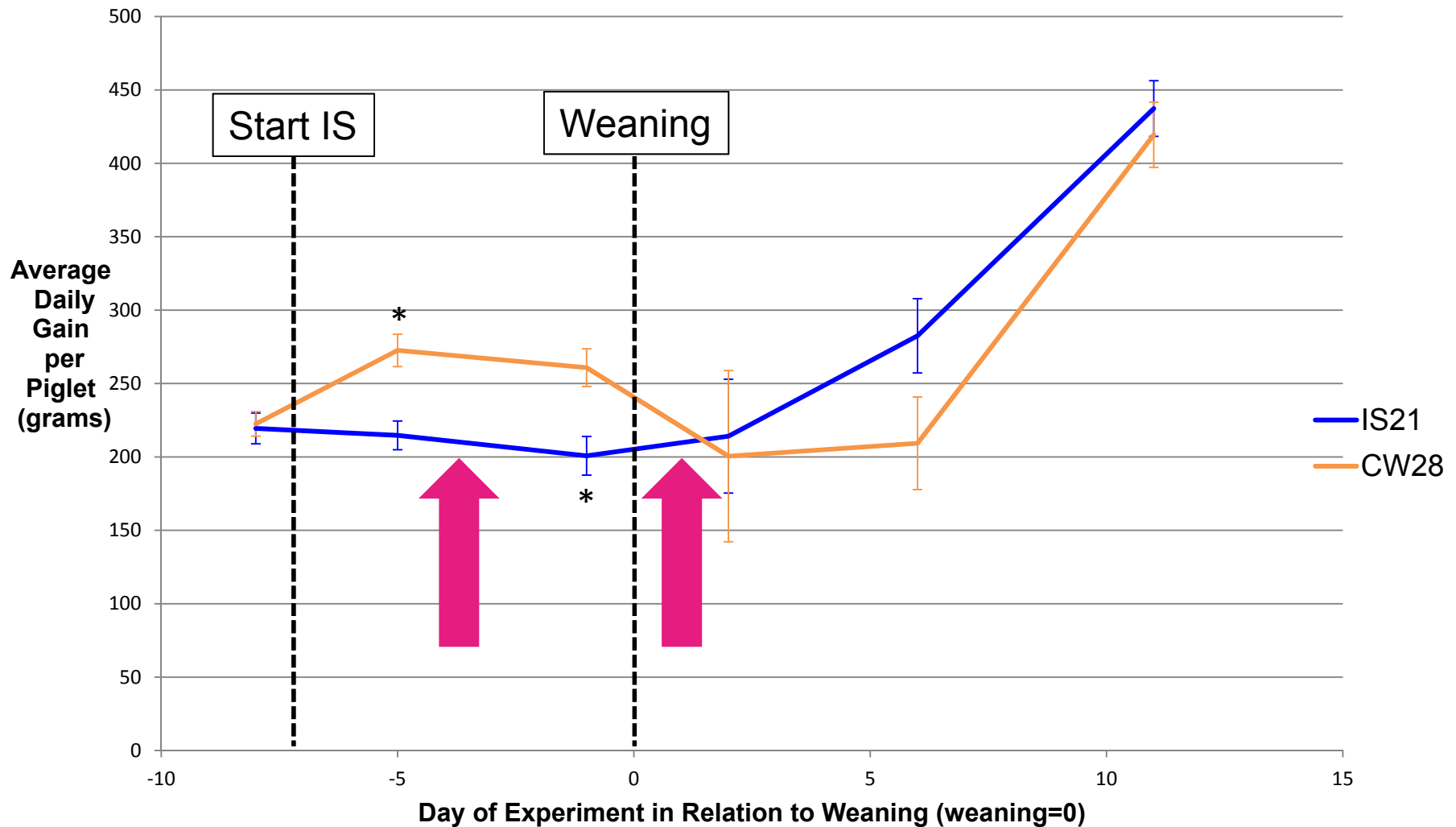


- Weighing and creep feed days - d13, 20, 27, 30, 34, 37, 41 and 46
- At d46 of age, body weights were similar ($P>0.05$) across treatments (14.2 ± 2.4 kg).

