

Temperature Stimulation of Poultry Embryos and its Impact for Later Adaptability and Performance

B. Tzschentke¹, I. Halle²

¹ *Biology, Perinatal daptation, Humboldt-University of Berlin, Berlin, Germany,* ² *Federal Research Institute for Animal Health, Institute of Animal Nutrition, Friedrich-Loeffler-Institute, Berlin, Germany*

At the end of incubation physiological mechanisms of poultry embryos are well developed. Further, qualitative changes in the maturity of physiological control systems occur. During this critical period environmental factors, like incubation temperature, can induce long-lasting imprinting of body functions to the respective environment. Further, temperature stimulations can improve the post-hatching adaptability and performance. The aims of the studies were to use chronic and short-term temperature stimulation during the last days of incubation to (1) induce long-lasting adaptation to warm and cold environment and (2) improve adaptability, hatching results and performance in poultry.

The results show, that chronic temperature experiences can induce long-lasting changes in physiological mechanisms which are related to cold or warm adaptation. Alterations were found in heat production, preferred ambient temperature, neuronal thermosensitivity and c-Fos expression in regulatory brain areas. In 8-weeks old chickens, for instance, after short-term heat load the neuronal c-Fos expression was significantly different between cold and warm incubated birds.

Both, chronic and short-term changes in incubation temperature did not reduce hatchability. But only the short-term stimulation can improve hatchability and later performance in poultry. These effects are sex-dependent and species specific. In Ross broilers, for instance, mild short-term warm stimulation significantly improves hatching rate and body weight at slaughter age exclusively in male chickens. In ducks hatchability and performance were improved by mild short-term cold stimulation. In co-operation with PasReform Hatchery Technology, NL, first results show that the effect of short-term temperature stimulations obviously depends on the age of the breeding parents, too.