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ABSTRACTS

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Multigenerational effects of heat manipulation during embryogenesis on body temperature and growth in broiler chickens

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Fast-growing broilers are heat-sensitive animals, especially at slaughter age. Thermal manipulation during embryogenesis consisting in increasing incubation temperature of eggs up to 39.5°C and relative humidity (RH) to 65% for 12h/d between days 7 and 16 of incubation has been shown to improve their thermotolerance. Previous studies have demonstrated the effects of these thermal manipulations on growth, physiology and meat quality of broilers reared in semi-commercial conditions, with impacts on their metabolism, gene expression and potential epigenetic mechanisms in the long term. The present study explored the effects of this treatment during incubation on body temperature and growth in the two following generations.

Parental broiler chicken (F0; Cobb 500) were either submitted to a control incubation condition during embryogenesis (C; 37.8°C and 56% RH) or treated (T) with cyclic exposure at 39.5°C and 65% RH for 12h/d from d 7 to 16 of incubation, and the resulting chickens were raised as breeders. F1 progeny were incubated under control conditions. The resulting CC and TC chickens, respectively, were raised under standard breeder conditions and were reproduced taking into account parental origins. The resulting F2 eggs were incubated in control conditions to obtain CCC and TCC animals, raised as broiler chickens under standard conditions up to 41 days of age. Results showed no effect of incubation conditions on hatchability within each generation. In F2, there was no effect of the initial incubation treatment on body temperature at hatching, unlike in F0. However, at 5 days of age, body temperature was lower in TCC than in CCC male chickens. Growth was also altered, as demonstrated by the 8% higher body weight observed in TCC compared with CCC chickens at slaughter age. Altogether these results provide the first line of evidence of a multigenerational effect of heat stimulation during embryogenesis on growth and thermoregulation in fast-growing chickens.

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