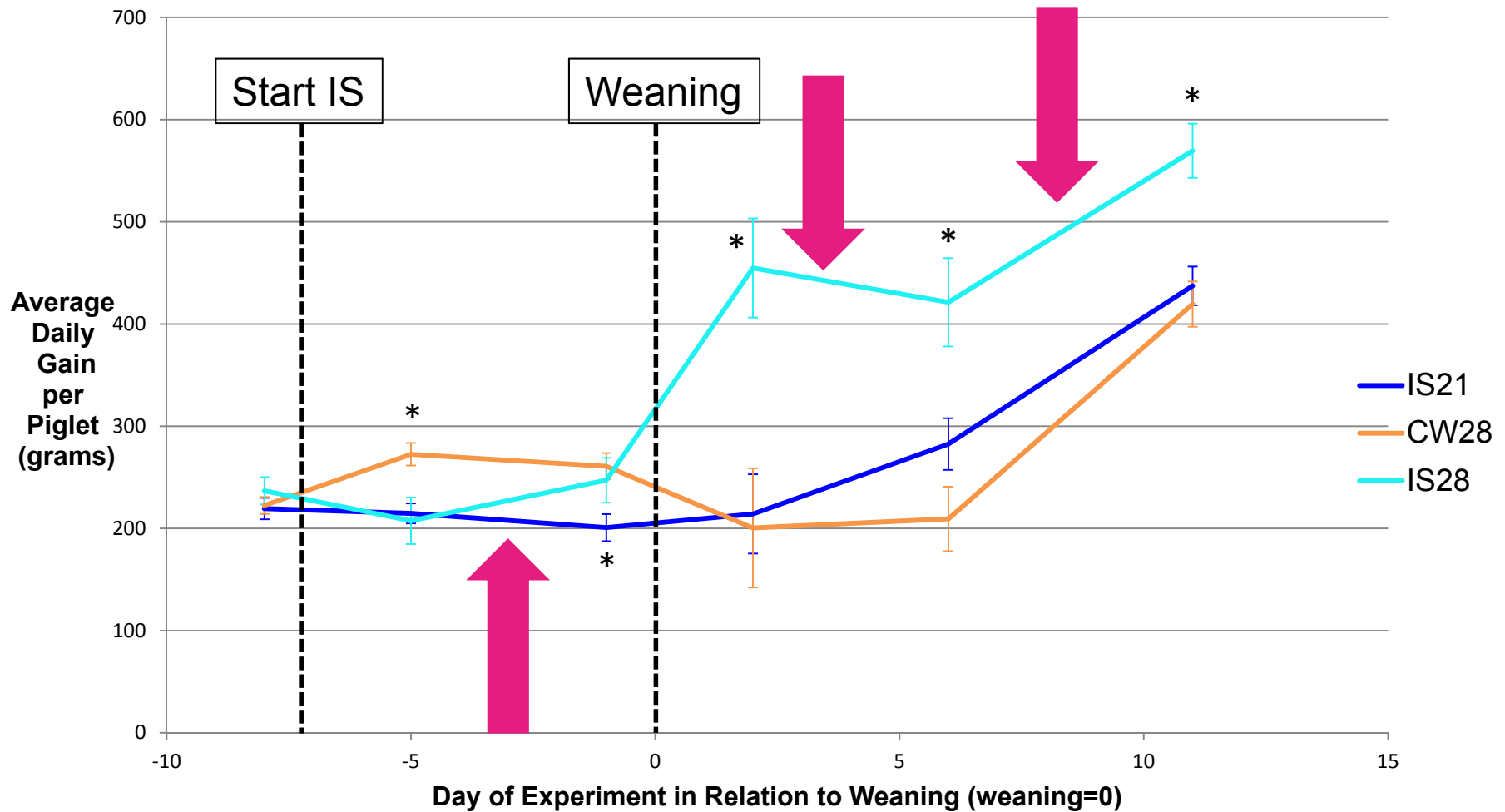


	Treatment				P value
	CW28 ¹ (n=14)	IS21 (n=14)	IS28 (n=13)	SEM	
ADG, g					
Day 5 - d 1 pre-weaning	261 ^a	201 ^b	247 ^{ab}	10.1	0.038
First 2 d post-weaning	200 ^a	214 ^a	455 ^b	29.5	<0.001
Days 2-6 post-weaning	209 ^a	283 ^a	421 ^b	20.2	<0.001
Weaning weight, kg	7.4 ^{ax}	6.8 ^{ax}	8.3 ^{by}	0.16	0.833
ADFI, g					
Day 5- d 1 pre-weaning	46 ^a	37 ^a	98 ^b	6.7	<0.001
Days 2-6 post-weaning	243 ^a	285 ^a	429 ^b	18.1	<0.001

Growth rate before and after weaning



Growth rate before and after weaning



Creep feed disappearance before and after weaning (grams per piglet)

	CW 28	IS21	IS28	SEM	P Value
1 day Pre-weaning	46 ^a	37 ^a	<u>98^b</u>	6.7	<0.001
2 days Post-weaning	102 ^a	105 ^a	<u>215^b</u>	9.6	<0.001
6 days Post-weaning	243 ^a	285 ^a	<u>429^b</u>	18.1	<0.001



Mannitol absorption before and after weaning

