Organic feed influences gene expression in chickens

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(PhysOrg.com) -- Organically fed chickens develop a different process of gene expression in their small intestines than that of chickens which get conventional feed. The organic chickens have higher expressed genes involved in the creation of cholesterol, but do not have raised cholesterol levels in their blood. This surprising conclusion was drawn by Wageningen animal researchers (The Netherlands) last month in the *British Journal of Nutrition*.

We had not expected much difference in gene expression between the two groups of chickens because the same ingredients were found in both types of feed, and these differed only in the way they are cultivated', says researcher Astrid de Greeff of Livestock Research in Lelystad. 'But it appears that another cultivation method can result in significant differences at the expression level. Much to our surprise, 49 genes seemed to be regulated differently.' The research was commissioned by the Louis Bolk Institute in Driebergen as part of a bigger research project into possible health effects of feed from different production methods.

De Greeff and her colleagues compared the gene expression of two generations of chickens which received organically cultivated feed with the gene expression of chickens which received the usual feed. They isolated RNA from the small intestines of the chickens. The amount of RNA is a measurement of the expression of a particular gene. The RNA of the organically fed chickens was labelled with a green colour; the RNA of the conventional chickens had a red label. Both RNA's were

brought together in a micro-array which comprises almost all chicken genes, and comparison was carried out. De Greeff compared pairs of five organically fed chickens and five conventionally fed chickens. She concluded afterwards that there were significant differences in expression.

A differential expression of 49 genes among a total of twenty thousand chicken genes may seem subtle, says De Greeff. But if you consider the fact that the cultivation method is the only difference in the feed, this is in fact a big difference. Moreover, seven of the 49 genes are involved in cholesterol biosynthesis, when only thirty genes are involved in total in the process.

What happens biologically when these genes become expressed higher is still unknown. 'Cholesterol is a building material for many substances, such as hormones. We don't know yet what the cholesterol does in the chickens.'

Provided by Wageningen University