RESEARCH ABSTRACT

PORK SAFETY

Title: Immunomodulatory and Growth Effects of the Seaweed *Ascophyllum nodosum* in Pigs – **NPB #00-063**

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Abstract:

A series of *in vitro* studies was conducted to evaluate the effect of *A. nodosum* extract (**ANE**) on activation of pig splenocytes and alveolar macrophages. In the first set of studies, splenocytes and macrophages were incubated with concentrations of **ANE** from .1-100 μg/mL. Concentrations of TNFα and PGE_2 were evaluated as measures of macrophage activation and interleukin 10 (IL-10) and interferon gamma (INFγ) were evaluated as measures of splenic lymphocyte activation. As positive controls, macrophages were stimulated with bacterial lipopolysaccharide (LPS) and splenocytes were incubated with the mitogen concanavalin A (Con A). **ANE** failed to stimulate secretion of PGE_2 or any cytokine by cultured immune cells. In a subsequent set of experiments, concentrations of **ANE** as high as 10 mg/mL were evaluated. Again, **ANE** did not alter IL-10 production by splenocytes. However, PGE_2 was increased ($P < .05$) relative to control wells in macrophages treated with 10 mg/mL **ANE** after 3 and 24 hours in culture. The results of our *in vitro* studies demonstrate conclusively that **ANE**, when presented directly to immune cells across a wide range of concentrations, generally failed to activate macrophages and lymphocytes. These immune cells are key players in both cell-mediated and antibody-mediated immune function. Very high concentrations of **ANE** enhanced production of the inflammatory mediator PGE_2, but never to the degree achieved by bacterial LPS.

An *in vivo* study also was conducted with dietary **ANE**. A total of 95 pigs (initially 15 lb and 17 d of age) was used in a 28 d growth experiment to determine the effects of **ANE** on weanling pig growth performance and immune function in response to enteric disease challenge with *Salmonella typhimurium* (**ST**). Experimental treatments were arranged in a 2 x 4 factorial with main effects of disease challenge (control vs. **ST** challenge) and dietary addition of **ANE** (0, 0.5, 1.0, and 2.0% of diet). Results suggest little beneficial effect of dietary **ANE** on growth performance or immune response in the presence or absence of **ST** challenge.