Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 10 *Swine Day (1968-2014)*

Article 239

1982

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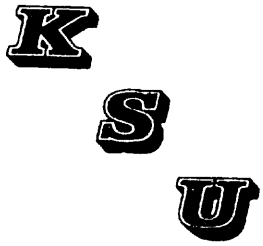

Cell-Mediated Immunity in Weaned Pigs

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Summary

The stress of weaning lowers cellular immune reactivity in 2-, 3- and 4-week-old pigs. However, pigs weaned at 5 weeks of age do not exhibit altered cell-mediated immune reactivity. Those changes could alter disease susceptibility in young pigs.

Introduction

Despite the common conception that weaning may trigger disease outbreaks in pigs, there have been few experiments on the influence of weaning on cellular immune functions. Additionally, trends toward younger weaning ages have imposed a management stressor on the young pig at a time when it is not physiologically mature and thus may be immunologically vulnerable to many disease pathogens. Therefore, the objective of this study was to evaluate the influence of weaning, in 4 different ages of pigs, on cellular immune function.

Procedure

One hundred and eighteen crossbred pigs were used to determine the effect of weaning at different ages on cell-mediated immunity. Pigs within litter were allotted on the basis of weight at 2, 3, 4 and 5 weeks of age to a weaned or nonweaned control group. Weaned pigs were housed in nursery pens in litter groups; nonweaned pigs remained on the sows as controls.

In vivo cell-mediated immunity was evaluated by a skin-test response to the mitogen phytohemagglutinin. Intradermal injections of phytohemmagglutinin or a saline control were given at weaning and the increase in skinfold thickness was measured 24 hours later. Additionally, the proliferative response of peripheral blood lymphocytes to mitogenic stimulation was evaluated at weaning and 24-hours later by a lymphocyte blastogenesis assay.

Results and Discussion

Pigs weaned earlier than 5 weeks of age had suppressed skin-test reactions to phytohemagglutinin and lower lymphocyte proliferative responses.

Pigs weaned at 2 and 3 weeks of age had skin-test responses 32 and 16% lower ($P<.001$) than nonweaned controls. Pigs weaned at 4 weeks of age responded 14% less ($P<.05$) to phytohemagglutinin intradermal injection than did nonweaned littermates. Control and weaned pigs 5 weeks old responded similarly to phytohemagglutinin skin testing.

The effect of weaning on the proliferative response of lymphocytes to phytohemagglutinin is shown in figure 1.

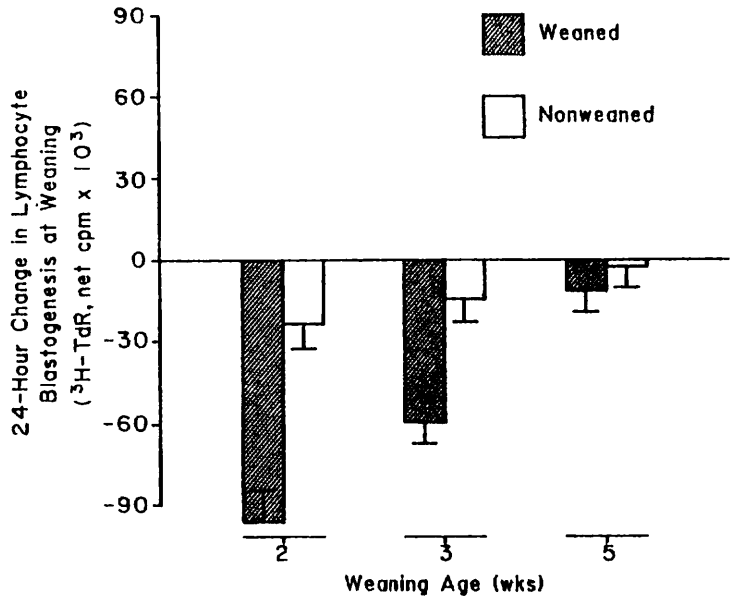

Figure 1. Phytohemagglutinin lymphocyte blastogenesis of pigs weaned at 2, 3 or 5 weeks of age. Values are reported as 24-hour post weaning blastogenesis sample minus the preweaning blastogenesis sample.

Lymphocyte blastogenic responses to phytohemagglutinin were decreased ($P<.01$) in pigs weaned at 2 and 3 weeks of age. However, weaning had no effect on phytohemagglutinin-induced blastogenesis in 5-week old pigs. These data suggest that pigs younger than 5 weeks of age are immunologically compromised by the stress of weaning.