



The Journal of Nutrition Vol. 128 No. 10 October 1998, pp. 1657-1660.

Pretreatment of Young Pigs with Vitamin E Attenuates the Elevation in Plasma Interleukin-6 and Cortisol Caused by a Challenge Dose of Lipopolysaccharide

Douglas M. Webel, Donald C. Mahan^{*}, Rodney W. Johnson, and David H. Baker

Department of Animal Sciences and Division of Nutritional Sciences, University of Illinois, Urbana, IL 61801 and

^{*} Department of Animal Sciences, Ohio State University, Columbus, OH 43210

ABSTRACT

The effect of a short-term, high-dose intramuscular injection of *d*- α -tocopherol was studied in pigs given a challenge dose of lipopolysaccharide (LPS). Twenty-four pigs surgically fitted with jugular catheters were used in a 2 \times 2 factorial design. Pigs received either 0 or 600 mg *d*- α -tocopherol by intramuscular injection for 3 d before receiving an intraperitoneal injection of saline containing either 0 or 5 μ g/kg body weight *Escherichia coli* LPS. Blood was collected from indwelling jugular catheters at 0, 1, 2, 4, 6, 8, 12 and 24 h after injection of LPS. Plasma α -tocopherol levels were 13-fold greater ($P < 0.01$) at time 0 in pigs pretreated with 600 I.U. *d*- α -tocopherol (9.9 ± 1.3 mg/L) than in those not treated with *d*- α -tocopherol (0.74 ± 0.09 mg/L). Injection of LPS increased ($P < 0.05$) plasma levels of interleukin-6 (IL-6) and cortisol at 2-h postinjection, regardless of vitamin E treatment. However, pigs that received α -tocopherol before the LPS challenge had substantially lower ($P < 0.05$) peak levels of IL-6 and cortisol than pigs not receiving α -tocopherol. These results suggest that supplementation with a surfeit level of vitamin E reduces the response of pigs to endotoxin.

Commentary by STUART

A summary sentence in the manuscript stated: "Stress such as weaning may induce excessive production of pro-inflammatory cytokines; their reduction by vitamin E supplementation may result in improved survival and growth performance of pigs during the critical first week after weaning."

This study demonstrated that injecting weaning pigs with a biologically available source of vitamin E dramatically increased vitamin E status by 13-fold that resulted in lower plasma cortisol and IL-6 levels after LPS injection which should result in improved post-weaning survival and growth performance.

Vitamin E injectable used in the study was **VITAL E[®]-300**. **VITAL E[®]-500** has same bioavailability as VITAL E-300 with 66% more vitamin E per ml (data on file).

Not all injectable vitamin E products have equal bioavailability. Generic "knock-offs" sold under various labels have little or no bioavailability. **VITAL E[®]-500** is bioavailable. Remember that "cheaper does not always mean more economical."

Oral supplementation with 400 I.U. *d*- α -tocopherol/gallon drinking water (**EMCELLE[®] TOCOPHEROL**, STUART) has also been shown to maintain serum vitamin E levels in pigs after weaning. Both injectable and oral source of vitamin E may be used in combination to insure adequate vitamin E-status during the critical post-weaning period.