

Inhibition of adrenal steroidogenesis and heat shock protein 70 induction in neonatally feed restricted broiler chickens under heat stress condition.

ABSTRACT

This study was conducted to determine the roles of plasma corticosterone concentration (CORT) and heat shock protein 70 (Hsp70) expression in the acquisition of thermotolerance in broiler chickens subjected to neonatal feed restriction. Equal numbers of chicks were divided into one of the four feeding regimens: ad libitum (control), 60% feed restriction on days 4, 5 and 6 (FR60), 60% feed restriction on days 4, 5 and 6 + 1500 mg/kg metyrapone (FR60M) and 60% feed restriction on days 4, 5 and 6 + 1500 mg/kg quercetin (FR60Q). From 35 to 42 days of age, all birds were exposed to $37 \pm 1^\circ\text{C}$ and 70-80% relative humidity for 3 h/day. The neonatal feed restriction elevated heterophil to lymphocyte ratios (HLR), CORT and Hsp70 expression in FR60 chicks. The FR60M and FR60Q treatments suppressed CORT and Hsp70 expression, respectively. Subjecting birds to FR60 improved feed conversion ratio (FCR) and body weight gain, and reduced HLR when compared to controls in response to heat exposure. Following heat exposure, the HLR and weight gain of FR60M and control birds were not significantly different. Although FR60Q chickens had improved FCR and weight gain, their HLR were similar to controls following heat exposure. The control birds had significantly lower CORT than other groups in response to heat exposure. The Hsp70 expression of FR60 and FR60Q birds was lower than those of control and FR60M groups. It is concluded that Hsp70 expression did not appear to be a major indicator of thermotolerance acquisition in neonatally manipulated broiler chickens.

Keyword: Broiler chickens; Neonatal feed restriction; Heat shock protein.