

Scientists shake Darwin's foundation -- chickens inherited parents' stress symptoms

Evolutionary theory ever since Darwin is based on the assumption that acquired traits, such as learnt modifications of behaviour, cannot be inherited by the offspring. Now, a Swedish-Norwegian research group, led by professor Per Jensen at Linköping university in Sweden, shows that chickens can actually inherit behavioural modifications induced by stress in their parents.

The scientists grew groups of chickens under stressful conditions, where a randomly fluctuating day-night rhythm made access to food and resting perches unpredictable. This caused a marked decrease in the ability of the stressed birds to solve a spatial learning task. Remarkably, their offspring also had a decreased learning ability, in spite of being kept under non-stress conditions from the point of egg-laying. They were also more competitive and grew faster than offspring of non-stressed birds.

To investigate whether there was any genetic basis for the effect, the research group examined the expression levels of about 9000 genes in the brain of the chickens. In birds exposed to stress, there was a number of genes where the expression was either increased or decreased, and the same genes were similarly affected in the offspring.

The results therefore demonstrate that both the changes in gene function and the behavioural changes caused by stress were transferred to the offspring. Both these effects were only seen in domesticated chickens, not in the ancestor, the red junglefowl. The scientists therefore speculate that domestication may have favoured animals which are able to affect the biology of their offspring through genetic modifications.

The results offer new insights into how animal populations may be capable of adaptation to stressful environments in evolutionary short times. This can help explain both the rapid development of animals during domestication, and evolutionary responses to changing conditions in nature.

Source: Linköping university

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