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Effect of regrouping unfamiliar pigs at weaning on immune function

Abstract

Pigs weaned at 3 weeks of age and regrouped with unfamiliar individuals had a 4-fold increase in plasma cortisol when compared to pigs that remained in a litter group. However, cellular measures of immune function were not altered by regrouping.; Swine Day, Manhattan, KS, November 10, 1983

Keywords

Swine day, 1983; Kansas Agricultural Experiment Station contribution; no. 84-174-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 442; Swine; Weaning; Immunity

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K**S****U****EFFECT OF REGROUPING UNFAMILIAR
PIGS AT WEANING ON IMMUNE FUNCTION**Frank Blecha¹, D. Steven Pollmann and David A. Nichols

Summary

Pigs weaned at 3 weeks of age and regrouped with unfamiliar individuals had a 4-fold increase in plasma cortisol when compared to pigs that remained in a litter group. However, cellular measures of immune function were not altered by regrouping.

Introduction

Weaning pigs at an early age can increase the productive potential of modern swine management systems. However, little is known about the physiological maturity of the young pigs cellular immune system and even less is known about how different management stressors may impact on that disease defense mechanism. Our earlier studies have shown that weaning pigs at 2 and 3 weeks of age lowers cellular immune reactivity. Rarely are pigs weaned and not regrouped with individuals from different litters. However, some evidence has shown that regrouping unfamiliar individuals is detrimental to immune function in laboratory rodents. Therefore, the objective of this experiment was to determine whether regrouping unfamiliar pigs at weaning influences cellular immune function.

Experimental Procedure

The first trial used 32 pigs from 4 litters. At 3 weeks of age all pigs were bled (day 0). Twenty-four hours later half of each litter was weaned and mixed with nonlittermate pigs in pen sizes of 4. The other 4 pigs from each litter were removed from their sows but remained in a litter group as nonmixed controls. Behavioral observations (seconds of biting) were recorded on the mixed pigs for 1-hour immediately after mixing. At the end of the behavioral observation a blood sample was obtained (day 1) from all pigs and PHA was injected intradermally into the flank for a subsequent skin-test evaluation. One day after mixing (day 2) a blood sample (day 7) a final blood sample was obtained from all pigs. Plasma cortisol levels were determined on samples for day 0, 1 and 7. PHA skin-test responses were calculated as the difference in flank thickness from day 1 and day 2. Lymphocyte blastogenic responses to PHA, Concanavalin A (Con A) and Pokeweed mitogen (PWM) were determined on day 0 and day 2 samples. Because weaning was confounded with regrouping in the above experiment a second identical trial was conducted with 5-week-old pigs weaned at 3 weeks of age.

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Results and Discussion

The effect of regrouping unfamiliar pigs on plasma concentration is shown in figure 1.

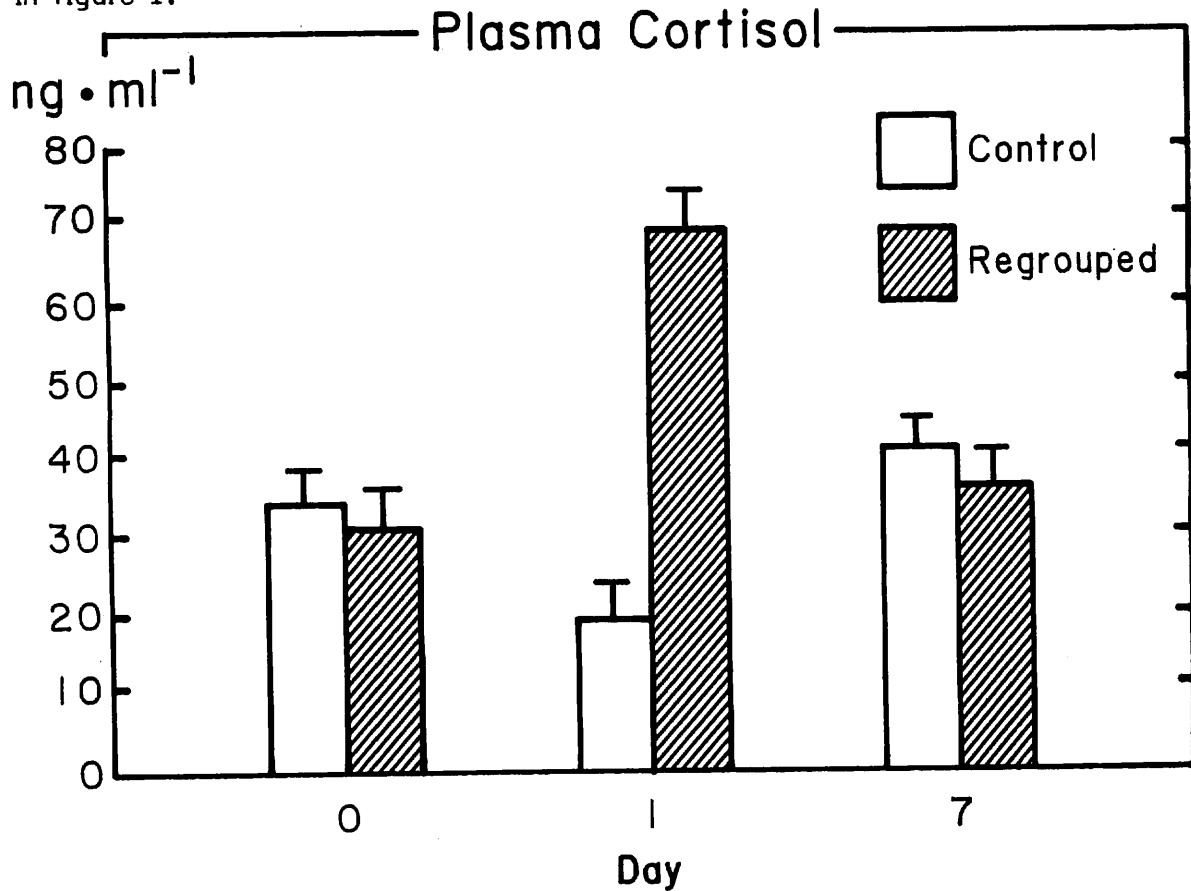


Figure 1. Plasma cortisol concentrations in control and regrouped 3-week old pigs. Day 1 samples were taken 1-hr after regrouping.

Regrouping unfamiliar pigs resulted in a 4-fold increase in plasma cortisol. However, plasma cortisol levels were not correlated with agonistic behavior. Further, neither measure of immune function was altered by regrouping (Table 1) or correlated with plasma cortisol levels.

Table 1. PHA Skin-Test Response and Lymphocyte Blastogenesis in Regrouped and Control Pigs.

Treatment	PHA skin-test Flank Thickness (Δ mm)	Item					
		Lymphocyte Blastogenesis (cpm $\times 10^3$)					
		PHA		ConA		PWM	
		day 0	day 2	day 0	day 2	day 0	day 2
Regrouped	6.57 \pm .33 ^a	373 ^b	340	289	236	284	267
Control	6.14 \pm .41	363	314	278	215	304	264

^aMean \pm SE

^bMean; pooled SE = 18

Although statistical analyses on the second trial are forthcoming, the raw data suggest the same interpretation as the first trial, i.e., that regrouping on weaning pigs is not immunosuppressive.

These studies demonstrate that regrouping of unfamiliar pigs at or near weaning is not immunosuppressive. We are beginning experiments designed to determine whether various management alterations (creep feeding and drug-induced immunostimulation) can reduce weaning-induced immunosuppression in young pigs.