

Dietary *n*-3 fatty acids reduce lymphocyte proliferation in broiler chickens

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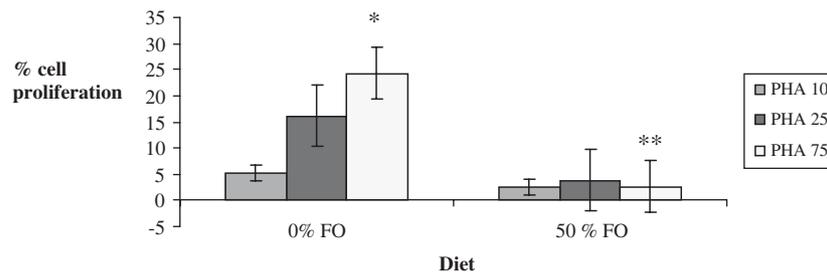
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There has been interest in the enrichment of poultry meat with long-chain *n*-3 PUFA as a means of increasing their consumption by human subjects. There is some concern that high levels of *n*-3 PUFA may have detrimental effects on immune function in chickens. However, research to date is inconsistent with respect to immunomodulation by *n*-3 PUFA. The aim of this experiment was to determine the effects of dietary *n*-3 PUFA on the proliferation of splenocytes, thymocytes and peripheral blood leucocytes in broiler chickens.

One-day-old male Ross 308 broiler chicks (*n* 24) were fed a common starter diet for 21 d. At 21 d, birds were randomly allocated to one of two pens, twelve chicks per pen. Water and feed were provided *ad libitum*. The broilers were fed for 33 d on one of two wheat–soyabean meal-based diets. Both diets contained 50 g/kg added oil, which was either fish oil (FO) or soya oil. Chickens between 41 and 43 d of age were sacrificed and lymphocytes from freshly collected spleen, thymus and blood were prepared. Concanavalin A (Con A), phytohaemagglutinin (PHA) and *Staphylococcus aureus* (PANSORBIN)-stimulated proliferation of splenocytes, thymocytes and blood leucocytes was assessed by carboxyfluorescein succinimidyl ester incorporation using flow cytometry. Results were analysed using CellQuest[®] software of flow cytometry and the WEASEL programme (from Walter & Eliza Hall Institute).

FO significantly inhibited the splenocyte response to Con A (10 µg/ml), PHA (75 µg/ml), and *S. aureus* (8 × 10⁵ bacteria per well) compared with the control diet (*P*<0.05) (see Figure for PHA-stimulated proliferation). FO also inhibited the proliferative response of thymocytes to Con A (*P*<0.05) and of peripheral blood leucocytes to *S. aureus* (*P*<0.05).

Impact of dietary fishmeal (0-50g/Kg) on PHA-mediated splenocytes proliferation of broiler chickens



In conclusion, feeding broiler chickens a diet containing 50 g/kg FO significantly reduced *in vitro* proliferation of splenocytes, thymocytes and blood leucocytes. These studies highlight the need for the poultry industry to consider the health status of poultry when poultry meat is being enriched with long chain *n*-3 PUFA.

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