**Title:** The effects of khazak yolk injection on the expression pattern of NPY in the broiler chicken

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**Introduction**

Intensive selection of poultry breeds specially for superior growth has been shown to often lead to disturbance in various body hemostatic system including energy balance regulatory pathway. Dysregulation in appetite/satiety systems may eventually result in excessive fat accumulation and cause metabolic disorders. Accordingly, compared to native chicken breeds, most of commercial lines of broilers exhibit a greater appetite when given unrestricted access to feed. Furthermore, maternal Programming effects on the offspring metabolism, appetite and brain function was also demonstrated in different types of animal models, but the underlying physiological mechanisms involved remain unclear. Importantly, it has been suggested that this hyperphagia could be due to any defect or perturbation in signal transduction pathway of the appetite regulatory mechanism. Several lines of studies have shown that the involvement of hypothalamic AMP‐activated protein kinase (AMPK) in senses and maintains whole-body energy balance by regulating expression of various metabolic pathways-related genes. Accordingly, numerous brain neuropeptides including NPY, have been shown to participate in regulation of appetite and satiety. The aim of this study was to investigate the breed specific effects of yolk component on the post-hatch performance and expression of appetite-related genes in the diencephalon region of the progeny's brain.

**Methods**

In this research, the effect of in ovo injection of egg yolk of native kahazak chicken into the egg yolk of the commercial Ross 308 strain at prior to incubation on some metabolic-related parameters were tested in the resulting progeny. The search parameters included feed intake, feed conversion ratio, some of serum biochemical parameters, malondialdehyde concentration as well as relative expression of AMP-activated protein kinase (AMPK) and Neuropeptide Y (NPY) genes in progeny's brain tissue. To achieve this goal, 320 fertile Ross 308 eggs were equally allocated in a‌ completely randomized design into two experimental groups, those injected with Khazak yolk (Test) and control group. Blood and tissue samples were collected at the end of experiment and evaluated for the parameters noted.

**Results**

In the present study, compared with the control group, khazak egg-yolk injection resulted in a significant improvement in the feed conversion ratio as well as significant decreases in serum triglyceride, triglyceride/HDL-C ratio, relative visceral fat mass content and levels of AMPK expression in the progeny's brain (P<0/05). In contrast, khazak yolk injection had no effect on the 45-day body weight, cumulative feed intake, relative brain weight, serum glucose, cholesterol and LDL-c levels but also had no effects on malondialdehyde concentration and NPY expression in progeny brain tissue. According to the results of this study, the injection of native khazak egg yolk into the yolk of the commercial Ross 308 eggs have effectively improved the feed efficiency and reduced AMPK expression in the diencephalon region of the progeny's brain.